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Success factors in commercial property projects: the contractor's perspective

Master of Science Thesis in the Master's Program Design and Construction Project Management

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Gothenburg, Sweden 2014
Master's Thesis 2014:7

MASTER'S THESIS 2014:7

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Examensarbete / Institutionen för bygg- och miljöteknik,
Chalmers tekniska högskola 2014:7

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Cover: Picture of construction site outside Gothenburg city. A picture of construction workers working late shift with assembly of building framework.

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ABSTRACT

Profitability is central for many companies concern. Many projects in the construction industry can be considered a success in terms of quality and time. This study investigates factors that affect profitability in commercial property projects, by taking the contractors perspective and only focusing on the profitability. Literature supports that there are four main categories that affect profitability: project related factors, external related factors, human related factors and project management related factors. Key players in the construction project are project managers and production managers, therefore we have chosen to interview people in those roles connected to 20 projects during 16 interviews. Through interviews, study visits and exercises we have made a ranking list of factors that affect profitability.

Key words: Profitability, construction, project, production, management, team

Contents

Preface

In this case study, interviews have been performed with twenty employees, involved in sixteen projects, within Skanska. The projects have been carried out within the last couple of years. The interviews have been carried out from January 2013 to May 2013. The interviews are a part of a master thesis that is a case study, which investigate if there are any connections between construction projects that succeed financially, and projects that did not succeed financially; all in the perspective of a construction company. The case study is carried out in the Skanska region of Gothenburg, district of commercial properties, Sweden, and the Department of Civil and Environmental Engineering, Division of Construction Management, Chalmers university of technology, Sweden. The case study is partly financed by Skanska Sverige AB.

Professor Per-Erik Josephson was the supervisor at Chalmers, District manager Christian Wieland and Project manager Lars Gustavsson as guiding supervisors at Skanska. All interviews were carried out within Skanska and the district of commercial properties Gothenburg, and only considered projects that have been carried out within the district of commercial properties in Gothenburg.

We are highly thankful, and appreciate the help and feedback we received from Per-Erik Josephson, Christian Wieland and Lars Gustavsson during the work with this master thesis. We want to thank “Stisse” for the feedback and being our “sounding board”. Finally, thanks to all the interviewees, who gave their time and effort in making this master thesis possible.

Göteborg december 2013

Henrik Liljedahl och Jon Möller

1 Introduction

A construction project may be considered more or less successful, depending on who´s point of view you are looking at it from. Hopefully, all those stakeholders involved in the project are satisfied, but they will however, all have different measurements of what a success is. The contractor wants to gain as much profit as possible from the project. However, today's large contractors must be sustainable and take in many factors that must be fulfilled before they can reach profitability. They have to put their focus on a lot of other things, such as environment, customers, external stakeholders, employees, safety, quality and many other issues, issues that need to be taken care of, and at the same time, keep up the process and try to make a reasonable profit.

A common problem in the construction industry is that every project is unique. The "wheel has to be invented again and again" with every new project. So should there be unique ways of making a profit every time? Or would it be possible to benchmark projects, and find common factors in those projects that affect the profitability?

If we did a bench marking study on one of the largest actor on the Swedish construction market and if the case study is benchmarking the very best performed projects, and the projects that did not all succeed to deliver, of course in the terms of profitability, would it then be possible to clarify if there are any clear patterns, and if there may be common factors. Would it also be possible to rank these factors by the level of importance in order to gain profitability? One problem though, is that other factors such as employees and safety may not be considered.

So, if we benchmark projects and also interview people from project organizations, we should find and rank the most important factors that affect profitability in a sustainable way.

This master thesis focuses on a regional business unit, within a large publicity traded construction company, and present factors affecting profitability in commercial property projects. The thesis is based upon interviews with project managers and production managers in 24 completed constructions project performed by the case company.

1.1 Purpose

The aim with this master thesis is to find and present critical success factors from profitable and non-profitable commercial property projects that affect profitability. The master thesis is based upon a construction contractor´s perspective. The aim is further divided in three research questions

- What makes some of the investigate company's projects profitable?
- Which common factors can be found in profitable finished projects?
- Which avoidable factors can be found in non-profitable finished projects?

The master thesis is limited to look only at construction projects, every completed project within the last five year, in a commercial construction business unit, in the Gothenburg region, within an international publicly listed company.

The master thesis uses interviews as its research approach. Data is collected from parts of the project and production management team from commercial construction

projects. The size of the master's work is 30 credits, and the execution time limit is five months. The focus is only on factors that may affect the profitability of a commercial construction project.

2 Project success factors

The theoretical framework gives an introduction to project success, and further explains the concept of success and profitability in the context of a construction project. It also explains why certain factors affect profitability in the construction project. It provides a broad base towards understanding the research topic, profitability in a construction project and describes significant terms being used.

2.1 Project Success

The term ´project success` is frequently used within the context of project management literature, and a search for the term project success, in the literature, gives you several vague definitions. Ashley et al. (1987) believes that over-achieving the expected expectations, are the answer to project success, de Wit (1986) and Truman (1986) view project success as more of meeting specifications and requirements in a more technical approach, while Liu and Walker (1998) argue that project success is complex to achieve, because all stakeholders in a project have different perceptions of success, and how expectations of project success are met. So it is a difficult job, undertaking and defining and achieving project success, but it is found to be an important concept.

Baccarini (1999) argues that the project management literature mixes elements of project success interchangeably, by using both product success and project management success as similar meanings of project success. Product success is more of meeting the clients project objective, the goal of the project, fulfilling the end users needs, the purpose, and satisfying stakeholders to the project's final product, when used. Project management success is to be considered a process during the project life and characterized by the assessment of the well known project managing triangle, cost and time and quality (Atkinson, 1999). On the other hand projects may be considered a failure even when delivery of those constraints is met. Project management success is therefore also about the actual quality of the process and the success or failure of meeting the stakeholders needs connected to the project management process (Baccarini, 1999).

There is no sole formulated perspective of project success, which applies to all parties in a project, nor when or how it is achieved. Project success needs to be carefully defined, and stated from whose perspective, and after what goal and purpose, in order to satisfy all project participants' viewpoint of success, according to Sanvido et al. (1992). It is important to consider project success as a complex task, because it depends on several expectations from several stakeholders, i.e. success for whom, where, how and when is it achieved. Product success and project management success can differ. As de Wit (1988) put it, a team can get a prize for a job well done for a successful project, for which they are not responsible, and may in a corresponding manner, get bad criticism for something they have not done. Project management success can be that the project has been managed successfully. But the project could, on the other hand, not fulfill client expectations. Other stakeholder, like the users, may find a project that has fulfilled client expectations, to be a project failure, because they do not realize it. Truman (1986) considers that the project stakeholders need to be prioritized, because it is near impossible to satisfy all stakeholders expectations of

project success, and it is therefore important to satisfy the most important stakeholders, often the clients goal with the project. Liu and Walker (1998) continue to argue that agreeing with common goals can make project success sufficient to all stakeholders, also because specific definitions may result in project failure for other stakeholders. How well project success is achieved may also differ between different perspectives. A contractor may consider a project a success if the outcome is according to the preset specifications. An economist would view project success by achieving costs below budget. A manager over employees after the employees competence, or experience development, and a consultant after how much money it charged per hour worked, or a client to the overall achievement according to the project goal.

When project success is to be achieved, it may therefore differ from each perspective. According to Munns and Bjeirmi (1996) project's product successfulness can only be decided after the product has been used, and after project completion in the operational phase. While achieving the projects purpose can be handled in a more short-term, when the project is delivered to the client. Project management success is more or less measured directly after project has been finished, by conformance to project constraints, e.g. cost and time, or during the actual project process according to the proven quality (Baccarini, 1999). That a project is assessed and found either a success or failure is also interesting, since some participants may see it as a partial failure, or partial success in different phases and various points, depending on the definition of project success.

Project management success and product success are interlinked, since costs overrun, i.e. project management success, may affect the attainment of profitability, i.e. product success. If a successful project is achieved through following, satisfying or even over-achieving the project purpose and goals are left to be decided by the involved parties in the project. Although, the team does not have the responsibility for setting the project goal and purpose, it is their mission to satisfy the project outcome in the production. In other words, the team needs to be aware of the project goal and purpose, to have the right scope, and to be in the right direction for project success. (Baccarini 1999). Baccarini (1999) further states, that both product success and project management success must be considered separately and stated early in the initiating phases to the project team, in order to achieve project success.

Project success from a contractor's view

In a construction project, there are both common and specific success factors for different actors in the project life. Sanvido et al. (1992) refer to the difference between common and specific criteria when measuring success. One common criteria for all parties in a construction project, is the financial scope of the project. The construction project must therefore be profitable, as it is the most important success criteria for every party, in order to be successful. Additional specific criteria for the construction party's organization may be: having no claims, technical specifications met (quality), client satisfaction, high level of communication, high safety, limited uncertainty in the project, making a profit, and finishing the project within the set time.

A building or facility project in the built environment we live in today is completed, and put to use by a mixture of participants, by designed or accidental actions, processes and procedures. Specific factors are more significant or critical, than others when trying to achieve project success within construction. Rockhart (1982)

developed the term of critical success factors, after it were introduced by the consultancy company McKinsey, (Ronald, 1961). Rockhart (1982) considered that success is achieved through conformance according to a number of factors that are critical for the project success. Sanvido et al. (1992) further developed the term as factors predicting success. The term of project success and critical factors affecting the success has since then become a rich topic of investigation, seeing as the quest of continuously delivering successful projects are as important today as it was yesterday. There is today, no existing general agreement of what factors determine a successful construction project, but according to Chan et al. (2004), project success factors could be divided into four main categories:

Project related factors. These factors refer to common factors that describe the nature of the project. What type of project, size and complexity of the project.

Project procedures factors. This category is characterized by two methods, procurement method and tendering method, e.g. design-bid build contract or design-build contract differs. These affect the projects preconditions differently, e.g. time to plan the project differs from choice of contract.

External factors. Environment is a factor that influences the construction processes. Other examples of external factors, are the political environment, level of technology and economical environment.

Human related factors. This is the category that contains all involved or participating parties, such as clients, contractors, subcontractors, project managers, consultants and suppliers etc. The client influences the construction project's time and economical performance, according to Walker (1995). Walker (1995) further argues that the client's representative, e.g. a formal and strict client representative, can give the project difficulties. Other client related factors that have an influence, are the type of client, how well the client has defined the scope, the client's experience, client's knowledge in financing construction projects, and the client's knowledge of construction projects or construction organizations (Chan & Kumaraswamy 1997). Other key players are the contractor and subcontractors Characteristics such as experience, management, supervision, cost-control, and information systems affect the construction phase of a project. Chan et al. (2004) further suggest that project success requires team spirit and team effort through all team members and participating parties In other words, the atmosphere needs to be supportive towards team-working and applies to e.g. consultants, client, contractors and sub-contractors (Hassan, 1995).

Project management factors. This group of factors is affected by previous management experience, but contain many other attributes that affect the project, e.g. communication systems, mechanisms for control, feedback, capabilities, safety programs, control of subcontractors, coordination, managerial actions etc. According to Hubbard (1990), the project management factor is the key for project success. Through communication, scheduling and project planning, the project manager is a "key stake holder" (Belassi and Tukel, 1996).

Chan et al. (2004) state that variables in all groups influence variables in the other groups. There are specific characteristics in each main category, that if met may improve the preconditions for a successful project. Examples of these are: low

complexity of the project, short project duration, effective project management, client experience, private funding, experienced leadership, and/or a stable environment.

Profitability according to the contractor

Profitability is generally known as a key performance indicator for publicly traded companies. Profit is defined as the difference between cost and revenue Hirshleifer et al. (2005). Investors in publicly traded companies, strive to get a yield of invested money. A yield will pay dividends for shareholders, and get more shareholders to re-invest in the company and attract new shareholders. In other words, stable profitability will attract new investors, and the demand of shares will rise. This master thesis is written from the contractor's perspective, and considers the profitability measures of economical goals in projects, i.e. profitability is met for the contractor if it is greater than or equal to the pre set target margin goals.

2.2 Project related factors

Core business

A company's strengths lies in its competencies that it has acquired over time, and those competencies gives the company a competitive advantage over the competition and further promotes success. The best competencies that an organization has should therefore define its core business. Warren Buffett is a known American investor and considered by many as the most talented investor of all time. Buffet has a famous strategy: "Sticking to what you know", and it is applicable to every business, including the construction industry and the projects that characterize it (Hagstrom 1997). According to Peters and Waterman (1982) and their eight themes responsible for success in companies, argue that a company should "stick to the knitting" and stay with the corporate skills, in order to make money. In other words, it is associated with a higher risk to execute projects that are outside the company, or the company units, area of knowledge. It is better to understand the business appropriately, in order to not make mistakes. Zook and Allen (2001) state that, if the company focuses on the core business and then later get market share dominance, it often enables superior profitability.

Early stages, management entering projects within right time

There is a general agreement among the industry, that planning is important for the projects´ outcome, and that planning is often vital in order to obtain profitability. There exists, according to Johansson et al (2006), several purposes of planning before a project starts. One mentioned purpose, is the possibility to "learn" or think through the construction project before starting, a second is to attain a good economy. Johansson et al. (2006) further state that surprisingly there often occurs an unnecessary restraint of resources in early the stages, e.g. the design stage, which adversely affects the project.

If the project team is given the possibility to think, and plan through the project ahead, there is a good chance to find and make changes in production planning that have multifaceted benefits. Benefits, for example, for the contractor that improve the

construction process, or other cheapening measures. Jergeas and van der Put (2001) argue that weather-related risks and problems with logistics in construction projects, could be easier avoided, if assembly of construction elements, i.e. higher degree of prefabrication, would be considered at more efficient locations. A site built house in relation to a mounted prefabricated house in the autumn, or around the winter months, is considerably more receptive towards rainfall, snowfall and wind. This, while under construction, could easily damage the building and/or set the project back in time, and affect the profitability. This efficiency and savings in money, by standardization and prefabrication, may be possible if a blue-collar worker is taken off site and applied in another way than is more common today, e.g. by assembling construction elements off the construction site, Jergeas and van der Put, (2001).

2.3 External factors

The economic situation nationally and in the world in general impact the regional construction market and the construction process. According to Borgbrant (2003), there is a relationship between the construction business increase in price and the economical environment. Whenever there is an economic boom, costs and prices tend to rise, and when a recession occurs, the costs and prices increase halt. Johansson et al. (2002) conclude, in their study of procurement in large complex infrastructure projects, that it is hard for companies to make a correct bid during recession, if the economical situation later changes, sometimes it pays off, sometimes not. Costs and prices during the company's calculation, during recession, may be significantly lower than when the project is carried out. This could result in the company's underbidding, in order to get the project. Which may be described as a situation like the "winners curse".

2.4 Human related factors

The Project Team

The team is an important part of the project-based organization. It is the team that together delivers the project, not a number of individuals. Iyer and Jha (2005) found that the collaboration between project participants, the "team work" in the project, is one of the most important attributes that contribute to a more successful project. Collaboration within the team was one of the success factors in the city tunnel project in Malmö, which was finished within budget and before schedule Vene (2012).

Additional to collaboration, both positive and negative attitudes of the project manager, and the atmosphere within the project team are the most contributing factors, pointed out by the contractor, for project success respectively project failure (Iyer and Jha, 2005). This supports the argument for the right allocation of correct project team to right project, in order to increase the probability of project success. An additional factor to consider within the team issues is the turnover rate in the project team, found by Chua et al. (1997). This strengthens the view, by Knauseder et al. (2006), that if a key individual in the team leaves, they may take away knowledge of significant importance to the project as whole. A middle manager that is assigned to

another project, in the same parent organization, can have an effect on the project outcome since his or her knowledge and expertise is more or less lost and not shared properly. Chua et al. (1997) continue to address issues with project participant and suggest that this should not be overlooked. On the other hand, Pinto and Prescott (1988) have another theory, that the right personnel on the right project are more "the rule than the exception". This personnel factor is connected to human resource management and the recruitment, retention and development of the team, and leads to the theory that the staff factor for success may not be as important as previous research has taught us to believe.

Additional factors are made distinctive, when evaluating project success and team involvement. Strong team commitment to tasks during the project life contributes to the overall success of the project, according to Gustavsson (2011). Parallel to this is to have the inherent capability and collected experience of handling the unexpected, which is the deviation from the planning that will happen under the project execution phase. This is often made difficult, due to the projects uniqueness, and temporary infrastructure connected to the location and time of the project. Successful project teams have this ability to adapt to the changing environment (Karrbom-Gustavsson, 2011). This capability from the team perspective and strive towards delivering a successful project is further connected to commitment to the project. According to Kadefors (2004), the work with team building and the sense of togetherness in the pre-execution phases, is beneficial for participants within the team, and ultimately to project success. Engagement in the project can be personal to each of the participants in the team, but can also be further developed through the project life.

According to Passos and Caetano (2005), the use of feedback on past performance provides major benefit on future team performance. Getting feedback on one's strengths and weaknesses may help the individual to develop those. When the same team works towards a shared well-defined goal, and has predefined team roles and focus on problem-solving, it promotes success even further. (Forsyth, 2010). Katzenback and Smith (1993) further support the connection between team-work and better task performance. On the other hand, Forsyth (2010) states that it is important to know that team-work does not equal success, and the more complementing competences among the different individuals in the team, the higher demand requirements are on the individuals in the team. Chang and Bordia (2001) argue that team cohesion is an additional factor that positively affects performance. Team output could for instance, be increased by focusing on developing task cohesion in that team Chang and Bordia, (2001).

Instable project organization (Key personnel turnover)

The project-based organization is characterized by having the project as a core business function in the producing organization, and that it is the common model for executing business opportunities (Hobday, 2000). The project-based organization fits organizations that produce complex and highly valuable products and services, which change in preferences, size, level of difficulty and time duration. The construction project has the characteristic of this and being complex often said to be unique in some way, having time, resource constraints, defined goals, turnover of personnel, project members that are spread out at different locations during the project phases, and having the final assembly at new site locations (Knauseder et al. 2006). According to Hobday (2000), the project-based organization is effective in

constructing new organizational constellations depending on the client demand and what is asked to deliver, identifying and managing opportunities and pitfalls, and learning during the project execution. It is quite non-effective in adapting and taking advantage of organizational capabilities and resources (Hobday, 2000). Additional problems relevant to project-based organizations, is the learning problem, the utilizing of knowledge from past projects, and putting it to use in the future. Josephson et al. (2003) argue that knowledge sharing, which newcomers need when they are replacing former team members and who enter the project at a later phase, is important, and is also a great challenge for the construction industry.

Larger construction projects are often carried out over a longer period of time, and most construction projects have similarities when it comes to the project organization. Karrbom-Gustavsson (2011) investigated a construction company with projects around the world, and made the following observation. She found that there was not a single team member in the investigated project organizations that was on site during the whole project cycle. This is something that seems to be common in the construction industry. Karrbom-Gustavsson (2011) highlights that there are often a number of people involved in the project startup, some during production, others join the project at the end, and some key-personnel change during the different phases of a project. When projects run over a longer time period, e.g. several years, other problems may rise with key personnel. In those projects it is possible that some key personnel in key management roles, e.g. project management, who often are involved during the whole project, leave the project. This affects the profitability, since accountability for project success and profitability, lies within the role of the project manager, who also has the power to lead to success, according to Hobday (2000). An additional responsibility of the project manager is to build the actual project team, provide assistance to the project requirements, and make sure that the project is delivered after the client's goals and expectations.

The relationship between profitability and employee satisfaction, loyalty and ultimately a low turnover of employee is done by Heskett et al. (1982). They argue that employee satisfaction is connected to employee retention and low turnover, which leads to higher value to clients. This value links to client satisfaction and the loyal clients that ultimately links to higher profitability for the company. Reasons of leaving the project may be that; employee's quit their employment, get different tasks or leave for another project (Karrbom and Gustavsson, 2011). It is not unusual that people quit their jobs, and the project-based organizations are not an exception, but rather the opposite. A high rate of employee turnover in projects may not only decrease the profitability, but also have a negative effect on the pace and the culture within the team Kryvenda (2012).

If or when a project manager leaves the project it will result in a decreased opportunity to be profitable, and to utilize opportunities, because of lost knowledge and information about the project, which is linked to key personnel turnover. Huselid (1995) furthermore argues that work satisfaction is linked to lower employee turnover, which is connected to financial performance. Josephson et al. (2003) further state, that important knowledge is lost when key personnel leave the project. Jaselskis and Ashley (1991) also state that personnel turnover within a project-based organization as a contractor, is not seen as positive, and project success is more probable to be realized if the personnel turnover is kept low.

Consultants & sub-contractors

Large contractors like Skanska, NCC and Peab have many suppliers and sub-contractors of goods and services. The profit seeking, that is commonly known in today's society, is often reinforced if tendering is considered only on lowest price, rather than quality, specific competences, or other aspects. According to Josephson (2009), this affects the continuing formation of new project teams, and further to the increased work with clarifying project goals, not only to the involved sub-contractors, but also to other participants, e.g. consultants. The time it takes to learn to know each other, and their capabilities, steals time from other important activities in a construction project, e.g. finding cost effective solutions. This can be avoided by the pursuit of long-term relations between the parties (Josephson, 2009).

Borgbrant (2003) argue that, due to the decentralized management in the construction industry, strategically decisions that has effect on the projects profitability, e.g. the choice of sub-contractors, is unfortunately taken into consideration too late. This is done as late as in the beginning of the production phase, which prevents effectiveness and ultimately profitable supplier relations. Borgbrant (2003) further states that the activities on the construction site are too focused in short-term profitability, both through work procedures and team composition on site, i.e. a new team again and again.

Both Borgbrant and Josephson's thoughts about the adverse consequences with short-term relations with suppliers, should promote work involving the suppliers, and to focus more on long-term profitability issues in the production. Watson (1997) and Mathews et al. (1996) argue that the introduction of partnering is meant to eliminate inconsistent relations between the parties, often between client and contractor, but can also include suppliers, so that the parties can work together towards shared goals and obtain mutual benefits. By involving sub-contractors earlier in the construction projects for example, in internal projects with partnering firstly between client and contractor, the benefits could be multifaceted, and could cheapen measures, from the general contractor, or in this case the sub-contractors, and that would make production easier, faster, and cheaper, or a combination of these, and this would benefit all project participants. Black et al. (2000) add that commitment, trust and communication are required for partnering to succeed, and that one of the largest benefits of partnering, is increased client satisfaction, which is a project with an internal client. Baxendale and Graves (1997) state that partnering with suppliers is positive if it gives added value to the end client, while having the same qualification requirements. Wong (2002) also adds that, constructive partnering with suppliers will ultimately benefit the client's satisfaction.

Constructability is, according to the Construction Industry Institute (1986) defined as: "the optimum use of construction knowledge and experience in planning, design, procurement, and field operations, to achieve overall project objectives". Constructability is an important factor in a construction project, as it facilitates the construction process on many levels, e.g. streamlined construction, decreased mounting time, and this saves hours worked by blue collar workers, and the project's overall execution time. All this is beneficial to the project's overall profitability. Fischer et al. (1997) argue that designers, often consultants, have great influence in their roles towards better constructability in all production phases. This is because the designing role of consultants enters the project in the early phases, and therefore can change or influence the project design in an early stage, which in turn affects constructability. Fischer et al. (1997) propose that construction experience should be

collected and passed on to the designing professionals by production personnel using feedback loops, in order to have knowledge that benefits the constructability in future construction projects.

Jergeas and van der Put, (2001) further argue that the early involvement of the production management team in the design stage, would benefit the project constructability, e.g. by layout, dimensioning, construction methods, structural elements. These mentioned changes contribute to project profitability. Jergeas and van der Put (2001) conclude that constructability principles are gained by establishing a relationship built on trust and joint respect with the project designers, architects, consultants, contractors. If the relationship starts in an early stage of the project life, and is intended to share the vision of project success between the involved parties which is beneficial to the project, and delivered to the client´s pre set goals and expectations, then there are good opportunities in gaining profitable advantages in the relationship. Choosing both the right sub-contractors and consultants seems to have a consequence on the overall project profitability.

Knowledge management

The construction industry is repeatedly associated with the characteristics of an industry, that is constantly exposed to new and partly unique projects (Belassi and Tukel 1996; Borgbrant, 2003), says that there are challenges to learn from earlier experiences. (Kululanga et al. 1999; Knauseder et al. 2006), and Use knowledge from one project to the next. This may be due to the complexity of the construction process as stated by Gidado (1996), or, the possible variants and combinations that influence the elements of construction projects (Cox and Goodman, 1956). The utilization of knowledge and past experience may perhaps be decreased, due to the production staff's inability to see the end value of the work with knowledge learning and/or that it is perceived as time-consuming. There is however, a way for construction to work off the label of being "old-school", obsolete and practicing proven methods "which always work", and not to try something new, in the fear of doing it wrong. The development of organizational learning and knowledge sharing together with the ability to do so in the context of project based organization, is a way of learning from past experiences. The purpose of managing knowledge within an organization, is also a benefit which competes within the industry as whole, according to Fernie et al. (2003).

Organizational learning is the area of studies around how an organization learns and adapts to the environment, and can be expressed by being closely related to individual learning. The primary idea is, according to Clegg et al. (2011), to capture knowledge from the individual employees within the organization, and share the knowledge with others. This is in order for the knowledge that these individuals have, to not leave the organization, if an employee chooses to leave. A comparison to this explanation is the one of Argyris (1960), who states that organizational learning is about the "detection and correction of errors". High level organizational learning may then be an organization that has a high capability to learn and adapt to what it does as an entity; it knows what is knows. On the other hand, Yeung et al. (1998) refer to organizational learning almost as Clegg et al. (2011) does, in that the knowledge from individuals is shared outwards. Not only in the organization, but across and between the organizational limit of time and space. This makes it interesting in the context of construction projects, which is characterized by the boundaries of time, fragmentation,

location and space. To make it further interesting you could say that organizing is characterized by utilizing, systemizing, structure known information or knowledge, while learning is about acquiring knowledge or an understanding of the unknown, which makes organizational learning a bit contradictory.

As mentioned earlier, knowledge sharing is an opportunity for the construction industry to utilize knowledge from past experiences in building projects. For example is effective knowledge sharing per se, within a construction company, a competitive advantage in order to make the most of the known knowledge in the constantly changing construction project environment (Fernie et al. 2003). Knowledge sharing is the process of actually exchanging skills and know-how between people, and more specific in this context, employees within the organization. This type of knowledge sharing is often supported by modern technology, such as different types of management and communication systems (Cabrera and Cabrera, 2002). The problem is that the sharing of knowledge is affected by more than management systems. It is affected by an organization´s culture and social environment (Cabrera and Cabrera, 2002; Fernie et al. 2003) that needs to support and promote sharing. It is also affected by incentives that might encourage sharing and level of trust between the host and the receiving party of the shared knowledge (Cabrera and Cabrera, 2002; Kadefors 2004; Fernie et al. 2003). On the other hand, one must also think about the costs in conjunction with knowledge sharing and weigh the usefulness and value against the actual costs of sharing, and to come off with good knowledge sharing one must know that it requires that the whole organization collaborate (Cabrera and Cabrera, 2002).

Yet, there does not have to be a cost connected to the sharing of knowledge. A report, titled "the construction industry's capabilities", promotes the small talks, that welds together a group of people into a team, and that construction companies should acknowledge its importance, (Karrbom-Gustavsson, 2011). These small talks, which could happen under coffee breaks, made a significant positive contribution to knowledge sharing, and project outcome in a case study of power plant construction projects. A quite different study made by Jonsson (2012), particular by comparing management systems for knowledge sharing and "fika" culture, also describes knowledge sharing as an important part of an organization´s competitive edge. She argues that "fika", e.g. talking over a cup of coffee, might be as important as actual digital management systems, for sharing knowledge and past experiences.

Finally, to learn in a project based organization, as construction projects are characterized by, requires that people as well as the organization are open to new things, and have an eagerness to learn and a transparency in the organization that enables it. Transparency is then also connected to trust, which is crucial for developing further learning. Trust also contributes to increased project performance (Kadefors, 2004).

Errors in construction projects

Errors costs money, and it is generally accepted that it is costly to correct an error or as the report from the SOU (2002) puts it, "Its cheaper to do it correctly the first time". The very same report also states, that the errors in production have increased over the years.

Costs due to errors in production, are the costs of discovered errors and correction during the production phase. These costs are, according to Josephson and Saukkoriipi

(2005), estimated at 10 percent of the construction cost. The costs of error during the production are often divided in two main categories, visible and invisible. Visible errors are, according to Josephson and Saukkoriipi (2005), errors that we can discover and correct with todays methods, while invisible errors are hidden, and cannot be solved. Josephson and Saukkoriipi (2005) estimate that visible errors costs vary between 2-9 percent of construction cost.

Costs connected to unfulfilled quality are also errors, but it affect and extends over a longer time than just the production phase. These costs contain errors that are discovered and corrected before delivery or production. Control costs are errors discovered by the client after delivery. These types of errors cost often around 10-20% of the whole project turnover or production cost (Josephson and Saukkoriipi (2005).

Why errors occur is undoubtedly a righteous question. The report from the SOU (2002) deals with this question and argues that error occurs from negligence or fraud. It is, these days, very unusual, that someone gets convicted of fraud, therefore the conclusion is that negligence is the most common source of errors. An example of negligence may be ambiguous orders, carelessness, and ignorance, (SOU 2002). Another study carried out to identify causes to errors, made by Josephson and Hammarlund (1999), investigated 7 different building projects. Josephson and Hammarlund (1999) stated that: The client may cause errors through delays of important decisions. Furthermore the client organization may affect errors if it is unstable, and the turnover of personnel involved in the project is high. High pressure in the time schedule, or the cost of the project team may evoke error. The design of project team is also a contributing factor. Proper support function for the project team is important, nevertheless good motivation of staff is a key issue in order to prevent errors.

Errors may result in delays, delays that may have their root causes in the planning phases. Stress or too much time pressure in the project planning phase may, according to a report from the Swedish work agency, cause substandard construction documents which consequently cause delays and errors during the production phase that could have been avoidable.

2.5 Project management factors

Communication within projects

Communication is a broad concept that affects a project on every level and area. Constructive communication contributes to bring clarity through to a project. Clarity within a building project is a top-ranked factor in a questionnaire survey made by Persson et al. (2009), in order to reach project success. Clearness and transparency is something that should follow through the whole project, from early stages to a completed project and between every involved party. Clarity from e.g. the customer and what the client requests is important in order to avoid delivering a product or service that is not up to standard, or doesn't conform to the client´s demands Persson et al. (2009). Indistinct and undefined decision paths may cause problems with delays, that indirectly affects the profitability of a project. Short and easily perceived decision pathways allow a smoother project with less delays (Johansson et al., 2006).

Construction companies deliver not only a product, but also a service. It is associated with risk to deliver a little bit wrong, in relation to what the client wants or expects, if the providing company is not accurate over the client expectations. Ambiguity between customer expectations and the construction company may result in overspending of time, money and other valuable resources (Zeithaml, 2009).

Managing the client

According to Heskett et al. (1997), it is of great importance to manage client expectations, since expectations in what the client believes is being delivered, is vital for the perception of what is actually being delivered. It is the client who determines and defines quality and value. However, these determinations are not absolute, but relative. In other words, there are possibilities to influence a client's expectations. There is, within all service industries, a common picture that the client is always right and that the service provider always should strive to exceed its client´s expectations, which is something that Heskett et al. (1997) argue against. All clients are not valuable for the company, and anecdotes about how companies treat their customers like royalty and do efforts above the normal, in order to satisfy the client, are not unusual, however these may be misleading. The client in these anecdotes often belong to the company's most profitable clients, but there is not much heard about these companies also having systems to "fire" clients that is unprofitable and time consuming. In other words, the company should try to choose and work with clients that are right for the company, and fit the. According to Mochal et al. (2011), the management of client expectations presents a huge challenge for the project management, and gives a different view on expectations, between the provider and client, and this is a common cause in unsuccessful projects.

3 Methodology

This section describes how the study was conducted, what was done in the research process, the chosen method, why the specific method was chosen, and what consequences the chosen method had on the results of the study.

3.1 Case study

The case study approach is qualitative, and investigates the events, projects and persons, and is done so more holistically, to give a comprehensive view. The extreme cases that deviated the most from each other, will disclose more interesting information. This method approach is exploratory and subjective, and is more focused on the processes, e.g. the interview.

We chose a case study approach in our master thesis, i.e. the study of a company in the construction industry in a profitability perspective. We chose to investigate a number of projects within construction of commercial properties, that deviated from the "normal" profitability scale, both the good, the mediocre and the bad one's, to see why the result was what it was, in order for the company to maintain a consistent and high profitability in its projects in the future. One of the company's overall objectives was to keep profitable projects, and at the time, they were in need of a general boost.

The decision to chose a case study method meant that we wanted to gather information by interviewing people that had been involved in those construction projects, and could share their experience with their own interpretation. The idea was that they had first hand information they could share with us during in-depth interviews.

We chose to just limit ourselves to the project's profitability, in order to go deeper into what factors that influence it. It meant that the investigated project could have had an outstanding result in terms of quality, client satisfaction, and that it finished ahead of schedule, with very little environmental impact but low profitability. This thesis considers only profitability, and the factors affecting it.

This is mainly a qualitative research report, and according to Cohen and Crabtree (2006) those reports are multifaceted, in the sense that it involves a variation of different approaches. Cohen and Crabtree (2006), state that it is a kind of social construction, and continues to describe the interpretive feature in qualitative research that we have chosen to focus on. That feature is about understanding how people perceive and make meaning of experiences in their own everyday environment.

Qualitative research is the opposite to the statistical research, and can be done through a number of ways in empirical resources, by reading and going through literature and articles published, case studies, interactional, observations, interviewing, or different kinds of experiences (Denzin and Lincoln 1994). Our main method focus is on interviewing, and by trying to get as much information about the specific topic from the interviewee as possible. According to Denzin and Lincoln (1994), this is best done by asking broad questions, to allow the interviewee to open up, and answer in his/her own terms, and by posing new searching questions to further develop the answer. We tried to apply this technique, in order to get an authentic result and have an open mind without leading questions.

3.2 Data collection

We were given 24 projects to investigate, selected by an executive manager. All projects were within the commercial districts portfolio over the three last years. We chose 20 of those 24 projects, due to time constraints and practicable matters. Four of the projects turnover were considered too low, and we were unable to get a graspable report in the given time. Some other projects were divided in project phases and were registered as a project for each phase. We merged these types of projects and ended up with 16 projects.

We conducted 16 in-depth interviews, at least five more informal interviews, and two pre-interviews concerning the 20 projects. The interviews were conducted with employees, still in the company, who had different responsibilities in the project. Those interviewed had different roles, and consisted of; a district manager, project manager, production manager, production supervisor, project engineer, calculation engineer, project purchaser, project designer and a senior manager.

We started our interview process by conducting an explorative interview with a senior manager. As the basis of this interview, we continued with a guide to our research questions. This interview gave us the opportunity to test our interview questions, partly our roles as interviewers, searching follow-up questions, and finally our minor exercises. This made us think over our strategy, both one and two times over, in order to improve the interviewing process. Later, well under our interview process, we continued to improve and develop our roles and interviewing techniques as we obtained more experience.

We realized, after the first "test" interview, that we were going to gather a lot of information. Just the recording material alone would be nearly 40 hours long. We also realized that we didn't really know which conclusions the interviews would end up with. Therefore we decided to develop small extra exercises that we carried out during the interviews that would help us generalize and find patterns.

The interviews was chosen to be semi-structured, due to the fact that it provided us with the opportunity of obtaining relevant information while getting open interpretation of the interviewee's experience in their own terms. The conducted interviews lasted around 120 minutes. Cohen and Crabtree (2006), state that if semi-structured interviews are carried out in an accurate way, they will provide consistent data that can be contrasted with each other, and this it did. The interviews were performed by both of us, one leading and one taking notes. The interviewees' employment in the company varied from a couple of years to about 30 years, all with different kinds of experiences within the industry, ranging from self-taught, to post secondary university education, giving different perspectives on the situations that had occurred.

Before we conducted the interviews, we met and divided the given projects into three profitability groups, depending on the end result compared to the pre-set target margin goal of the project that was set out at project tender**.** The projects were sorted under colored labels: result above target margin was labeled green, results just below target margin was labeled yellow, results equal to loss was labeled red.

The questions´ characteristics were set according to the projects end result. In order to gather correct information, we needed to meet people that had actual experience in the studied projects, and that had developed an interpretation of what actually happened during the project. The need of a holistic perspective from the project phase led us to

the choice of interviewing the production managers of each project. They were one of the key players in governing the project, and were responsible for its implementation with high profitability (Skanska, 2013). In addition to these semi-structured interviews, we conducted five extra interviews in connection to projects that we thought needed extra attention and confirmation. These interviews were performed in a more informal way, e.g. over a cup of coffee, and without recording or note taking.

We were careful not to mention anything about profitability in the beginning of the interviews. This was done so as not to lead the interviewee, to gain a general opinion of what a successful project implies to the interviewee, and to see if they would mention profitability as an important factor in determining success.

The first questions were more general, and project explanatory. This to get the interviewee to start thinking back about the project. We wanted to get a general idea of what the project was about, the size and type of project, the location and so on. We wanted to know if there could be a pattern between type of project and the economic results. The role of the interviewee is interesting in several ways. We interviewed people with different roles in management, mostly people from production management, but also project management, and one district manager. The idea and goal with the wide spread of managers, was to gain a broader picture of what actually happened in the projects. Our thoughts were that interviewing people with different management roles would give us a different perspective.

The subsequent questions were mostly affected by the profit result of the project. These type of questions were followed with questions about preconditions, such as: "how did you experience the preconditions of the project", "how did you experienced procurement, and subcontractors etc."

We then asked questions about project characteristics, and here we carried out the first exercise, where the interviewee ranked root causes to errors, or as to why they thought errors did not occur. The interviewees got a list, containing the following causes to errors in production: stress, dedication, risk taking, knowledge, information, and they were asked to rank them. One theory was that errors in production could be found in direct relation to profitability. Other questions about the project characteristic were the topic of the team. We wanted to know how the interviewee felt about team related factors such as: team atmosphere, team design, goals, workload, feedback etc.

Following the questions about the project team, we wanted to know how the interviewee experienced production preparation. We performed an exercise (see figure 1), were the interviewee's marked when they were involved with the project, and when they wanted to be involved. We divided the projects in two groups, above or just below target margin and loss projects. The exercise map can be seen under the section result. Another theory of ours was, that knowledge transfer would be a great contributor to project profitability, if for example, reference project was used and utilized for knowledge.

At the end of the interview we carried out a map-exercise, or fishbone, as we wanted to find out if the collected interview data could be confirmed, and by repeating it, see that we had understood correctly. The interviewees were asked to state the three main factors as to why the project profitability outcome was as it was. We used the "why-method" with these three main causes, in order to find root causes. Additional input to the study has come from informal meetings with employees at staff functions and senior managers from the head quarters, as we had enough office space at the head quarters in Gothenburg, and had many short talks during coffee.

The qualitative research approach made it a challenge in obtaining authentic information, and demanded that we as interviewers, had to develop trust, in order to get the interviewees to open up and give us this authentic information. This was something we worked hard with, mostly by being engaged in the interviews and show interest in the interviewee. Fortunately, we did connect with most of the interviewees in a trustworthiness way, and we obtained their own interpretation of their situation. The interviews felt good, the engagement was high, and they contributed to the study in a constructive way.

3.3 Data analysis

After the first couple of interviews, we realized there would be a lot of material to process. Therefore we transcribed the interviews as soon as possible after the interviews. The transcription process went smoothly, since we both had an interview template on which to write notes on during the interview. We compared our notes with the tape recorder and interview notes, and then summarized it.

Each interview was sorted after profitability result, i.e. green, yellow and red, in order to ease the information extraction during future writing on the thesis. To be able to recognize if some types of the projects were over-represented in the three target margin categories, we added the type of project into the list. We did the same with the type of client, and whether the project was undertaken during, for example, a recession.

- Result above target margin (green) + type of project + Client + Economical precondition
- Result just below target margin (yellow) + type of project + Client + Economical precondition
- Result equal to loss (red) + type of project + Clent + Economical precondition

We started to sketch on a matrix after the first interviews, where we, after many long discussions, filled it with topics that we both believed were the most important areas to pursue. For further interesting reading, see the outcomes and conclusions from each interview *in Appendix 1 and 2*. The projects in the matrix were also divided into the three colored labels, this made it easier to see patterns, and find common denominators among the different categories. Green and red project were often seen to be contrasting to each other. This list were later reduced and transformed in to an "excel file", this was done for ease, and allowed us to visualize the overall picture, and finally helped us to rank the final factors that affect profitability. The ranking is based on how the interviewees mentioned the factors contributing or not contributing to the projects profitability result in each interview

The exercises that we carried out during the interviews, helped us to confirm certain conclusions, for example, getting involved in the project in time, is very important, and getting the right design drawing correctly and in time, plays a crucial role. The exercise "rank the root cause in errors in production" were summarized in "excel", where we analyzed the data, and sorted it after how the interviewees indicated the respective factor, and which rank they marked. The "timeline" exercise was rewritten in one figure, where we labeled the arrows in different colors, regarding project profitability result. The analysis of this exercise contributed to our top ranked factor

affecting project profitability. The “mapping” exercise was analyzed, and this well confirmed our interview results, in that we had understood the interviewee. We discovered that the three first answers could be divided into three main groups followed by the roots causes. This was done in order to strengthen our findings.

After half of the interviews where finished, we somewhat revised our theory, so we could get a better angle, and delve more in-depth. At this point in our work, we began to see patterns and common denominators, and this made it possible for us to start writing about the discussion and some of the result parts.

The result that we got from the interview we conducted, is only one perspective of what actually happened. If we were to change anything, e.g. interviewing another key player in the production, we would have had different assumptions, and for that reason would have come to a result with a different perspective.

4 Results

4.1 Presentation of the investigated business unit

Skanska, District Commercial Properties Gothenburg

Skanska is one of the world's leading construction and project development companies (Skanska.com). In order to be a leader in project development and construction business, they have well formed strategies and goals that cover Skanska globally, nationally and regionally. Skanska has global targets and values that are partly presented through five zero vision.

- Zero loss-making projects
- Zero environmental incidents
- Zero work site accidents
- Zero ethical breaches
- Zero defects

Sweden is one of Skanska's largest markets and is considered as a home market; Skanska Sweden´s ambition is - being the most profitable company in the industry, and a leader in green building and safety.

Skanska Sweden has a strategy plan up to 2015. This strategy plan covers and affects the different regions and regional business areas. The regional business areas are divided into different districts, and these districts are units specializing in different business areas of the industry. Skanska Commercial Properties is a district specializing in commercial property projects, and it is this part of Skanska, that the thesis deals with.

The region of Skanska Commercial Gothenburg is focusing their goals 2012 and 2013 on eight measurable objectives that is somehow connected with the five zeros: finance, employee satisfaction, work attendance, safety, customer satisfaction, green building, productivity and market share. The result for 2012 of these eight targets was mostly characterized by, reached or overreached goals. The financial result for 2012 is strong overall. Turnover, overall operating profit and order stock, is above, or on target, but the margin in construction projects activities, is lower than the goal margin of 10 percent. Construction projects are a core business area for Skanska Commercial Gothenburg, and the result in construction projects activities is not acceptable. The profitability needs to increase in this area. Skanska Commercial Gothenburg needs, as part of their internal strategy plan, to identify ways to increase this profitability. One course of action in finding solutions, and facilitating increased profitability in future projects, is to evaluate finished projects in order to locate factors that affect the profitability. Evaluation of finished projects may be done through interviews with project and production management.

Type of project and the interviewee´s role

Types of projects were widespread in scope and size, and the team members' roles would prove to change during certain projects. There is a good mixture of both type of project and size of project in the green category (Table 1). There are five projects included in the twenty-four that were investigated and these distinguished themselves as extra profitable; one school, two senior-housing, and two office projects

Project number	*Type of project*
Result above target margin (green)	
1	Office space, remodelling
2	School
3	Senior housing
4	Office space, remodelling
5	Senior housing
Result just below target margin (yellow)	
6	Office building
7	Hotel
8	Office space remodelling
9	Office building
10	Industrial building
Result equal to loss (red)	
11	Housing, exclusive
12	School
13	School
14	Housing, exclusive
15	Housing, exclusive
16	School & Housing "villas"

Table 1 Type of project according to profitability categories.

Projects with moderate results, and just below target margin, were represented as a large mix of types of project, but were still projects within commercial property. What is interesting though, is that we found a pattern in the group of projects with pure loss result. This group is mostly represented by housing projects, and especially with exclusive housing projects. One problem with exclusive housing is that interviewees said that it was hard to calculate the right price, and the right time to execute. Projects that have a result of `over target´ margin have often made purchases that land below budget. This is hard in exclusive housing projects, according to interviewees. With too low a calculation in purchasing from the beginning, in combination with wrong calculation of mounting time of exclusive materials added, it resulted in ´forced time` schedule and profit loss. Or as an interviewee stated it "It is not the same thing to install a shower with waterfalls, that costs more than a standard bathroom, than to install standard materials, everything just takes longer ".

When it comes to the roles of the interviewee, there were generally no clear patterns between roles, and the project´s profitability. However, had the role of the interviewee often changed during the project, to an increased workload, in pure loss project.

Successful project according to the interviewee

Several areas were mentioned as important to a successful project in the first question during the interviews, however many formulations made by the interviewees, had similarities, and we generalized them into 16 overall points. The interviewees, involved in both production and project management, answered in a uniform way, and

the result, the calculated average, showed that profitability is the number one priority for a successful project. The second most answered point mentioned, was actually two. The first was to have fun at work, or as many interviewee's referred to as a "pleasant ride". The second was time, and with time means both to deliver within the time frame and that the time frame was feasible. Some following ranked points mentioned were: to have a satisfied client and end customer, to deliver the right quality on delivered product, and to have good opportunities or preconditions.

Profitability according to the interviewee

Asking the question about the meaning of profitability, gives us a hint to whether the interviewee knows what profitability means in the context of the districts construction projects. The question itself was intended to get the interviewee's mind set in the direction of economic and profitability, and a hint of the interview topic.

The projects that we investigated had all different percentages as target margin or profitability goal. Answers from the interviewees were common and generally shared. Almost everybody answered that it is about economical profit. Some answered with numbers, often 10%. Surprisingly many interviewees' answers were developed to thoughts about more than just economical profit. Thoughts such as; how to reach the targeted profit, or that profit also includes the team spirit, and the result delivered to the customer. One interviewee stated that "profitability is about delivering a certain result percent. It is always about money, and in the end it's really all about that". Another interviewee couldn't really explain what profitability was. Many answers were clever, and would certainly affect the profitability, or even be needed in order to be profitable, but in the end, it is not profitability in itself.

4.2 Project related factors

Interpreted preconditions among the interviewees

Answers were widespread, and the interviewees had many different experiences and impressions on what preconditions they had when they entered their project. Some felt that it was good enough, some not good enough, and there were cases when there were really poor preconditions when entered in the project. These interpreted preconditions, were often in relation to the end result. Bad respectively good preconditions, almost equals `not so good´, respectively bad profitability.

When it comes to the project that ended over target margin, there is one factor that they all have in common. Time to plan. Not that the projects itself necessarily has a lot of time for the production phase, but they all had enough time to plan and identify pros and cons within the projects. One production manager mentioned that he actually had "built" the project in his mind, several times before project start. The manager could therefore change large and significant details in the construction structure, to something that actually fitted the project better in several ways, e.g. faster production, better quality, better work environment. The change in choice of structure type was actually more expensive on paper, but thanks to the given time to think through the project, the manager saw that it would end up cheaper with a more expensive structure. This is something that he never could have done without the time to plan.

Another interviewee was a manager for a project that, at first sight, looked tough. The preconditions were similar to the projects that were loss projects. But time was given to discover and alert errors in the planning phase. Thanks to the time given to plan, the production manager was not only able to identify errors, but also come up with smart solutions that saved money. Nevertheless, the manager could analyze where production money could be made. In this case the documentation from the client was incomplete. The incomplete documentation, in combination with the type of contract, gave the manager an opportunity to make money. The manager therefore invested additional focus on the documentation of the necessary extra work that Skanska could finally charge the client for. Thanks to the time given to this analysis, the manager could alert the client about the missing details, in proper time, and the client therefore sanctioned the extra work, before Skanska carried out the work.

One profitable project had the not so unusual, preconditions with extreme time pressure. The project was located in a building with several categories of stakeholders, and was located in an area that was a logistical nightmare. The production manager was able to identify both pitfalls and profitable opportunities, specific for the project in time. Although the project suffered by time forced already in the planning phase. The project manager was able to split up and delegate urgent operations within the production management, to avoid pitfalls and exploit opportunities. This brings us to the next common factor for projects that turned out over target margin: The importance of the production management team entering the project in time. The project manager for this particular project would never have been able to deliver a profitable project, without the establishment of production management in the planning phase.

Projects investigated, that had preconditions of production management team not entering the project in time, seemed to have problems with profitability. This is not a one-time occurrence, the link between profitable projects and the time when the production management team-members enter the projects timeline, is actually one of the most common connections we have seen during the interviews. In order to visualize this connection, we asked the interviewees, for all projects that we investigated, to mark with arrows on a project timesheet, when the production management team entered the project, and when they think that they should be entering (Figure 1). Almost every interviewee from projects that went over, and or just below target margin, marked the entering, and wished to enter at the same mark. This mark was similar for all, and was in the beginning of project phase, at the time for start-meeting at the beginning of production preparation. Interviewees from pure loss project, all marked the entering of production management team significantly later in the production preparation phase, and remarkably, after production started.

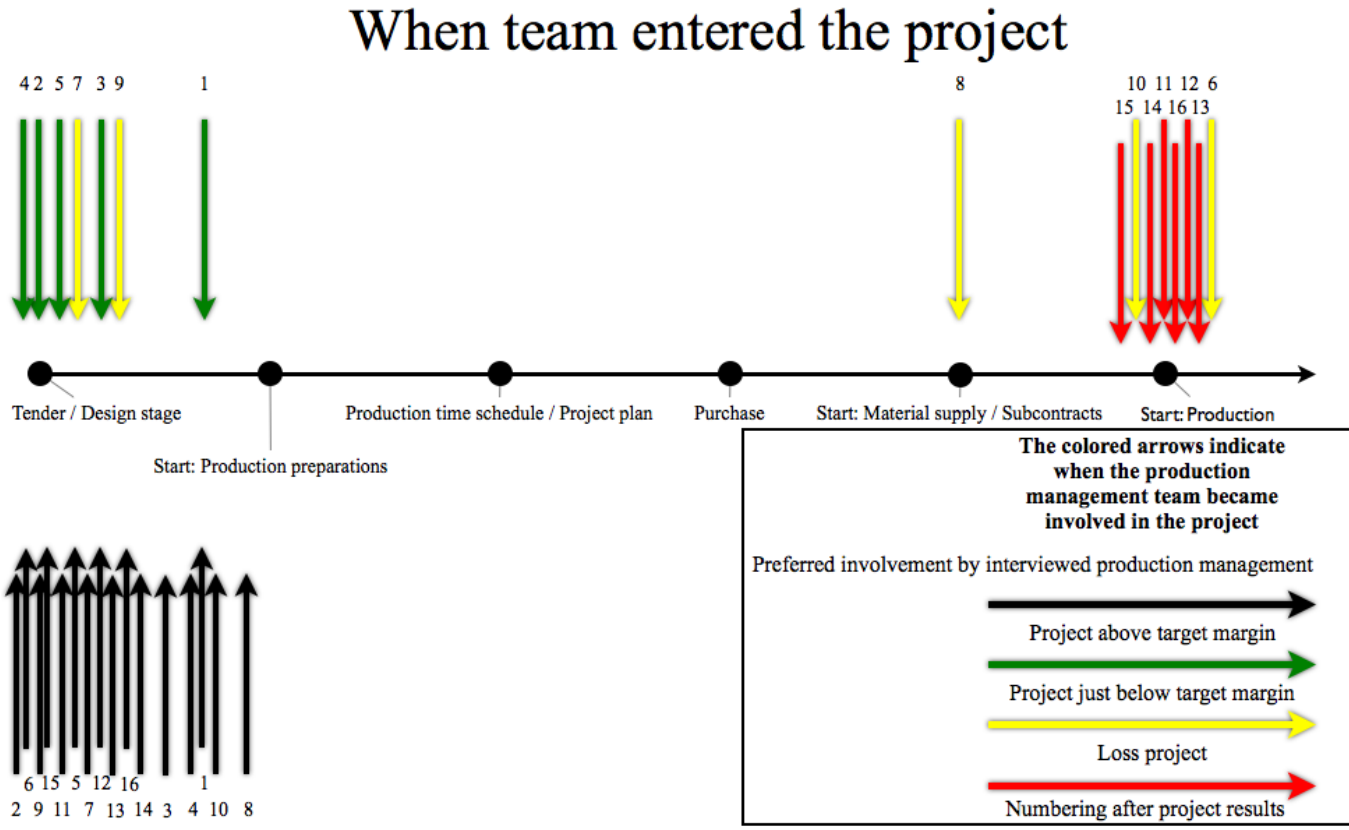


Figure 1 The result of the exercise where the interviewee marked when they joined the project organization, and when they wished to join the project organization

Type of contract

After the more open-ended questions, we preceded the interviews by asking a couple of standard questions regarding the project's properties. It was meant to give a general picture, to see if the contract form had affected the preconditions for profitability. We also believed that it would be interesting to see if there was any connection between client category, and the profitability outcome of the project. We carried out a check to see if the interviewee felt that the contract form had been the right one, from his or her perspective. Some interviewees had the experience, that the project had a bad start, because of the type of contract between the client and Skanska. Some of them believed that it had been inevitable, because it was not possible to arrange the contract in any other way. On the other hand, there have also been occasions where the interviewee believed that the wrong type of contract had been chosen for the project type, in the context of being profitable.

An example, made by a production manager of a loss project, illustrates this relationship. The project was taken during recession, and performed for a client organization with an unclear structure as to where project goals and decision

pathways were ambiguous. The trust between parties was discovered to be limited, not to mention low, and the construction contract was under a design-build contract, but extremely controlled by the client. According to the interviewee, Skanska could hardly decide anything, despite the contractual agreements stating so, due to an opportunistic client. According to the production management team, this project would probably have better preconditions in being profitable if executed under a traditional design-bid-build contract. The vague performance requirements that the client claimed, were hard to meet, while at the same time being profitable with the contractual agreements. On top of this, the project was performed with few construction documents: drawings; specifications; bills of quantities, with great uncertainty at the entry to the project.

Another production manager had a different experience of one tough project taken during recession. The chosen construction contract was the right choice, in the context of the profitable outcome. Had it been a different contract, in this case it was a traditional design-bid-build contract, the outcome would most certainly have been different according to the interviewee. Although the project was carried out in the recession just like the previous example, the design-bid-build contract facilitated the CAW, i.e. changes and correctional work among other things. The documentation of CAW was accurate, and the project organization was proficient in charging the client for what it had, and had not ordered.

4.3 External factors

Recession

Within the questions about the pre- conditions for the project, we were keen to know if there were any correlations between the surrounding economic pre-condition and the characteristics of the project. Several interviewees mentioned that their projects, within the group of pure loss projects, had been taken during economical recession. The result is interesting, and we can see a connection between the combination of types of projects, and types of clients in these projects that were taken during economical recession (Table 2). Especially as there is a clear connection between economical recession, private clients and loss projects.

Project number	Type of project	Economical precondition
Result above target margin (green)		
1	Office space, remodelling	
2	School	
3	Senior housing	Recession
4	Office space, remodelling	
5	Senior housing	
Result just below target margin (yellow)		
6	Office building	Recession
7	Hotel	
8	Office space remodelling	
9	Office building	
10	Industrial building	
Result equal to loss (red)		
11	Housing, exclusive	Recession
12	School	Recession
13	School	Recession
14	Housing, exclusive	Recession
15	Housing, exclusive	?
16	School & Housing “villas”	Recession

Table 2 The three profitable categories with the column “if there was a recession”

4.4 Human related factors

Team design, work experience together

The answers to the questions about project team constellations, and how well it functioned were overall positive in projects that resulted in ´over target margin` or just below, the majority of the interviewees thought that the team constellations were either good or desirable. However, a team is not stronger than its weakest link, and some interviewees mentioned teamwork as a important issue for project success. The interviewees indicated that there were some problems with the team constellation in loss projects. Some of those loss projects, seems to have had a common problem with project management that was not involved enough (See appendix 1). This meant that the production management had to take more responsibility, and this resulted in an increased workload. In many cases, this problem was discovered and communicated often too late in the project phase. This is something that several interviewees mentioned as an experience which they will try to avoid in future projects.

The general perception among the interviewees is that the most team members had often worked together before, and functioned well. It is worth noting, that the common thought among the interviewees, is that the starting phase takes much longer with new members, and that the whole of the production management teams should not be new from project to project. It takes both time and energy from each team

member to work in new teams for every new project, according to several interviewees. A positive result is that the interviewees´ overall picture of the perceived engagement within the teams, seemed to be generally good in all projects.

Key personnel turnover

It is evident that there is a connection between turnover of key personnel and project profitability. The result was clear and reflected the projects' profitable, or non-profitable result. All profitable projects had a low personnel turnover, and all pure loss projects suffered from a high rate of key personnel turnover, often within vital management roles. In other words, it seems that key personnel turnover is significant for the projects profitability. Projects just below target margin had similar problems, often affecting the project with loss of important information that was not written down or further communicated. One moderately performed project succeeded with a change of the entire production management, and therefore lost undocumented information from exiting team members. Another pure loss project suffered from key personnel turnover, which meant loss of information on project opportunities, and resulted in the focus on production propulsion that indirectly led to profitability loss. According to the interviewees, the turnover of key personnel does not mean a complete failure of the project, if it is planned well and executed with sufficient time to handoff of significant information. One production manager, from a profitable project, described the successful turnover of a production foreman, due to the good planning and constructive handoff, which was given time. Some interviewees from loss projects, stated that the absence of a management role, during a time period, or the replacement of production management personnel was perceived as severely disadvantageous to the project. Some interviewees, both from pure loss project and project just below target-margin, mentioned that replacement of a production manager, during the project construction stage, affect's profitability in a negative way.

Competences

Two interviewees, from different projects that had reached over target margin, used both internal reference projects, and other teams´ experience, in order to prepare the team for the project, both with pros and cons. Other interviewees had team members that had had experience from similar earlier projects, and could therefore use some of that experience and repeat it, with slight changes in some of the production parts. One interviewee from a project that went over ´target margin´, stated that there was no special competence within the project team that was used as an advantage, neither did the project team use or visit any reference project within Skanska. The result from interviews related to projects that resulted just below ´target margin` is mostly similar to the groups of projects that resulted over ´target margin`. Outspoken benefits with the use of reference projects are often cost savings, or that the project consists with something a new demand or solution that the team had not worked with before. There is one difference though. The frequency of use competence from similar earlier internal projects, are higher within the group of projects that went just below ´target margin`. Only one project did not use knowledge sharing from a previous project, but on the other hand, this project wasn't labeled as a difficult project, and there was not much time to prepare. Three interviewees from projects with ´loss result` used reference projects and site visits. All of these three interviewees stated, that the competences and knowledge transferred from earlier projects, did help them to save

costs and time, and the result would probably have ended up even worse, without the help of reference projects. Some of the interviewees from the group of ´loss projects` used reference projects because some specific projects demand. Two other interviewees within the group of ´loss projects` had experience within the team, but one interviewee found the knowledge sharing through internal experience and competence from similar earlier projects as "something that is often planned, but never being implemented" the only experience the interviewee mentioned, was knowledge sharing in what went wrong in their own project.

Atmosphere and activities

Activities within the production team existed in almost every project, but they differed between each other. Breakfast and the Swedish "fika" was the most common of activities, but differed in terms of arrangement. Some projects had "fika" on Fridays, while some of the other production management teams had an active approach towards the culture of meeting more often, and without any intended topics. Almost every interviewee agreed that small open-ended meetings, such as shared coffee breaks and breakfasts, are an important chance to exchange experiences during the project. Several interviewees mentioned, that these short meetings are crucial in order solve small problems. Several interviewees explained that these meetings also increase the potential for an even lighter mood, and moreover a better atmosphere on site. It is interesting to note that some of the projects that went really well, worked more actively towards attaining a good relationship through several short weekly repetitive activities. It is remarkable, that some projects that were an economical loss stopped with such activities during the production phase. It was also noted by some interviewees, that meeting each other, e.g. through joint activities, was seen to enhance the clarity in the project. According to one interviewee, the use of a kick-off in the early phase before a long professional relationship, may be a considerable advantage to the project. For example, a good and early established relationship with an architect, will probably lead to better cooperation, and a will to change details.

All towards the same goal

The general agreement among the interviewees from ´profitable projects`, was that the project organization within Skanska, worked together towards shared goals. Two project managers mentioned that the work towards achieving the pre-set project goals, agreed with the client, and had a direct impact on the profitability of the project. On the other hand, according to several production managers, the focus on the goal, was often set to deliver the project according to the time schedule. Therefore the anchoring with profitability was however, not always so clear in every project.

The interviewees, from ´non-profitable projects`, had a somewhat different picture in working together towards common shared goals within the project. The project organization within Skanska, was working towards the common shared goals, according to the majority of the interviewees. But the client, and sometimes also the users alignment with the project goals, was on the contrary, not so clear. In some ´non-profitable project`s, the interviewees mentioned that the client had a different understanding, which was not shared with Skanska in regard to the project goals and what to deliver. The common understanding, that did not occur between the client and

Skanska, was, in some interviews, mentioned as a contributing factor to the projects overall non-profitable result.

Errors in production, why did they occur

During the interviews, we asked the interviewees to rank what they interpreted to be the root factors as to why errors had occurred, or what contributed to the non-occurrence of errors in the production phase, and which had reasonably affected the projects profitability. The following factors were presented to the interviewees, with examples:

- Stress, stressful environment
- Dedication among involved parties
- Risk-taking, if the project was associated with risk-taking
- Knowledge, overall experience
- Information, construction documents, clarity in decision pathways

Four of the projects that had a result over ´target margin` were considered as projects with a small amount of errors. The other projects were differently affected by errors, but were all considered as projects where errors occurred. Interviewees in projects with a lower degree of errors interpreted information, knowledge, and engagement as root factors as to why errors did not occur in these projects, Figure 2. While knowledge, information and engagement were the strongest common root factors, interpreted by the interviewees, as to why errors occur in production, Figure 3. Interviewees mentioned several times, that construction documents were inadequate, e.g. architect, structuring engineering or HVAC (heating, ventilation, and air conditioning) drawings, or that those documents were not finished in time for production. Interviewees also commented on the choice of information due to the poor communication between parties or team members, or that communication of decision pathways was inadequate. Skanska project and production management team are generally perceived as engaged. The exception was blue-collar workers, which in some cases was perceived as uninvolved. Otherwise, the general lack of engagement was found among consultants. In some cases, un-engaged consultants that did not communicate between each other, was shown to be inexperienced, and therefore they inevitably produced inadequate construction documents. Information and knowledge is in some other cases very likely connected to the problem with production management involvement too late in the projects´ early phases.

Stress is evident during the production phase, according to the project and production management team interviewed. Stress is not interpreted by the interviewees as a common source of errors during production, as the authors thought would be. Risk-taking is not ranked among the most common reasons for production errors, but it was mentioned that there is a common believe among some of the interviewees, that there is, in some cases, risk-taking associated within the early phases.

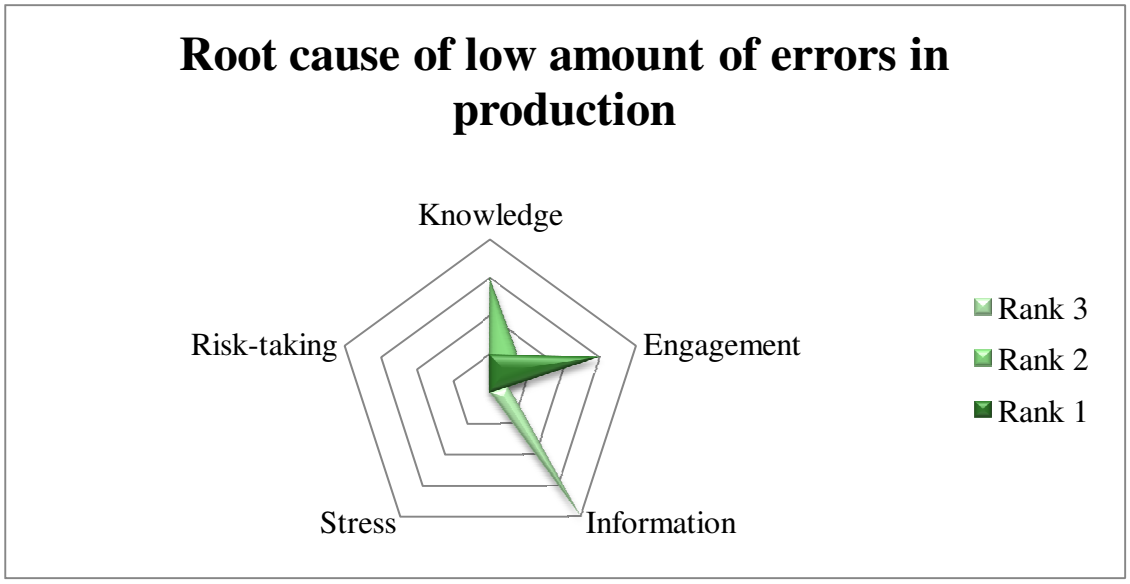


Figure 2 Ranked root causes to why there was a low amount error, ranked by the interviewees.

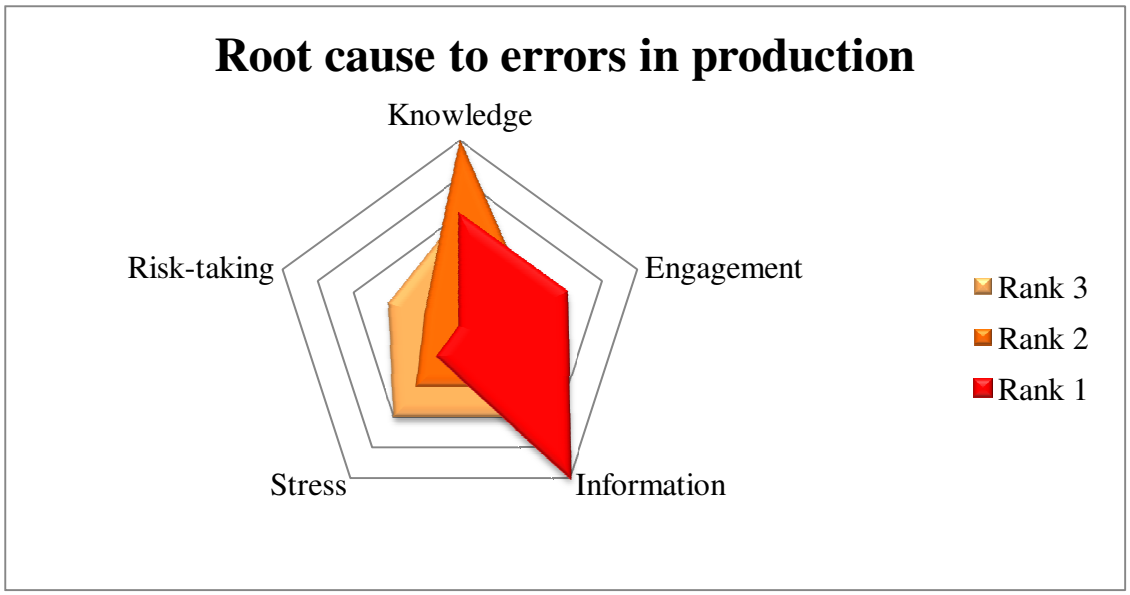


Figure 3 Ranked root causes of error, ranked by the interviewees.

4.5 Project management factors

The client

When we divided the projects into the three groups of profitability result, we saw that there existed patterns between the projects economical results and the type of client, Table 3. The groups of projects that generated the most profitability, consisted mostly of external clients. Not surprisingly, the internal Skanska client is found in projects that have economical results over target margin, or in projects with a result just below target margin. Actually, more than half of the projects that delivered results just below target margin, were executed for an internal Skanska client.

The five least profitable projects, in terms of the final profit margin, had an external client. However, there is one client category that is over-represented in the group of projects, that are pure loss, namely small private companies or consortiums. Another thing that these clients seem to have in common, is that they are new customers to Skanska. Several interviewees mentioned that they experienced this specific type of client, as unclear in their expectations and requirements. This brings us to a related situation that many interviewees mentioned, even during interviews regarding profitable projects. Namely, that is important that the clients are aware of what Skanska are able to deliver for the money that the client wants to invest. Several interviewees mentioned that clients, particularly small private clients, often have an over-expectation of what they would get for their money. A production manager expressed this pretty clearly: "It is important that we, in time, explain to the client who wants a Rolls Royce, that for this amount of money you will not get a Rolls Royce, but you will get a Volvo, and we can build you a very nice Volvo". According to the interviewees, in some of the loss projects, the client had a vague understanding of what is being delivered for the money invested. Additionally, the client had a lack of understanding that changes during the production phase are costly.

Project number	Type of project	Client	Economical precondition
Result above target margin (green)			
1	Office space, remodelling	External, private company	
2	School	External, private company with municipality	
3	Senior housing	External, municipality	Recession
4	Office space, remodelling	Internal	
5	Senior housing	Internal, Region	
Result just below target margin (yellow)			
6	Office building	Internal	Recession
7	Hotel	Internal, Region	
8	Office space remodelling	External, private company	
9	Office building	Internal	
10	Industrial building	Internal	
Result equal to loss (red)			
11	Housing, exclusive	External, small private client & small consilidation	Recession
12	School	External, municipality	Recession
13	School	External, municipality	Recession
14	Housing, exclusive	External, small private client	Recession
15	Housing, exclusive	External, small private client & small consilidation	?
16	School & Housing "villas"	External, municipality	Recession

Table 3. Type of client etc. according to the profitability categories

Internal client

When the production and project management team of the project where asked about the client on the specific projects, it was not unusual that the project contained attributes of some kind of partnering, where the client was internal within the Skanska organization. The interviewees on these types of projects, were mostly in favour of partnering, due to the fact that they found the decision making pathways became shorter than usual, and the relationship between the parties, was built more on trust and open mindedness, than is the case with an external client. It was considered a plus, that the daily operations were made easier for the project-based organization, because of the shorter decision pathways. Other answers to the question of why it was

favorable, was that these partnering projects focused on economy, instead shifting towards other project goals.

Interviewees explained, that the work with target price, project custom compensation, and the work towards attaining the project milestones set up by the parties at project start-up to get the maximum compensation, actually benefitted the projects profitability. Although, the client and contractor negotiate the conditions for the target price in common, it is the client that decides to agree to the target price. According to the project manager, it is crucial that the client knows that Skanska is confident with the target price in the early stages of the project, in order to create a positive picture of the whole deal. The project milestones, based upon the target price that Skanska later regulate their incentive against, could be one or two percent of the entire project order sum, and mean a whole lot more if they were met. Examples mentioned: A: economy, B: work environment C: Quality and Environment, and D: Customer satisfaction, to name but a few. The interviewee pointed out that it is important that the project goals are precise, concrete, and above all is shared between the parties. These project milestones have made the cost management focus somewhat less important, because following the project milestone would mean more profit for the whole organization rather than just saving money on a specific contractual part, and this was met positively.

According to a project manager, internal projects are more stimulating to work with than projects with an external client. The project manager went on to say that partnering projects with project milestones, provides opportunity for more constructive discussions, and to work closer with the project team, and in the end would benefit better and a more price-worthy end product. Another project manager thought that the decision-making pathways become very short, and that it was "wonderful to experience". Another production manager exemplified the favorable conditions, by making a handshake in midair, and told that this kind of gesture was enough for the parties concerned. He concluded by pointing out, that these kinds of projects are built up on high levels of trust, and that that simplifies the situation. The profit, if there is any, is shared between client and contractor. If there is a loss, that too is shared between the parties. According to another project manager, to work with this type of compensation arrangement with incentives, according to a jointly developed target price, promotes win-win situations.

On the other hand, according to some other interviewees, the internal projects with Skanska do not obviously contain the favorable conditions that should be expected within an internal partnering project. A few interviewees find it even to be, in some situations, more of an uphill struggle with projects within Skanska. One interviewee explained that there have been situations where technical solutions, that had affected both costs and time favorable, without loss of function, has consequently been turned down by the Skanska client. Some interviewees mentioned that including sub-contractors in the internal partnering projects, would most likely benefit these projects even more. One example is, when sub-contractors pointed out that Skanska could change the technical solutions to something that was cheaper and easier to mount, but were turned down. Because these sub-contractors were not part of partnering, they did not fight for the case, and they had nothing to win on solutions that were less time-consuming. Notably, that projects with internal Skanska clients often end within the group of project with profitability results just below target margin.

Communication

Communication is a factor that is evident in all type of projects. The interviews show that Skanska overall, is skilled at communicating the projects' overall goals, e.g. "the five zeros". Most of the interviewees had the experience that the organization on site was working towards common overall goals. Skanska's internal goal for profitability is not always shared within the whole project organization, and this is something that Skanska's own project and production management team try to reach.

Some interviewees from projects that have ended over target margin, have experienced clarity about what applies to the specific project, in order to gain a good profit. This clarity occurs through good communication, and was described by a production manager. He stated that the work with CAW documentation was crucial to the projects profitability. The production management team was skilled at charging for everything that the client had not ordered, but wanted through CAW documentation. Skanska was careful to point out that if the client had missed something that they wanted, they would explain it in such a way that the client understood that it would cost extra.

On the other hand we experienced the effect of poor communication. During an interview about a loss project, an interviewee told us that he would have done differently if the communication had been clearer and signified the importance of documentation in this particular project. He was entering the project during production phase, the focus was at this time on production propulsion, but would probably result better, if the importance of documentation were clearer during production phase. They didn't build what the customer paid for and Skanska's effort didn't exceed the payment from client.

Decision pathways are another part of communication that the interviewees have expressed to be of significance importance to bring clearance within a project. The lack of clearance of decision pathways is often shown in loss project. It may not affect profitability in first hand but may affect the project negatively overall, and therefore also profitability. Two interviewees, about loss projects, described that the decision pathways were unclear. One of the interviewees stated that it took almost half of the production phase before the production management team realized that one of the clients actually did not have the mandate to order change in construction details. The ordering client did exploit this diffuseness and Skanska did not get paid for all of the extra effort. The other project had a client representative that took decisions beyond mandatory, and the result was similar to the former example.

Finally, the identification and distinct communication with stakeholders in the construction project is of importance for the production management team on site and to the overall project. Not direct as a promoter to profitability, but rather as a mean to establish a good relationship with stakeholders that can have an effect on the project's profitability. One interviewed project manager stated that one of the preconditions, for the project's remarkable high profitability, was made achievable through communication. The project had to be carried out within a tight time schedule and close stakeholders, in the project environment, had the ability to stall the project. The production management team identified and handled the close stakeholders, in an early stage.

Feedback

According to the interviewees, feedback was used in the sense that the immediate supervisor, on site, sometimes commented on the production management team's performance. In those occasions, both project managers and production managers expressed that they tried to focus on positive and constructive feedback. One production manager, for example, expressed comments on individual's engagement and if something could be done differently on future, similar situations. Several project managers stated, as another type of feedback, that project sum-up meetings, when the project was finished, often yielded constructive information about the projects execution, and what the management had learned and could bring, as experience and a type of knowledge sharing, to future project. It was mentioned as to be: "a good analysis of the project execution". A production manager used constructive feedback towards the calculation department, by taking them out and showing what it looked like in real life, in order to prevent it in the future. On the other hand, it was expressed, by at least three interviewees from pure loss project, that feedback from project management decreased, parallel to the project declining profitability. They expressed that they felt a sense of loneliness on the project, and would have wanted more support from project management.

5 Discussion

Once again we want to remind that we have only considered the profitability as a project success factor. Projects that we have presented as unprofitable has in several cases been very successful in other perspectives.

Based on the interviews, we ranked the following five factors as the most important factors in order to reach profitability:

1. Team entering the project in time
2. Low key personnel turnover
3. Stay within core business
4. Managing the client
5. Pitfalls and opportunities

Some of the factors may be used as a checklist to increase the probability of reaching profitability. However, some factors involve common denominators that we found in non-profitable projects. These factors may, in other words, also give a indication of what to avoid. The matrix that we filled in, after every interview supports the factors that we have ranked. In other words what we interpreted as the most important, and the most frequently occurring factors that the interviewees mentioned.

Generally, the most profitable projects, respectively the least profitable projects, mirror each other on practically all of the five ranked factors that is presented. For example, one of the most profitable projects had the following characteristics: Production management team was involved in the project "within" time and was, among other things, able to improve the constructability; they identified, acted and communicated the specific pitfalls and opportunities for the project; the project had low key personnel turnover; the project was within the business units core business; the project had the right team with right competence assigned, the project had a high level of personnel engagement and an involved and dedicated project manager; the project had a stable and knowledgeable client with clear goals and expectations; there was a smooth cooperation between designing team and production team; the project had extremely good atmosphere and constructive feedback within the involved production team; there was a smooth cooperation between calculating department and production team, which enabled calculations of various structural systems with constructability weight in; the work with constructability resulted in reduced amount of working hours in production, there was active work with dedication among blue collar workers.

The loss projects were all almost the opposite of the above-mentioned example. For example; Team entering too late; no time to identify and act on pitfalls and opportunities; high turnover of key personnel; project outside core business and taken in recession; un involved project manager; unclear client.

5.1 Five ranked factors

1. Team entering the project in time

The clearest pattern between profitable projects and non-profitable projects is the time when the production management team is involved in the project, Figure 4. There is no doubt that this precondition is of significant importance to projects opportunity of reaching profitability. During the exercise, where the interviewees marked on a timeline where they had entered the project, we discovered that in projects that were profitable, the team had "enough" time to plan and think through the project. This is not only common sense but is also supported in theory. Johansson et al. (2006) stated the importance, of giving the production team, time to plan the project in an early stage. According to some of the interviewees, the time given to plan and think through was one of the main causes to the projects good results. Some of these interviewees had time to change the structural system, often to something that was more prefabricated than the first design. Two production managers changed structural systems, that seemed to be more expensive than the first design, but thanks to the given time, the team was able to consider alternate systems with other, project unique, factors in mind, such as weather, logistics, mounting time etc. This change of system had, according to the managers, direct effect on profitability and led to synergies in other areas, such as smoothness in production. Jergeas et al. (2001) argues that project unique factors, such as risks or problems with weather and logistics, could be avoided in some projects with more prefabricated systems. Changes in structural systems needs to be done by, or in cooperation with, the production management team and are impossible to do if the production management is not initiated in the project in time.

During the interviews about non-profitable projects, a picture emerged of a frustration among production management team, over not entering the project with enough time to plan. One manager stated that he would have changed the structural system if he had been given the requisite amount of time to plan the project. The project he was executing built construction solutions on site, during autumn and winter, which, among other things, resulted in rampant hours among staff because of the bad weather conditions. A prefabricated construction system, like the interviewed preferred, would have given a sealed house earlier, which had resulted in less consumption of working hours and a smoother production. In some other non-profitable projects, the production management suffered by forced and pressured time schedules, and was forced to execute time-consuming construction details, which could have been changed and avoided with more time given to better plan the project. We often visited projects that were under production when interviewing production management. During one interview we slipped in to the common discussion about time to plan projects. The interviewee showed us a detail on a blueprint of the project he was working on at the time and stated: "look at this detail, this project is heavily subjected to time pressure, and this operation took eight weeks, it would only have taken a few days to mount if it was delivered prefabricated. If I would have had more time given to plan this project, I would have identified and changed this operation, because I know that it would be cheaper in the end to buy it prefabricated".

In several interviews, constructability has been mentioned in order to have a smooth and streamlined production. Constructability may be improved if the production management team is initiated in reasonable time. Fisher et al. (1997) argue that constructability is important, and that the production management team must be involved in time, so that they can give feedback to the designing party, e.g. architects

and engineering designers, in order to improve the constructability. Other authors, such as Jergeas et al. (2001) seems to concur with Fischer et al. (1997) about the importance of collaboration between production management team and the designing team. We argue that the constructability is vital and that the production team must be involved in requisite time in order to secure the constructability and increase the preconditions for profitability.

Nevertheless, it is neither controversial nor a novelty that construction projects needs most attention at start. Issues like logistics, constructability, weather and other risks are no news to the construction industry. On the other hand, it is surprising that we actually find this clear pattern, with production management team not being involved in time, in non-profitable projects.

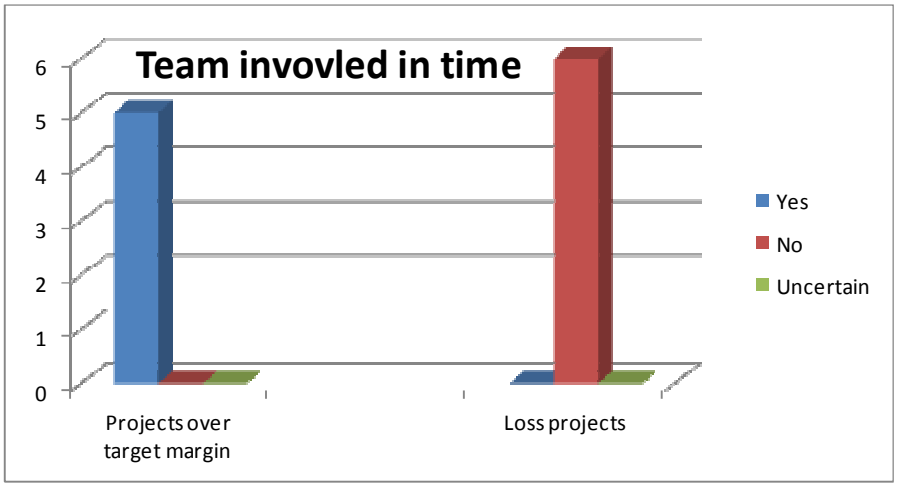


Figure 4 The result of how the interviewees answered the question "if the team was involved in time".

As Figure 4 show, there is a clear relationship between time when production management team enters the project, and the projects profitability outcome. Securing that the production management team enters early and is well informed enables profitability in several ways, not only by better constructability. Well-informed team enables time-pressured projects to succeed. Well-versed teams stabilizes projects e.g. where members are able to cover up for each other, no bottle-necks in the project organization. Without early involvement of project teams, we consider that the project can easily become disordered from the start and lose an important precondition for profitability.

2. Key personnel turnover

According to the interviews, there exist a clear pattern between a high rate of key personnel turnover, often within vital management roles, and a project's profitability, (Figure 5). High turnover of key personnel seems to be equal to lower probability of project profitability, and the reverse seems to apply to projects with a low turnover of personnel. This is supported by Jaselskis and Ashley (1991), Huselid (1995) and Kryvenda (2012), who argue for keeping a low personnel turnover, in order to easier achieve project success, financial performance and a more profitable project. It is further argued by Huselid (1995) that an increase job satisfaction, e.g. good atmosphere on the job, is linked to a lower employee turnover and ultimately a better

financial performance in the company. Key personnel turnover is further linked to production management team entering the project in time, to enter the project within time is more or less undone if the key team member is replaced. Our result is consistent with the literature claims; high key personnel turnover is affecting the projects profitability.

Key personnel turnover contribute to an unstable project organization, with loss of important information, loss of pace and team culture, as Kryvenda (2012) states. According to Cabrera and Cabrera (2002), the problem with knowledge sharing between departing personnel and replacing personnel, is also affected by loss of team culture and an unstable organization. The interviewees from loss projects with high key personnel turnover support this. They mentioned that information and knowledge loss affected atmosphere and resulted in a focus on production propulsion instead of profitability. Josephson et al. (2003) argues that the sharing of knowledge that is provided to the newcomers is vital, e.g. information about opportunities for increased profitability. Some loss of knowledge and information will always be the case, but the authors argue that it should be kept as low as possible, in order to have clarity in the project and not lose opportunities that contribute to profitability instead of just focusing on production propulsion, which is seen in many pure loss projects. Several interviewees, from the most profitable projects with low or no personnel turnover, have also mentioned that they had a very high job satisfaction and positive atmosphere, which instead affect employee turnover the other way around.

Fernie et al. (2003) further state that knowledge sharing contributes to the company's competitive advantage and therefore is adversely affected by key personnel turnover. When a project manager leaves a project, he or she transfers the responsibility of projects profitability to another individual, which Hobday (2000) argues is the responsibility of a project manager. The replacing project manager's responsibility over project profitability is made difficult by the turnover of the management role, and loss of knowledge and information. This is supported by Kryvenda (2012) that considers profitability is adversely affected by personnel turnover, especially for a role that has accountability for the delivery of the projects profitability.

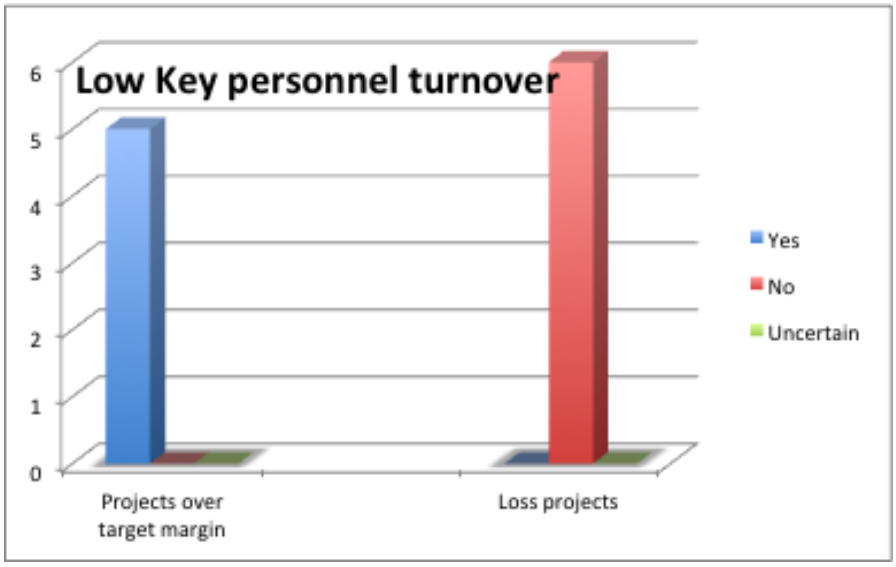


Figure 5 The result from question "if the project had problem with key personnel turnover",

3. Core business

”Stick to what you know” is a well-known quote that we used in the theory, and it corresponds well to the result of studying the type of projects. The majority of the loss projects were executed outside the business unit’s core business. The business area of the districts, under which we did the study, is commercial properties, but the majority of loss projects were actually housing projects. An overall assessment of all studied projects total order amounts, showed that loss projects total order value is approximately 10% of the district's total turnover. We wonder how much the green and yellow projects (above target margin or just below target margin projects), have to work in order to lift the district overall profitability, probably a lot. Peters and Waterman´s (1982) list of themes responsible for success, consists among other things of the theory "stick to the knitting", which is similar to Buffets quote above. We argue that the message of sticking to core business is equivalent to saying no to projects outside the business unit’s core business. Zook and Allen (2001) further argue that focusing on core business may also result in a greater market dominance, which eventually improves profitability. Noteworthy, is that all project outside core business seems to be taken during economical recession. But what would happen if Skanska, in the future, says no to projects outside its core business?

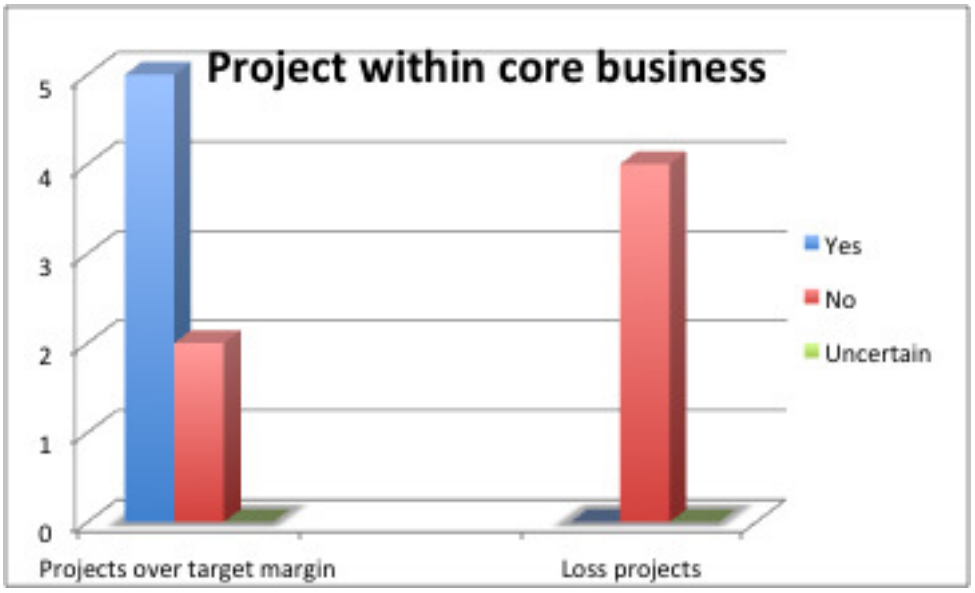


Figure 6 If the project was taken within core business.

4. Managing the client

The projects that we have investigated have a variety of clients, however we do see a pattern, Figure 7. Projects that deliver over target margin seem to consist of clients that either are major real estate companies, municipalities, internal region or internal company of Skanska. The internal client company of Skanska is a majority, among the projects that has delivered results just below target margin. Why it is an overrepresentation of internal clients in this category are not clear, but according to some of the interviewees the internal client is more difficult to work with in some areas than larger private companies. Some interviewees perceived that there is a resistance within this internal client to change constructability solutions towards

solutions that is cheaper to buy and easier to assemble. However, the interviewees experienced several advantages of working with internal clients. First of all there is a trust between the parties, but there is also a great clarity in the project, such as decision-making, shared objectives etc. There is two projects where the client is the region, these projects delivered well, notable is, that all respondents who have been involved in these "region-internal" projects, have experienced them as very pleasant. It seems that projects with a close relationship with the client, often a long-term relationship, favor the project in the long-term not strange enough. A key reason for a construction projects to be profitable is, among other things, the good cooperation between the contractor and the client Heskett et al. (1997),

There is, within the group of project that are loss projects, a clear pattern among the type of client. There is a majority of one type of clients that the authors, remarkable, hardly find in the other groups of profitability category, this client group consists of small private operators, often inexperienced. Several interviewees from loss-projects with these type of clients has stated that the projects were unclear, there was ambiguity in decision-making, who has mandate, who was the end user, what the client wanted, goals with the project, client expectations and so on. An interviewee, from a loss project, argued that Skanska needs to act differently with these clients. That for example, inexperienced clients need more guidance than other more experienced clients, in order to avoid misunderstandings between the client and Skanska. For instance, if the client is a new private client with little or no construction experience, it could be successful with some extra guidance with, e.g. deadlines, explanations of modifications and additions cost, that it costs to have the option to chose materials and so on. An additional example could be to propose a project management consultant, which can act as a competent representative on behalf of the client. The importance is to establish a good relationship between the parties and to develop trust, as Kadefors (2004) states to contribute to an increased project performance. The stronger relationship, depending among other things, on the common trust in each other, contributes perhaps further to receive additional offers on future construction projects. Mochal et al. (2011), further argues that different views on expectations, between client and provider, are a common factor for unsuccessful projects. Managing clients expectations are always important and like a metaphor expressed by an interviewee "If the customer wants a Rolls Royse but are paying for a Volvo, then we must explain that the customer are getting a Volvo, but that we can build a really nice Volvo". A common agreement on expectations between Skanska and the client brings clarity within the project, such clarity will, according to Zeithaml (2009) prevent Skanska to perform unnecessary and no value adding work, that takes both extra time and costs extra money. Some of these small private clients may, in combination with other aspects such as the nature of the project, does not fit the Skanska district at all, and like Heskett et al. (1997) put it, maybe Skanska should consider to "fire" such clients, or expressed in other terms; not take the project at all. We have mutually discussed and posed the question of what happens if Skanska says no to some of the projects that are in the category of loss projects. Loss project category accounts for about 10% of the total turnover. How much must the other two categories deliver before the district is profitable? Noteworthy is that several of the pure loss projects are combinations of small private client and project type outside core business, a combination that may make the decision easier.

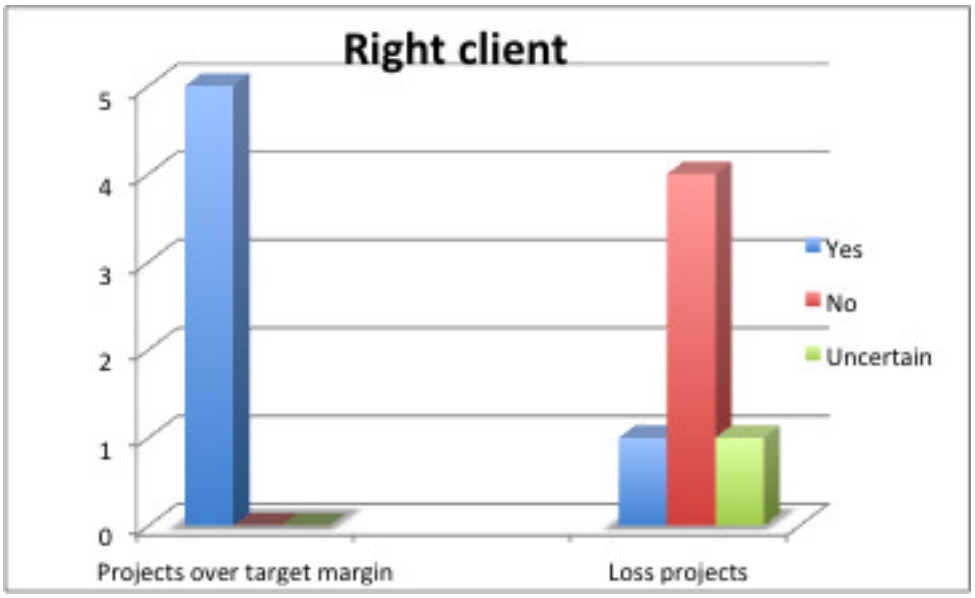


Figure 7 If the client was a "common" client which had knowledge within the construction business.

5. Pitfalls and opportunities

The time when production management team is involved in the project is well connected to the opportunity to identify and act on pitfalls and opportunities in the project. Identified pitfalls and opportunities by the project team, which is willing to make changes in process or frame that is potential new opportunities for profit, contributes to project profitability and is supported by Jergeas et al. (2001). A well-versed team can identify opportunities and pitfalls, and then act on them. It seems that profitable projects have had teams, with the goal of not continuing with the status quo, and try to find opportunities for profitability. A production solution, which increases profitability, save costs and/or time, often needs to be developed in an early phase. Several interviewees mentioned that they, because they were involved in the project time, had the possibility to identify opportunities and pitfalls, while interviewees, from loss projects that were not involved within time, mentioned that they did not have the opportunity to identify opportunities and pitfalls (Figure 8). Just having the production management team involved within time does not equal the successful opportunity identification. It depends on both personnel engagement, specialist knowledge, and is further connected to earlier experiences in the construction industry as whole.

One of the profitable projects had the production management team involved in the project with enough time, and could identify and split the work with pitfalls and opportunities within the team, e.g. logistical problems, management of important stakeholders, technical solutions. The opportunities could not have been exploited, the pitfalls could not have been identified in time, without the production management team being involved in time.

Communication, and clarity in the overall project, is affecting the profitability in construction projects, which is justified by Persson et al. (2009). Interviewees has mentioned that poor communication that has led to unclarity or ambiguity in project goals, how to focus the effort, e.g. towards profitable opportunities or production propulsion, have in some cases distinguished profitable from non-profitable projects.

During some of the interviews, we experienced a difference in the communication of what should be done in order to be profitable. Some of the interviewees sometimes felt that lack in communication contributed to ambiguity in the project. According to Persson et al. (2009), clarity within a construction project is a top ranking factor, in order to reach project success. Every construction project is unique, at some details, and in these details there are often different preconditions to be profitable. It is important, not only to identify pitfalls and opportunities in every project, but also to communicate these and how Skanska can use them to their advantage. Situations when key personnel is changed during the production phase, or when team members joining late in the production phase, may create the risk of focusing only on production propulsion instead of the project's unique strategic opportunities. We experienced that some of the projects end result would have been different if only the communication would have been little clearer. The work effort for the production management team had not necessarily been much greater, considered the possible benefits. The problem was instead a lack of guidance and clarity.

Documentation of what should be done, according to agreed goals and expectation with the client, and how it actual turned out in production, is seen to be crucial to some project's profitability. We came across some examples of projects, during the interviews, when clarity in communication of pitfalls and opportunities were important. At least two of these project economical outcomes, were a mirror of each other, partly depending on the CAW documentation. The first project identified work with CAW documentation as an opportunity to gain profitability and communicated this to the whole production organization. The second project suffered from key personnel turnover and had new replaced staffing focusing on production propulsion instead of strategic project opportunities. The interviewee mentioned that the problem was due to poor distributed communication and that a better focus on CAW documentation would have made the economical outcome differently.

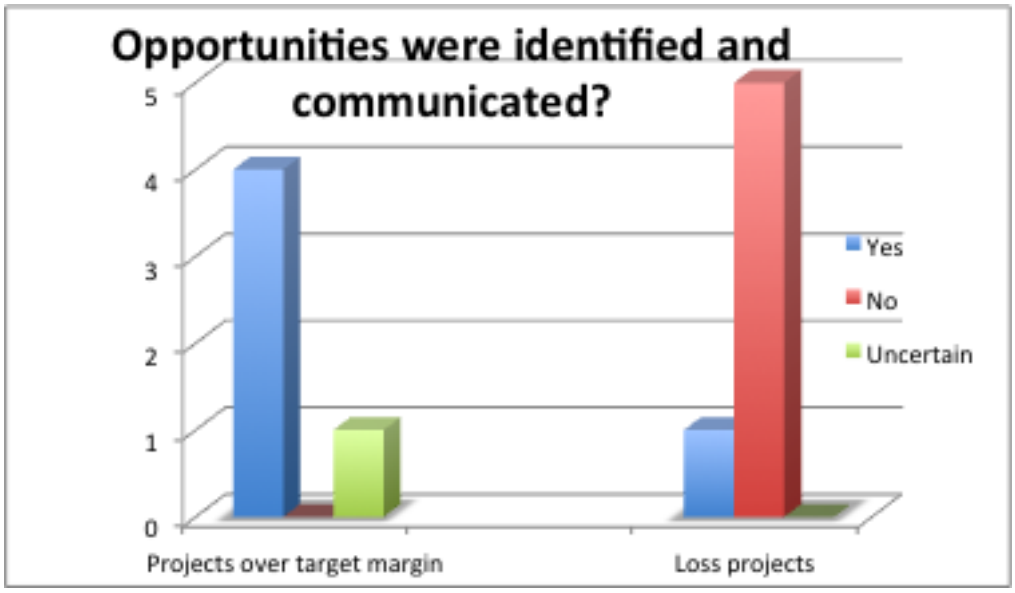


Figure 8 If the opportunities were identified and communicated.

Communication and clearance about decision pathways between involved project participants are also of significance, especially between Skanska and the client and/or client representative. The authors believe that poor decision pathways are partly affecting a projects opportunity to be profitable, especially when the project is within an unstable environment. Two projects have distinguished themselves on this point, and several interviewees have mentioned the importance of clear decision pathways between client and contractor, in order to promote profitability. An instable environment, e.g. by key personnel turnover, is according to Kryvenda (2012) negatively affecting team culture and the projects pace. A poorly involved or unavailable project management, which is seen in several loss projects, is further affecting project profitability adversely. This is due to the project manager's responsibility to deliver the project according to time schedule, is profitable, has a strong built team, and manages the client (Hobday, 2000). Decision pathways are crucial for the project profitability, because decision needs to be made and approved by client or client representative with the right mandate to do so. Some loss projects, which have had problems with diffuse decision pathways through the client organization, has affected the project profitability, often because the diffuseness has not been communicated to the whole team on site, Figure 9. This has sometimes led to, that Skanska has executed unnecessary or unapproved work, which at a later stage has not paid out. The clarity and management of client goal and expectations, in order to achieve successful projects, is supported by both (Persson et al., 2009) and (Mochal et al., 2011).

Figure 9 How did the interviewees interpreted clarity within the project.

Guiding stars, governing project goals

We argue for the need of a framework that guides the production management team towards specific project objectives, by identification and communication of project specific opportunities that promotes profitability. For example, guiding stars or objectives that contributes to project profitability. CAW documentation, for example, can be one of these guiding objectives for a specific project. That the whole project's organization is well understood that correct documentation of extra work needs to be approved by people with mandate, in order to utilize the diffuse decision pathways in client organization. Another example is to communicate the strategic opportunities to

replacing production management that come in late in the project phase, in order to not just focus on production propulsion.

The benefits with the guiding stars for the project are that they contribute to a shared understanding of what opportunities to utilize, states it constructive and makes judgment of appropriate application, creates a common and shared objective within the team so they can have the same focus, and further makes it easier to distribute responsibilities for increased project profitability.

5.2 Factors ranked 6-10

Right team

We consider that the team on site, in general, often worked well together. Our overall picture of Skanska is that they got production management team that consists of highly involve and dedicated individuals. Almost every interviewee thought that the engagement within the team on site where high. There is also a pattern that there was the right team on site in almost every project that had a result over or just below the target margins, see Figure 10. Some of the best performing projects had, according to the interviewees, in some cases, a dream team. These projects seem to have handpicked members. If it were generally positive feelings about the teams in the non-loss projects, it should reasonably show differently in some loss projects. Surprising and positively, the engagement were perceived as high in all studied project. On the other hand, according to Forsyth (2010), a high team engagement and teamwork does not equal success, nevertheless is team engagement probably vital for achieving success, the problem is not within the team engagement. However there exists deviations in the team's composition in some of the loss projects, see Figure 11. A common belief among the interviewees, from these projects, was that project management was perceived as too absent. Iyer and Jha (2005) state that the whole team is important for project performance and Hobday (2000) further argues that project management is vital for the team. We believe that it seems reasonable if parts of the problem are rooted in absent project management. Good though, is that several interviewees from projects with problems within management, answers the question of what they would do, and could done, differently, with: they would "flag" earlier upwards in the organization if the management issues would occur again.

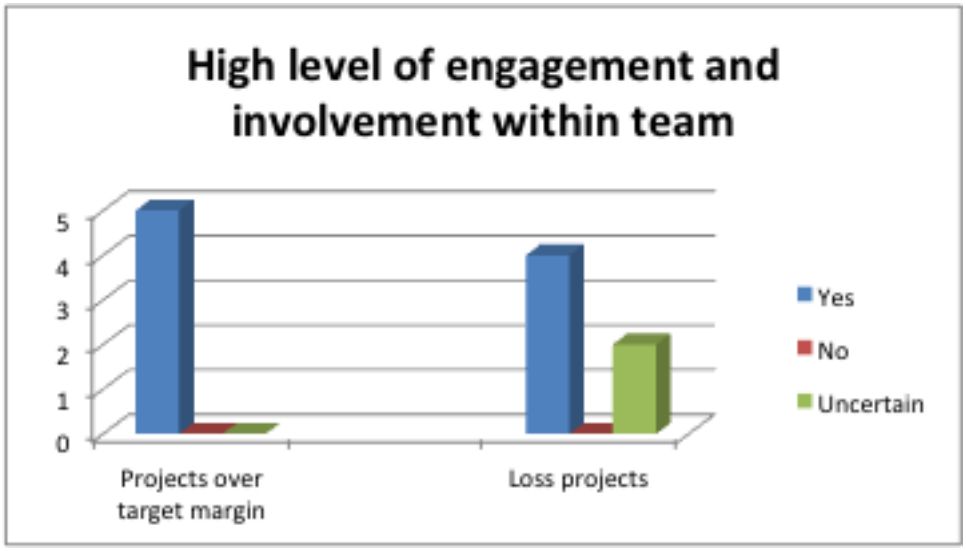


Figure 10 Engagement is overall high in the company, regardless of project result.

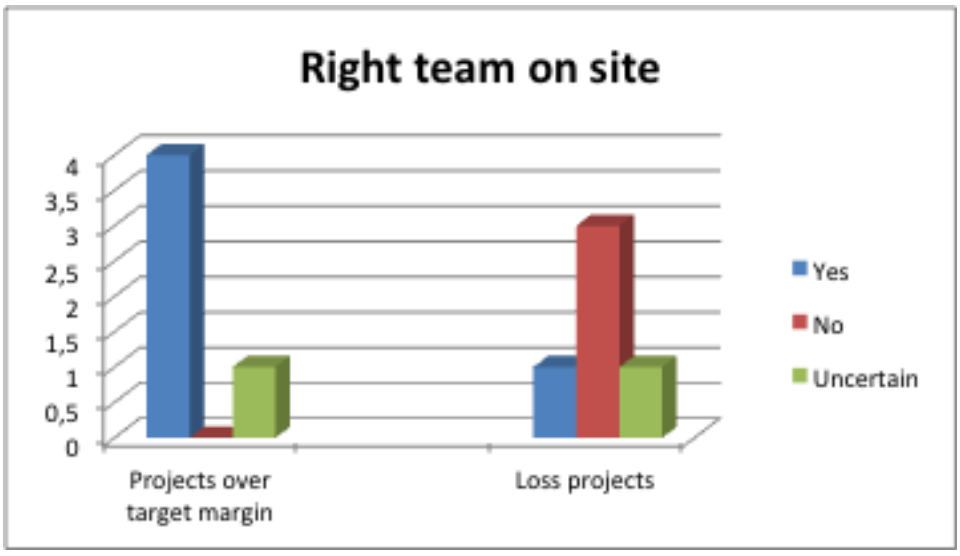


Figure 11 Some of the loss projects have problem with the project management.

Atmosphere

It is supported in the literature, for example by Chan et al. (2004) and by Chang and Bordia (2001), that team spirit, team effort and team cohesion is required for project success and performance. Our results from the interviews indicate consistency for that statement, and that atmosphere in profitable project, are considered high, according to the interviewees, see Figure 12. That the mirroring effect is nearly as consistent made that we got a stronger belief that a good atmosphere on the project is affecting profitability. The positive atmosphere is further connected to a lower personnel turnover, according to Huselid (1995), which also contributes to better project profitability. Activities and meetings in the project seem to contribute to an increased atmosphere, e.g. both external of site activities, meeting on site and small talks during coffee breaks, according to the interviewees. In this case, it's not coffee breaks in itself that directly affect profitability, but rather the knowledge sharing that is

connected to the coffee breaks that is contributing to profitability. Jonsson (2012) support this, he considers that this small talk is outperforming knowledge management systems in sharing of knowledge in projects. Almost all interviewees agrees with this argument, and mentioned that it is at these coffee breaks and common informal meetings, sometimes with feedback from the immediate supervisor, that experiences are shared and problem-solving is carried out. In other words, management should support “fika” or these small informal meetings.

Keeping up the atmosphere or employee satisfaction on the project should also be connected to team engagement and involvement, i.e. a having a high employee satisfaction should lead to employees performing on a higher level. Heskett et al. (1982) considers that employee satisfaction is, in the long run, connected to high profitability. To celebrate achievements in the project and focus on the constructive feedback should increase the overall project atmosphere, project performance and is, according to the interviews equally important in non-profitable projects as in profitable projects, to keep up the morale. Feedback from immediate supervisors is, according to Passos and Caetano (2005), beneficial for future project profitability. Not having support from, for example, project management in difficult "red" times has made that responsible production management has experienced loneliness, which could be avoidable. Avoidable in the sense that constructive feedback should not decrease in non-profitable projects, rather the opposite, in order to support production management.

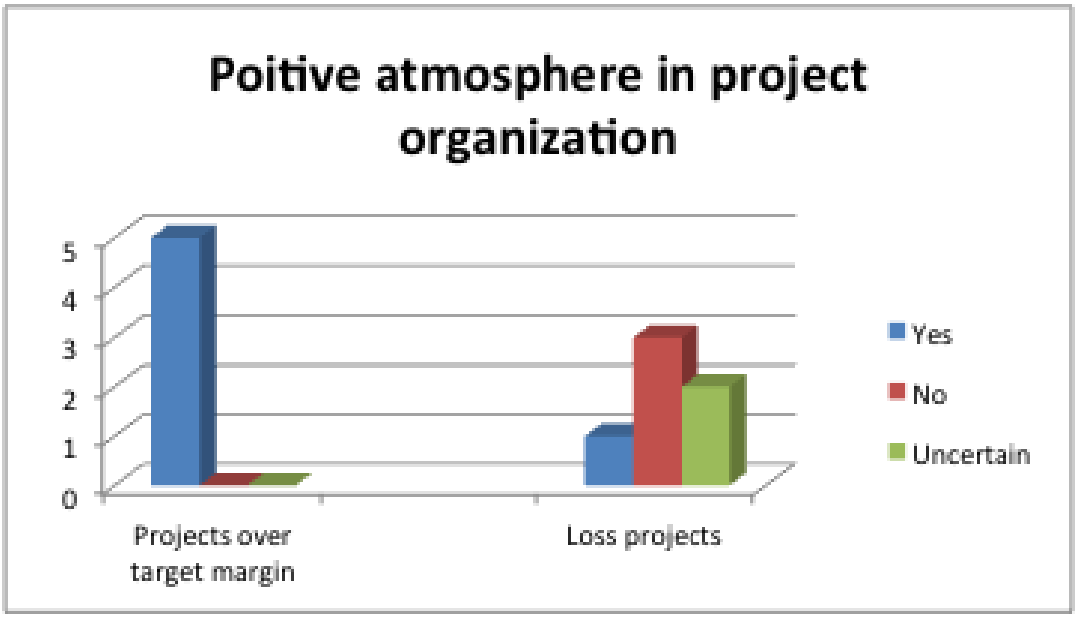


Figure 12 How the atmosphere was interpreted.

Blue-collar workers

We have not brought up the subject about blue-collar workers in the theory part. This choice has multifaceted reasons, one of them is that we have not interviewed blue-collar workers; nevertheless did several of the interviewees bring up issues that had blue-collar workers involved. Not generally as a cause, but sometimes involved in the result of other causes that affect profitability. We decided to add a question regarding the engagement among the blue-collar workforce, results of this question revealed no marked differences or connection between blue-collar workers engagement and the

projects economical outcome, see Figure 14. Some interviewees returned to the problem, where calculation has made incorrect estimates, some of this incorrect estimates refer to how long operations would take to perform, resulting in increased working hours for blue-collar workers. Another problem, which we suspect, is that there seems to be a connection between, whenever there is a calculation of a large amount, blue-collar working hours and, later in same project, a large exceeding in these amounts of hours. According to some interviewees, this amount seems to increase whenever there is a large amount of hours in the calculation. This suspicions are in a way confirmed when some interviewees, from projects that has delivered over target margin, has as a part of a strategy, to keep the calculated working hours as low as possible.

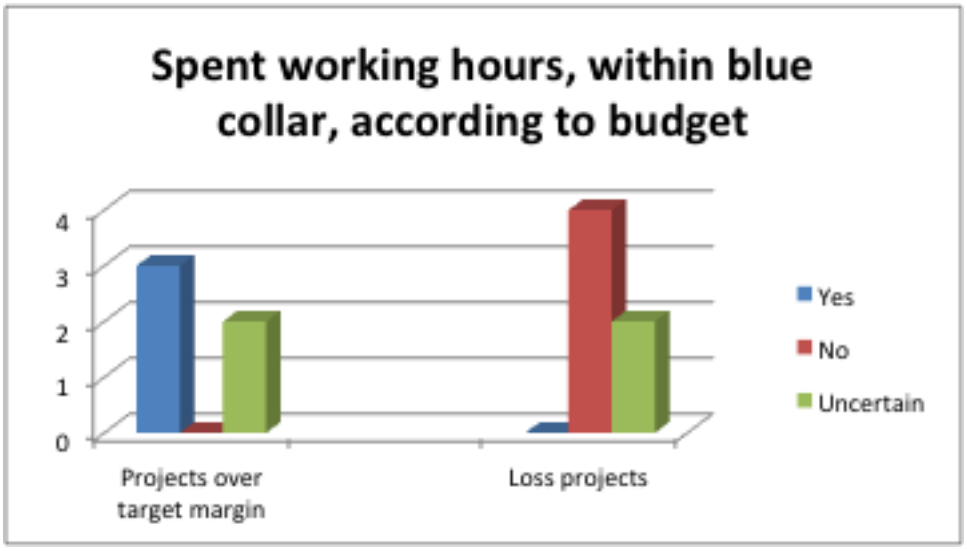


Figure 13 If the number of hours worked among blue-collar workers remained within calculation.

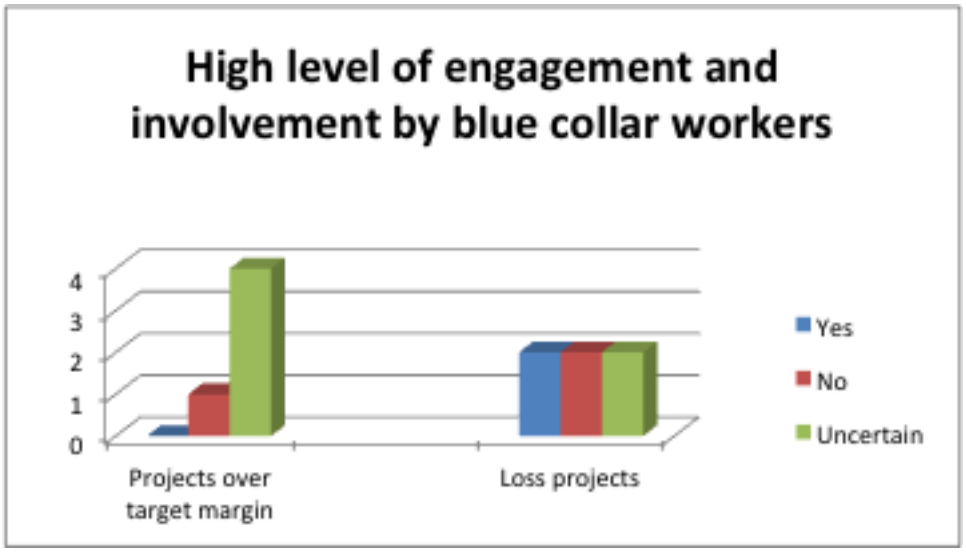


Figure 14 If there were a high engagement among blue-collar workers.

Calculation and recession

Non-profitable projects has a clear pattern of been taken in recession, while the other projects seems not to be taken during recession. The recession itself is nothing that Skanska may do anything about, but one pattern that the authors discovered is that the calculation also seems to follow the recession. Several interviewees perceived that Skanska had gone too low in the bid, in order to get the project, and that it would be impossible to build within the frames of the calculation. We believe that this situation may be described little bit like an inverted "winners curse", i.e. that Skanska won the bid but went too low. Some cases were described as that Skanska had calculated with low prices on subcontractors, but when the recession started to fade the market respond, as Borgbrant (2003) describes, with an increase in price, which resulted in errors in the calculations and a too low calculation. This is also consisting with Johansson et al. (2006) thoughts about the difficulties for companies to predict the economical situation when the project is being built. We have heard, during several interviews regarding profitable projects that a lot of the profit actually was made in purchases under calculation.

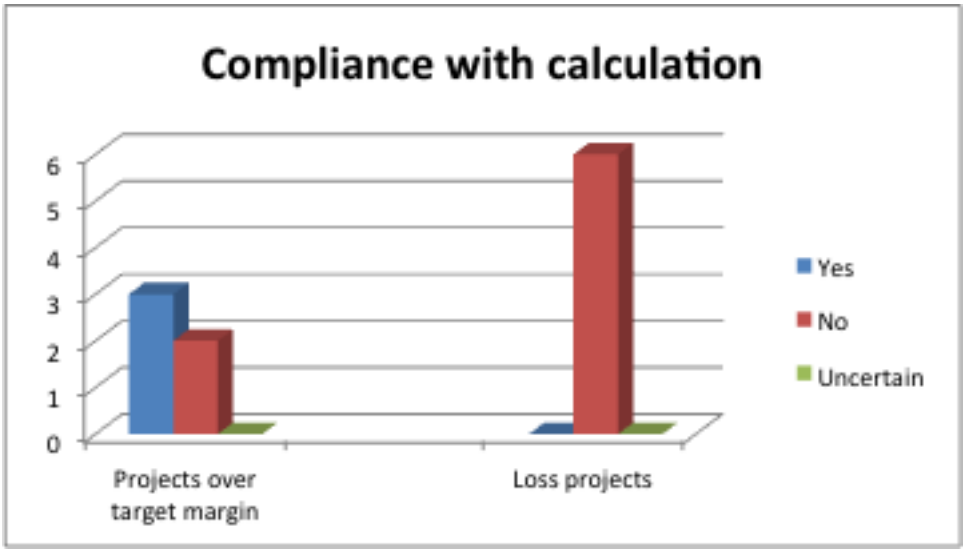


Figure 15 If the project were carried out in compliance with the calculation

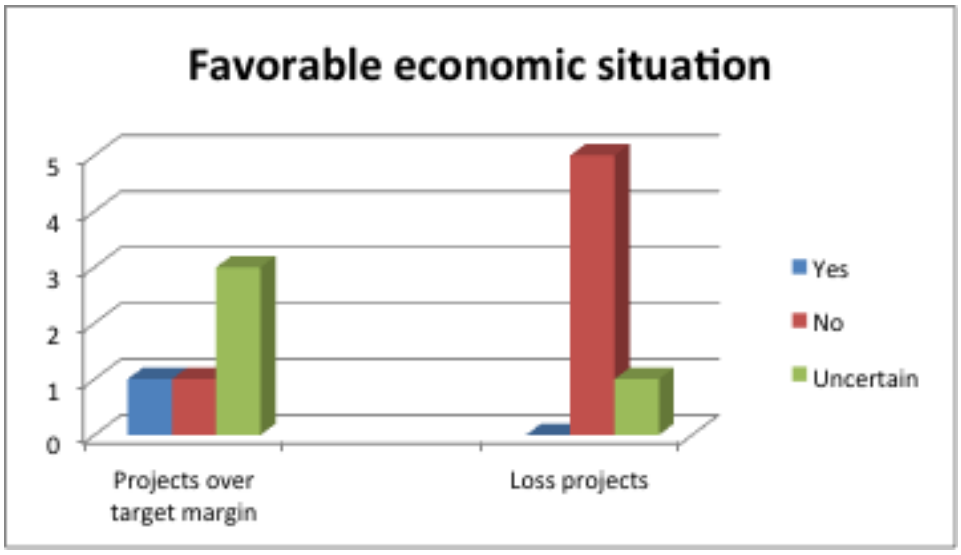


Figure 16 All loss projects were taken during recession

Designing stage and procurement of subcontractors

The project design and/or construction documents were considered to be of equal quality, regardless of project profitability outcome. It is remarkable, that almost all the interviewees thought that the construction documents were in need of improvement, some interviewees thought that they had substandard quality. That the construction documents was not correct, i.e. unable to be of use, due to the poor quality standard and that it had direct affect on the projects propulsion.

Consultants affect the project by facilitating the later production and non-occurrence of errors in production, through better produced construction documents that is: easier to read; coordinated between the different professionals; requires less scrutiny and contributes to constructability that all together affects project profitability. The positive affect of constructability is supported by Fischer et al. (1997), who further argues that construction experience should be brought back, by production management, to the designing team. It was often mentioned during interviews, by production management, that they wanted an early involvement in the project, in order to influence the project design, e.g. construction drawings, or to have the opportunity to scrutinize the designers work before production start. This is connected to production management team entering the project in time and is supported by Jergeas et al. (2001), who argues the early involvement of production management team in the design stage to improve, for example, layout, dimensioning and construction methods. It was also mention that Skanska wanted to govern the consultants to have a better design. Activities, which later results in the establishment of an early relationship with consultants are according to interviewees also connected to a greater chance of governing the consultants, e.g. towards better constructability. A proposal, in order to have a better project design result and so as to not put designing errors on production to fix at a later stage, is to have a more controlled designing stage, with more fixed deadline.

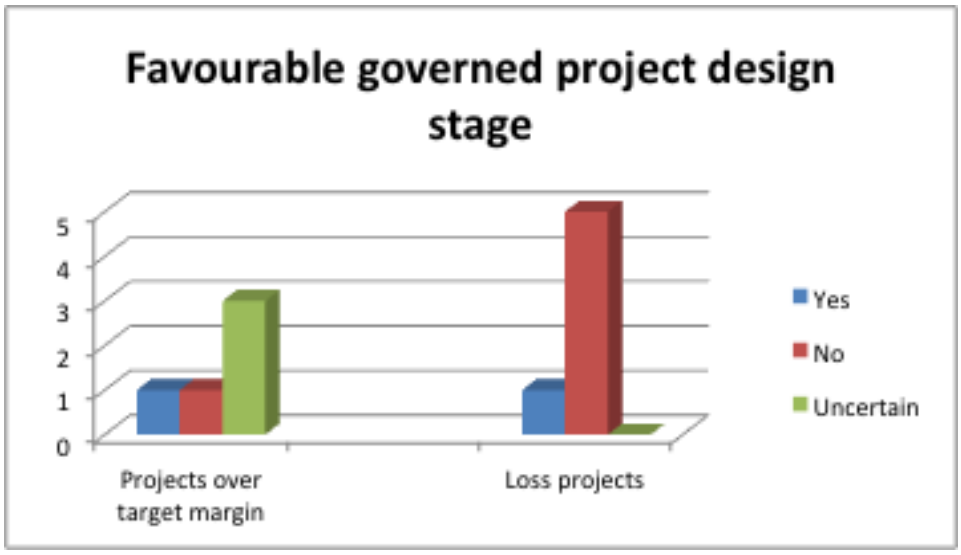


Figure 17 The interviewees' interpretation about the project design phase.

The overall picture of the collaboration with sub-contractors was expressed, by almost all interviewees, as positive in both profitable and just below target margin projects. Interviewees, from projects with an internal client, expresses positive feedback if the sub contractor could be involved more in the design stage, e.g. technical installations could be facilitated and give a higher value, or alternatively a lower final cost for the ordering client. This could perhaps be done through partnering between Skanska contractor, Skanska client and the specific sub contractor. Both Borgbrant (2003) and Josephson (2009) argue for a more long-term thinking in choice of supplier relations, and to consider the sub contractors at an earlier stage than it is currently, which according to the interviewees, is often done after the design phase is more or less finished. Long-term thinking should also be promoted, since a long-term relationship with suppliers could gain further synergies in future projects, i.e. using the same sub contractor with the same team composition project after project increases the chances of clarity in the project. Watson (1997) state that partnering is meant to reduce inconsistencies between the parties, Baxendale and Graves (1997) state that partnering is beneficial if it creates higher value to the client, and this is exactly what the authors propose. By introducing sub contractors earlier in the project, perhaps through partnering within internal projects, a higher value, e.g. by lower total building costs, could be gained by the internal client.

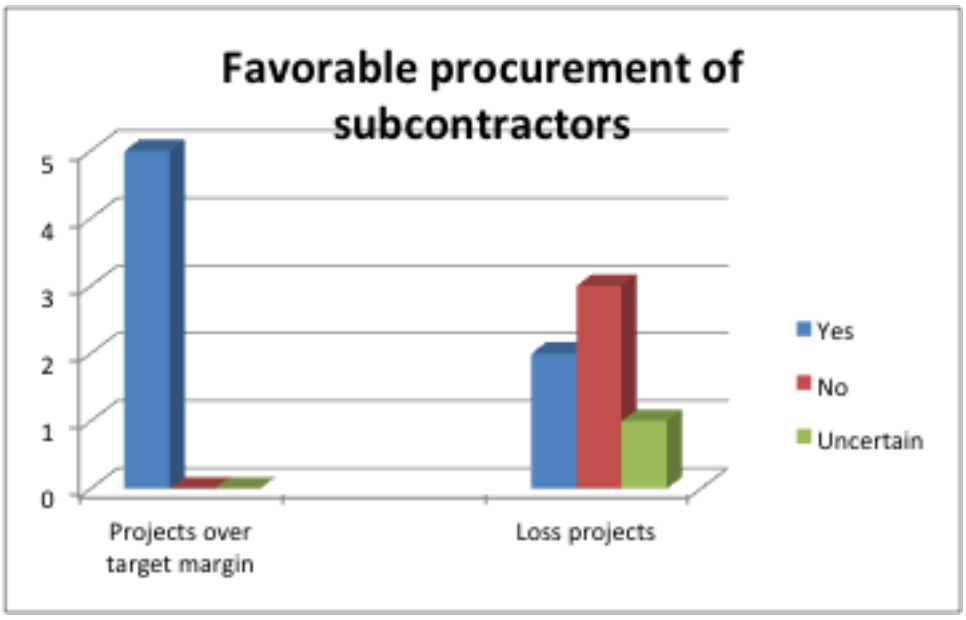


Figure 18 How the interviewees interpreted the procurement of subcontractors.

6 Conclusions

The interviews provided, in its entirety, time for reflection for those interviewed and this was often expressed with positive comments.

The interviewees' view of what they had learned from the project, or what they would have done differently, to increase profitability, and would bring as significant experience to future project, is the five ranked factors that affect profitability most often. The interviewees' reflections and the result from the interviews are connected to each other, and strengthen our result of the five ranked factors that affect profitability. Several production managers from loss projects mentioned, for example, our top-ranking factor, to involve the team in the project "within" time.

Another interesting reflection is that the poor quality of construction documents, and missing of preset milestones in the design phase, was mentioned by several interviewees in the production management team. It could perhaps be connected to the result from our interview exercise, about errors in production, because information, often commented with connection to construction documents, was interpreted as a high-ranking factor, as to why errors occurred. We believe that the designing phases could need a more structured execution plan, with more defined and clearly stated milestones. It is somewhat strengthen because it is indicated by so many interviewees that the process is poorly executed in so many cases, and that it often leads to a time limited production phase at the production site. A poor result from the design phase will adversely affect the construction phase, and the production management team often asked themselves the question, why they should pay the consequence for someone else "inadequacy and/or oversight".

Errors in production

We thought that errors would be mentioned more often in the interviews. However, the result did show that the problems within error category were connected to factors mentioned within other questions during the interviews. We have interpreted those connections or similarity as something that strengthens the findings and the top five ranked factors. Interestingly is that the figures of why errors did not occur and the figure of why errors did occur is mostly mirror each other, there is a relationship according these factors and errors affect the profitability, according to Josephson and Saukkoriipi (2005) could it be as much as 10% of the construction cost. Almost all projects that resulted over target margin are presented within the group of why errors did not occur, these projects were considered in other questions as projects with a high level of engagement through the whole team. Interesting though, are that information are ranked third, but often, as a factor of why errors did not occur. Information is ranked as the number one cause to why errors did occur in the other group. Josephson and Hammarlund (1999) argues that unclearness and bad planning phase are factors that affect occurrence of errors. Poor planning and unclearness may be reasons to substandard documents and all those factors are sorted under information. Unclearness, planning phase and substandard documents are all within the factors in the discussion that affects profitability. Unclearness may regard the client, the project goals, opportunities, key personnel turnover but also sticking to core business. Sticking to core business is the authors´ third highest ranked factor that affects the profitability. Planning phase could be the calculation or designing stage but also that the team is involved within right time, which is the authors´ highest ranked factor that

affects the profitability. Knowledge is ranked high in both categories, knowledge is something that the authors also has connected with the rate of key personnel turnover, and is strongly connected to the authors´ second ranked factor that affects the profitability. We cannot state that the error investigation in this thesis proves that the amount of errors affected the profitability, however do the authors believe that the factors that affect the profitability also has a connection with the amount of errors. There is a tendency that the amount of error is smaller in the project where profitability factors have been positive, and vice versa.

What is a successful project according to the interviewee

We believed that the rank order of profitability that would be mentioned would differ between production management and project management. Therefore, we divided all interviewed production personal, such as production leader, production engineers, production managers, under production management and the project managers in to project management. Interesting is that there is actually no big difference in when profitability is mentioned.

Type of project and the interviewee's role

It is interesting to see, that the loss projects seem all to be projects that has the characteristics of not being core business projects for the investigated district. The districts main business is to carry out pure commercial projects, like hotel buildings, office buildings, industrial buildings, retail stores etc. Exclusive housing is what we believe not core business of the studied business unit. This supports one of our theories that it is important to choose project that fit the organization, or as one interviewee stated "And there were we, building one level villas with a organization that uses tower cranes and high-house-scaffolding all around the buildings". Other interviews also highlight problems in the calculation department associated with exclusive housing projects. For example was a kitchen cost calculated to 200.000 SEK in a house that consisted some of the most exclusive apartments in Gothenburg City, it ended up in 1.200.000 SEK, each. One interviewee stated, "Our district doesn't have the experience to plan and execute this type of projects". The construction industry has low margins comparatively to other industries. Project outside the organizations core business, and with what the interviewed believes to have wrongs in calculation, seems to have small chances to be a profitable project.

Profitability according to the interviewee

This question is important, since being profitable is the core business of Skanska as a company. Skanska needs to be profitable, Skanska Sweden, the region of Gothenburg, the commercial district and finally the construction project needs to be profitable in order for Skanska as a company to be profitable. Skanska's business plan is to be profitable and this is the general topic of the master thesis. A general understanding, among all management employees, of what profitability really is, is key for the company's profitability.

Every project got its own unique target margin, it is therefore interesting that some of the interviewees actual put a percentage number as an answer of what profitability means. The meaning should be the same for all interviewees but was seen to differ

somewhat from each professional role within the group. That some interviewees struggled with defining what profitability is may make it difficult for the management to press focus on profitability. It is important that everyone, both white collar and blue collar worker, knows the meaning and has information about what profitability actually means in this context, in order for the whole organization to work with maintaining and increasing profitability which is according to the main business plan of Skanska. The decision to raise profitability is made on stab level, at headquarters, and this information must be explicitly pronounced from the top down in the organization, in order to be implemented from the bottom up.

7 References

Argyris, C. (1960). *Understanding organizational behavior*. London: Tavistock.

Ashley, D., Lurie, C. and Jaselskis, E. (1987). *Determinatior of construction project success.* Project Management Journal, 18(2), p. 69-79.

Atkinson, R. (1999). *Project management: cost, time and quality, two best guesses and a phenomenon, its time to acceps other success criteria.* International Journal of Project Management. 17(6), p. 337-342.

Baccarini, D. (1999). *The logical framework method for defining project success*. Project management journal. 30(4), p. 25-32.

Baxendale, T., and Greaves, D. (1997). *Competitive partnering - a link between contractor and sub-contractor. Procurement - A Key to Innovation,* CIB Proceedings Publication 203. CIB W92 Symposium on Procurement, Montreal, Canada, p. 21-28.

Belassi, W., and Tukel, O. (1996). *A new framework for determining critical success/failure factors in projects.* International Journal of Project Management. 14(3), p. 141-151.

Black, C., Akintoyeb, A., and Fitzgerald, E. (2000). *An analysis of success factors and benefits of partnering in construction.* International Journal of Project Management. 18(6), p, 423-434.

Borgbrant, J. (2003). Byggprocessen i ett strategiskt perspektiv. Stockholm: Byggkommissionen.

Cabrera, A., and Cabrera, E. (2002). *Knowledge-sharing dilemmas.* Organization studies. 23(5), p, 687-710.

Chan, A., Scott, D., Chan, A. (2004). *Factors Affecting the Success of a Construction Project.* Journal of Construction Engineering and Management. 130(1), p, 153-155.

Chan, D., and Kumaraswamy, M. (1997). *A comparative study of causes of time overruns in Hong Kong construction projects.* International Journal of Project Management. 15(1), p, 55-63.

Chang, A., and Bordia, P. (2001). *A multidimensional approach to the group cohesion-group performance relationship*. Small Group Research. 32(4), p, 379-405.

Chua, D., Kog, Y., Loh, P., and Jaselkis, E. (1997). *Model for construction budget performance: neural network approach.* Journal of Construction Engineering and Management. 123(3), p, 214-222.

Clegg, S., Kronberger, M., and Pitsis, T. (2011). *Managing & organizations: An introduction to theory & practice.* Second edition. London: Sage.

Cohen, D., and Crabtree, B. (2006). Robert Wood Johnson, *Qualitative research guidelines project – semi structured interviews.* Retrieved from http://www.qualres.org

Construction Industry Institute (1986) *Constructability: A Primer, Construction Industry Institute*. Austin, Texas. Publication 3-1, july

Cox, R., and Goodman, C. (1956). Marketing of house-building materials. Journal of Marketing. 21(1), p, 36–61.

Denzin, N., and Lincoln, Y. (1994). *Introduction: Entering the field of qualitative research.* In Denzin and Lincoln (eds.), Handbook of Qualitative Research. Second Edition. pp. 1-17. Thousand Oaks: Sage.

de Wit. A. (1988). *Measurement of project success.* International Journal of Project Management. 6(3), p, 164-170.

Fernie, S., Green, S., Weller, S., and Newcombe, R. (2003). *Knowledge sharing: context, confusion and controversy.* International Journal of Project Management. 21(3), p, 177-187.

Fischer, M., and Tatum, C. (1997). *Characteristic of design-relevant constructability knowledge.* Journal of Engineering and Management. 123(3), p, 253-260.

Forsyth, D.R. (2010). *Group Dynamics*. Fifth edition. Belmont, CA:Wadsworth/Cengage.

Gidado, K. (1996). *Project complexity: the focal point of construction production planning*. Construction Management and Economics. 14, p, 213–225.

Hagstrom, R. (1997). *The Warren Buffett Way: Investment Strategies of the World's Greatest Investor.* New York: Wiley.

Hassan, A. (1995). *Don't burn that bridge.* Journal of Management in Engineering. 11(6), p, 22.

Heskett, J., Sasser, Jr., and Schlesinger, L. (1997). *The Service Profit Chain: How Leading Companies Link Profit and Growth to Loyalty, Satisfaction, and Value*. The Free Press, New York.

Bhagat, S., Dong, M., Hirshleifer, D., and Noah, R. (2005). *Do Tender Offers Create Value? New Methods and Evidence.* Journal of Financial Economics. 76(1), p, 3-60.

Hobday, M. (2000). *The project-based organization: an ideal form for managing complex products and systems?* Science and Technology Policy Research. 29(7), p, 871-893.

Hubbard, D. (1990). *Successful utility project management from lessons learned.* Project Management Journal. 21(3), p, 19-23.

Huselid, M. (1995). *The Impact of Human Resource Management Practices on Turnover, Productivity, and Corporate Financial Performance.* The Academy of Management Journal. 38(3), p, 635-672.

Iyer, K., and Jha, K. (2005). *Factors affecting cost performance: evidence from Indian construction projects.* International Journal of Project Management. 23(4), p, 283-295.

Jaselskis, E., and Ashley, D. (1991). *Optimal allocation of project management resources for achieving success.* Journal of Construction Engineering and Management. 117(2), p, 321-340.

Jergeas, G., and Put, J. (2001). *Benefits of constructability on construction projects.* Journal of Construction Engineering and Management. 127(4) 281-290.

Johansson, M., and Mattsson, J. (2006). *Key factors contributing to more successful construction projects.* Luleå: Luleå University of Technology. 2006:259

Jonsson, A. (2012). *Kunskapsöverföring och knowledge management*. Liber: Malmö

Josephson, P.-E., and Björkman, L. (2009). *31 recommendations for increased profit – reducing waste*. Chalmers University of Technology. Göteborg

Josephson, P.-E., and Hammarlund, Y. (1999) *The Cost of Defects in Construction.* Automation in Construction, 8(6), p, 681-687.

Josephson, P.-E., Knauseder, I., and Styhre, A. (2003). *Lärande i byggprojekt – det bortglömda framgångsreceptet*. Göteborg: Byggkommissionen.

Josephson, P-E., and Saukkoriipi, L. (2005). *Slöseri i byggprojekt, Behov av förändrat synsätt.* Fou-Väst Rapport 0507. Göteborg: Swedish Construction Federation.

Kadefors, A. (2004). *Trust in project relationships - inside the black box*. International Journal of Project Management. 22(3), p, 175-182.

Karrbom-Gustavsson, T. (2011). *Byggsektorns förmågor: V Byggprojekt – ett skapande kaos?* Rapport 2011:4. Stockholm: TRITA-FOB.

Katzenback, J., Smith, D. (1993). *The Discipline of teams*. Harward Business Review. March-April.

Knauseder, I., Josephson, P.-E., and Styhre, A. (2006). *Learning capability in construction projects: from the learning organisation to the learning project.* (red) CIB W99 Quality and Safety on Construction Sites, International Conference on Construction Project Management Systems: The Challenge of Integration. Sao Paulo, Brazil 25-28 March 2003.

Kululanga, G., McCaffer, R., Price, A., and Edum-Fotwe, F. (1999). *Learning mechanisms employed by construction contractors.* Journal of Construction Engineering Management. 125(4), p, 215-223.

Kryvenda, A. (2012). *Reducing Adversity of Employee Turnover within Projects.* Göteborg. Göteborg: Chalmers University of Technology. 2012:34.

Liu, A., and Walker, A. (1998). *Evaluation of project outcomes*. Construction Management and Economics. 16, p, 209-219.

Mathews J., Tyler A., and Thorpe A. (1996). *Pre-construction project partnering: developing the process.* Engineering Construction and Architectural Management. 3(1/2), p, 117-131.

Mochal, J., and Mochal, T. (2011). *Lessons in project management.* Second Edition. New York: Springer

Munns, A., and Bjeirmi, B. (1996). *The role of project management in achieving project success.* International Journal of Project Management. 14(2), p, 81-87.

Passos, A., and Caetano, A. (2005). *Exploring the effects of intragroup conflicts and past performance feedback on team effectiveness*. Journal of Managerial Psychology. 20(3/4), p, 231-244.

Persson, D., and Hansson, E. (2009). *Att lyckas i byggprojekt.* Halmstad: Högskolan I Halmstad. 2082:3020.

Peters, T., and Waterman, R. (1982). *In search of excellence: Lessons from America's Best-Run Companies*. New York: Harper & Row.

Pinto, J., and Prescott, J. (1988). Variations in critical success factors over the stages in the project life cycle. Journal of management. 14(1), p, 5-18.

Rockhart, J. F. (1982). *The changing role of the information systems executive: A critical success factors perspective.* Sloan Management Review, 24(1), p, 3-13.

Ronald, D. (1961). *Management Information Crisis*. Harvard Business Review, 39(5), p, 111-121.

Sanvido, V., Grobler, F., Parfitt, K., Guvenis, M., and Coyle, M. (1992). *Critical success factors for construction projects.* Journal of Construction Engineering Management. 118(1), p, 94-111.

Skanska (2013). Produktionschef. Available: http://www.skanska.se/sv/jobba-hos-oss/tjansteman/produktion/produktionschef/.

Skärpning gubbar! *Om konkurrensen, kvaliteten, kostnaderna och kompetensen i byggsektorn.* (SOU 2002:115). Stockholm. Socialdepartementet.

Swedish Construction Federation (2011). *Fakta om byggandet 2011*. Rapport. Stockholm: Sveriges Byggindustrier.

Tuman, J. (1986). *Success modeling: a technique for building a winning project team*. Project Management Institute Annual Seminor & Symposium, Montreal, p, 94-108.

Walker, D. (1995). *An investigation into construction time performance*. Construction Management and Economics. 13(3), p, 263-274.

Watson K. (1997). *No hiding place*. Construction Manager. (2). pp, 12-14.

Vene, E. (2012). *Så får han gruppen att jobba åt samma hall*. Ingengörskarriär, 30, maj

Winch, G. (2010). *Managing construction projects*. Second edition. West Sussex: Wiley-Blackwell.

Wong, A. (2002). *Sustaining company performance through partnering with suppliers*. International Journal of Quality & Reliability Management. 19(5), p, 567-580.

Work Environment Authority (2006). *Hälsofarlig stress i byggprocessen*. Rapport 2006:11). Stockholm: Arbetsmiljöverket

Yeung, A., Ulrich, D., Nason, S., and Von Glinow, M. (1998). *Organizational Learning Capability: Generating and Generalizing Ideas with Impact*. New York: Oxford University Press.

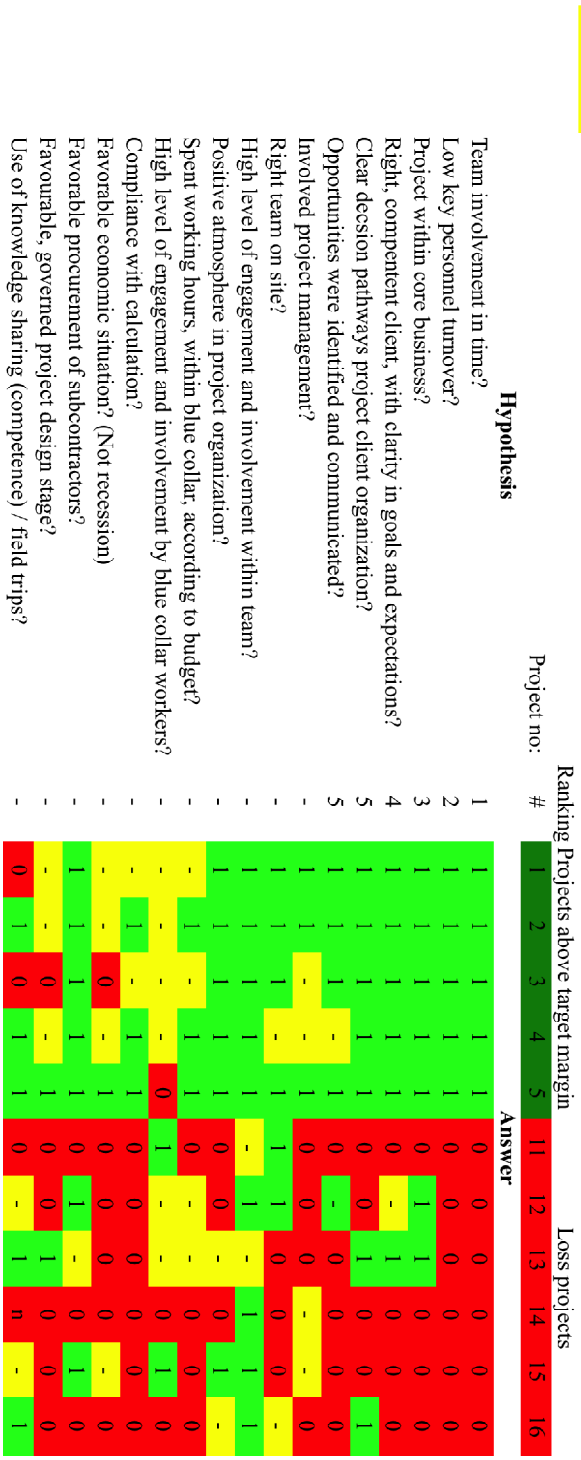
Zeithaml, A. (2009). *Delivering quality Service - Balancing customer perceptions and expectations*. New York: Free Press.

Zook, C., and Allen, J. (2001). *Profit from the Core: A return to growth in turbulent times.* Harvard Business School Press.

8 Appendix

Appendix 1:

Appendix 2


Authors interpretaion of the interview
1
yes
0
no
-
Uncertain or ambiguous
Ranking Projects above target margin
Loss projects
Project no:
#
Answer
Hypothesis
Team involvement in time?
Low key personnel turnover?
Project within core business?
Right, competent client, with clarity in goals and expectations?
Clear decsion pathways project client organization?
Opportunities were identified and communicated?
Involved project management?
Right team on site?
High level of engagement and involvement within team?
Positive atmosphere in project organization?
Spent working hours, within blue collar, according to budget?
High level of engagement and involvement by blue collar workers?
Compliance with calculation?
Favorable economic situation? (Not recession)
Favorable procurement of subcontractors?
Favourable, governed project design stage?
Use of knowledge sharing (competence) / field trips?