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Are the project success factors identified 30 years ago still valid today?

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Preface

This Master thesis was written as the final part of Executive Master of Business Administration program at Handelshøyskolen in Stavanger, University of Stavanger (UIS)

The main aim for the research was to validate if the success factors established 30 years ago are still valid in 2019? The relevance of the study is to understand if the technology shifts the last decades, together with business environment becoming more digitalized, have made an impact on the way organizations perceive the importance of the identified project success factors today.

Even though our respondents at professional network platform LinkedIn are anonymous we would like to express our gratitude to all 203 respondents that provided us with responses to our survey. Thank you for your time and contribution!

A special thanks goes out to John Kirkhus, Øystein Huglen and Inge Rydland for their willingness to review the early versions of our survey and help us craft this into the very successful survey that it became!

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Finally, with gratitude we thank our master thesis supervisor, Professor Terje Våland, for his thorough supervision and guidance throughout the process. His guidelines and comments helped us find our way and stay on track throughout our work. We greatly appreciated the sessions we had together during this period.

Sola, May 20, 2019

Abstract

Organizations are becoming more project based than just a few decades ago and project management can be instrumental in helping organizations execute designated tasks effectively and efficiently. However, the use of project as a tool to achieve the organizational goals does not automatically guarantee project success.

Implementing and executing good projects depends on many different factors. This thesis is an effort to investigate if the project success factors identified in the 1980's, are still valid today. For our thesis, we have elected to focus on Pinto and Slevin's 14 project success factors that were developed in the mid- 1980's. This is partly because these success factors are the most cited, and as such, seem to be the ones that have received the most attention.

For our survey we decided to use social media platform LinkedIn as the main access to respondents. By using LinkedIn, we had the ability to easily reach out to respondents globally and the opportunity to gather information from many respondents in a relatively short time period.

The main conclusion that we can draw is that the success factors that were identified over 30 years ago, are still valid in 2019. Overall, most respondents rated the majority of the 14 factors high, or very high. The exception being the success factor "Environmental Events". This factor consistently scored lower. Environmental events relate to the likelihood of external organizational or environmental factors impacting on the operations of the project team, either positively or negatively.

In addition to confirming that the 14 success factors still seem to matter, some of our respondents pointed to a potential new success factor: Organizational Culture.

The critical success factor rated highest amongst all respondents was the success factor "trouble-shooting". Trouble-shooting relates to the ability and capacity to handle deviations from plans and unexpected events, both negative and positive.

This thesis is a contribution in the field and project and strategic management. In addition, our Further Research chapter points to several interesting topics that warrant future studies. The results can be used by practitioners that are interested in improving the efficiency of their projects.

Key words: Project management, Project success factor, Critical success factors, LinkedIn, Microsoft Forms, ANOVA

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1. Introduction

In this chapter we will set the stage by providing the context in which we are focusing our thesis. We will then present our problem statement and complete this chapter by introducing some practical implications of our work.

1.1. The context

Over the last 50 years, projects have become a common way for organizations of all sizes to survive and thrive in an ever more competitive world. Projects allow organizations to identify and implement the strategy needed to continue to evolve. Throughout our careers many of us are exposed to, and participate in, various projects. With projects we mean a series of successive tasks that must be completed in order to achieve a specific outcome. However, it is not just important for organizations to run projects of various sizes. The projects must be successful as well, if the business is to continue to thrive. We define successful project as a project that delivers the planned outcomes to the end customers.

Implementing and executing good projects depends on many factors contributing to project success. Research over the last 50 years claims that there are a limited number of factors that need to be present for a project to be perceived as a success, see for example, Belassi and Tukel (1996) and Müller and Jugdev (2012). Despite that project success has been a dominant theme in the project management literature over the last 50 years, and that academic research has largely attempted to develop a universal theory on project success, there is still little consensus on the factors that lead to project success (Müller & Jugdev, 2012).

Furthermore, the same researches claim that most of the work done on project success factors stem from the 1970's and 1980's (Belassi & Tukel, 1996; Müller & Jugdev, 2012). We want to investigate to which degree these factors still apply as critical success factors in the present day, and perhaps challenge established, mainstream theories on recipes for success. Particularly seen in the light that recent surveys claim that over 50% of projects that are initiated either failed or were challenged. See for example the annual PMI *Pulse of the Profession* report (PMI, 2018), or the annual CHAOS report (The Standish Group, 2018).

The changes in business landscape have been profound since the early research on project success factors developed in the 1970's and 1980's. Back then, organizations and decision makers were often caught up in a traditionally linear (non- disruptive) thinking. Today, digitalization of work processes and traditional manufacturing is challenging this way of linear thinking. Organizations and decision makers need another mindset to cope with these new forces causing disruption to their businesses.

The study will be limited to the analysis of project success factors and project failure will not be part of the work.

1.2. Problem Statement

Emerging new technologies is disrupting existing business models today, and this technological shift is seen across many industries. A paradigm shift is underway and will challenges our thinking in the way of doing business in the future. Another shift underway is the way organizations are using projects as a tool to cope with the competitive business environment of today.

The relevance of this thesis is to understand if the predictive factors for project success identified 30 years ago, are still valid in 2019, when organizations are going through digital transformation reshaping their business models, and where projects have become one of the most common ways organizations are executing their business strategies. Furthermore, comparing the abundance of research carried out on success factors that correlate to project success with the surveys showing failure rates of projects poses some interesting questions. One of which we are addressing in this thesis:

Are the project success factors identified 30 years ago still valid today?

In addition, the aim is to further understand the following:

- Are there differences between which factors lead to project success depending on whom is surveyed?
 - where that person is located
 - what industry the person works in
 - gender
 - age group

- what role the person has in the organization
- what role the person has in the project
- size of his/her organization
- the size of the project that the person was involved with
- Finally, are there new factors that play an important role in ensuring project success in 2019?

1.3. Practical implications

We are in the middle of a paradigm shift when it comes to the speed of technical breakthroughs (Schwab, 2016). As such, it becomes more important than ever to focus on the right activities and factors in order to facilitate project success. Digitalization is the new hot topic for many organizations. Many technology-based organizations are prioritizing innovation projects to create business advantage to sustain their business. We live in times of great change, and it is ever clearer that companies will likely not gain competitive advantage by their ability to recognize how markets are moving. Instead, focusing on executing the necessary strategic responses as quickly as possible is what will differentiate them from the competition (The Economist, 2013). Different business strategies require different project strategies including cost advantage, customer focus, product advantage and time advantage or a combination of these project strategies. If done well, projects can give a firm a significant competitive advantage. Done poorly, it can lead to the failure of a business.

The study will contribute in the research area by merging theory and practice to explore the effect of established, 30-year-old factors on project success today. This thesis will give insights to organizations of different types and sizes that are interested in understanding which factors need more attention than others in an ever-changing world.

The result from the study will be important for top management and project managers, as well as others who are interested in understanding which factors are critical during the project life cycle. With the aim being to ensure project benefits are captured long-term.

1.4. The journey

The following three steps summarize how this thesis will be organized:

- First, relevant theory will be studied, and the most applicable success factors will be chosen based on their relevance and widespread use across the world
- Second, a survey will be sent out to a wide, global audience, in order to gather empirical data on the applicability of the success factors
- Third, the findings will be analyzed and discussed relative to relevant theory.

2. Theory

In this chapter we will initially focus on the bigger pictures, before narrowing in on the most applicable theory. We will conclude this chapter by focusing in on the individual aspects that explain in detail each of the factors that affect project success.

2.1. Introduction

According to Wittington et. al. (1999) the project way of working has been one of the main initiatives to create competitiveness in existing and in new markets for organizations. This project way of working has become a major contextual factor in how to conduct business and execute daily work in organizations. Doing business in this way has increased substantially in recent years and the organizations doing business through project work will need their projects to succeed for the organization to succeed. However, according to research papers, many projects fail to contribute the benefits customers or project owners are expecting (Shenhar, Milosevic, Dvir, & Thamhain, 2007). Recent studies, such as those carried out by the PMI, Standish Group as well as KPMG, confirm this by showing that over 50% of projects that are initiated, either fail, or were challenged (Hastie & Wojewoda, 2015; PMI, 2018; Sjoström & Braun, 2015).

Considering that there is relevant research available on factors that lead to project success, see for example Belassi and Tukel (1996) and Müller and Jugdev (2012), we find the PMI, Standish and KPMG survey results to be quite interesting. Could it be that the established success factors no longer apply to the same extent as when they were first identified 30 years ago?

A project is a temporary endeavor undertaken to create a unique product, service or result. Temporary in this context means that it has a defined beginning and end in time, with defined scope and resources (PMI, 2017). A project is unique in the sense that it is not seen as part of the daily routine operation in an organization, but a specific set of activities designed and executed to accomplish a common goal for the organization.

In general terms, here are two major groups that each business can be divided into (Zatti, 2013):

1. Run-the-business: This is the group that focuses on the continuous and repetitive activities that are involved in operational management of a business.

2. Change-the-business: This is the group that focuses on innovation and developing the business. This is the group that strategic projects belong in.

Both groups historically treated projects as standalone events and success was measured based on if the project achieved agreed scope, time and budget and the need to satisfy the customer. (Kloppenborg, Tesch, & King, 2012) In many cases projects are initiated for other reasons. Of course they need to meet all the project objectives, but these are steps and means to achieve the real purpose: *projects are initiated for business results* (Shenhar et al., 2007). When the project team is engaged in day-to-day project execution, their mindset is focused in getting the job done and not focused on the business aspect. This operational mindset of doing the job efficiently may lead to disappointing business results, and even failure, when the project is not done effectively (Shenhar et al., 2007).

2.2. Success factors

The early studies on factors which affect outcome of projects were focused on factors that lead to failure. The concept of success and failure factors was first introduced by Rubin and Seeling in 1967 (Belassi & Tukel, 1996). Since then the term “success factor” has been well defined and extensively covered in project management literature. It refers to a set of conditions to which the project must adhere to in order to achieve success (B. A. Hussein, 2012). To understand the relationship between factors and project success, we need to define the concept of project success. The understanding of project success has changed over the years from definitions limited to providing operational value for the project, to reflecting the value of success over the project life cycle (Jugdev & Müller, 2005). In this thesis, project success will be considered in terms of the outcome of the project, i.e. the success of the product or service that the project created, which is aligned with research literature (Muller, 2017). Looking beyond the operational approach, which is measuring project success on the last day of the project, is also referred to as project management success in the research literature (Muller, 2017). From a project manager perspective, it is possible to fail on one anticipated success factor in a project, while at the same time succeed in another. The definition of success has progressed from being limited to the implementation phase of the project life cycle to reflect an appreciation of success over the entire project and product life

cycle (B. A. Hussein, 2012). This is further mentioned in the study made by (Shenhar et al., 2007) where they placed customer satisfaction as the number-one-criteria for overall success and put the operational criteria (“the iron triangle”) second (Shenhar et al., 2007).

Many previous studies have examined and identified factors contributing to project success for different categories of projects, other studies have examined the effects of specific factors on project success regardless of the type of project (B. Hussein, 2018). Belassi and Tukul (1996) and Müller and Jugdev (2012) carried out literature reviews of the factors that have been identified in literature (Belassi & Tukul, 1996; Müller & Jugdev, 2012).

Reviewing the articles by Belassi and Tukul (1996) and Müller and Jugdev (2012), combined with recent Google Scholar citation reviews, it becomes clear that one set of critical success factors (CSF) stands out as being more popular than the other CSF’s (Pinto and Slevin 1986; 1988). See table 1 below. One of the reasons why Pinto and Slevin’s work is widely recognized is that they took a broad and systemic approach to their studies, proposing a scientific basis for success. To start out with, they defined project success and, in this way, identified the factors that supported success. They then followed up with an assessment of the different weights each of these factors had over the project life cycle or in different industries. Finally, they developed a tool that allows project managers to assess the status of their own projects. Table 1 below is a summary of the initial table created by Belassi and Tukul (1996) that identified 7 CSF lists. We have summarized the table by focusing on the 4 CSF lists with the most citations on Google Scholar per December 31, 2018. Note that Pinto and Slevin’s work is found in four different articles, as such, the citation number is a combination of these four, published in the period 1986 – 1988 (Pinto & Slevin, 1986a, 1988a).

Authors:	Cleland and King (1983)	Baker, Murphy and Fisher (1974)	Morris and Hough (1987)	Pinto and Slevin (1986 & 1988)
Cited:*	1102	774	1296	3275
Critical success factors:	Project summary	Clearly established success criteria	Project objectives and their viability	Project mission
	Operational concept	Goal commitment of project team	Technical uncertainty innovation	Top management support
	Top management support	On-site project manager	Politics	Project schedule/plans
	Financial support	Adequate funding to completion	Community involvement	Client consultation
	Logistic requirements	Adequate project team capability	Schedule duration and urgency	Personnel
	Facility support	Accurate initial cost estimates	Financial, legal and contractual matters	Technical tasks
	Market intelligence (who is the client)	Minimum start-up difficulties	Project implementation	Client acceptance
	Project schedule	Adequate planning and control techniques		Monitoring and feedback
	Executive development and training	Task (vs. social orientation)		Communication
	Manpower and organization	Absence of bureaucracy		Trouble-shooting
	Acquisition			Characteristics of the project team leader
	Information and communication channels			Power and politics
	Project review			Environment events
				Urgency

* as per Google Scholar on Dec 31, 2018

Table 1 - Summary of the most cited CSF's from Belassi and Tukel's work (1996)

As is seen in the table above, more than a decade before Pinto and Slevin's work, Baker Murphy and Fisher carried out what is considered to be one of the earliest CSF lists (Baker, Murphy, & Fisher, 1997). As part of research work Baker, Murphy and Fisher carried out under the sponsorship of NASA in the early 1970's, they found 10 factors to be strongly related to project success and failure. (Baker et al., 1997).

Another and more recent study that caught our attention was done by Dvir and Shenhar's 2007. They looked at 18 very large and successful strategic projects in a variety of industries. They found 11 factors that these projects seemed to have in common, of which six factors stood out as being essential for the success of these 18 strategic projects. The six essential factors can be summarized as (Dvir & Shenhar, 2007):

- Mission definition – setting clear goals
- Long project definition phase – ensuring detailed plans are in place
- Unconditional management support
- A highly qualified project manager (or product champion)
- Using outside knowledge – not trying to reinvent the wheel
- Integrated development teams – ensuring a highly skilled project team is created

This study has not made it to the comparison lists developed by Belassi and Tukul or Müller and Jugdev, but nevertheless, is interesting in the sense that the six essential factors identified by Dvir and Shenhar can also be identified in the generic lists as summarized in our Table 1, which is an abridged version of the original comparison table created by Belassi and Tukul (Belassi & Tukul, 1996).

Reviewing the factors that have been identified in various studies, it becomes quite clear that even though the basis for the various studies are very different and have stretched over the period between 1960 - 2010, the factors affecting project success seem to be quite similar, even if there is no common consensus that has enabled the creation of one single CSF list. See Table 1 for a comparison.

For our thesis, we have elected to focus on Pinto and Slevin's CSF list. This is partly because the CSF list developed by Pinto and Slevin is the most cited, and as such, seems to be the one that has received the most attention. Furthermore, Pinto and Slevin proposed a scientific basis for success by originally introducing a 10-factor model. This list of factors was derived from asking participant to look back on successful projects with which they had been involved with and put themselves in the role of the project manager. They were then asked to identify which factors would substantially affect successful implementation of the project. They further refined this list with four additional external factors that are outside of the control of the project team, but nevertheless play an important role in ensuring a project is successful (Pinto & Slevin, 1988a). Pinto and Slevin summarize the critical success factors as follows (Pinto & Slevin, 1988a):

1. **Project mission** – Initial clarity of purpose, goals and strategic choices to get there
2. **Top management support** – Willingness of top management to provide the necessary resources and authority/power for project success
3. **Project schedule/plans** – A detailed specification of the individual action steps required for project implementation
4. **Client consultation** – Communication, consultation, and active listening to all impacted parties

5. **Personnel** – Recruitment, selection, and training of the necessary personnel for the project team
6. **Technical tasks** – Availability of the required technology and expertise to accomplish the specific technical action steps
7. **Client acceptance** – The act of “selling” the final project to its ultimate intended users
8. **Monitoring and feedback** – Timely provision of comprehensive control information at each phase in the implementation process
9. **Communication** – Access to an appropriate network and necessary data to all key factors in the project implementation
10. **Trouble-shooting** – Capacity to handle deviations from plans and unexpected events
11. **Characteristics of the project manager** – Competence of the project manager (administratively, interpersonally, and technically) and the amount of authority available to perform his/her duties
12. **Power and politics** – Ability to deal with conflict of interest between the project objectives and key stakeholder objectives
13. **Environmental events** – The likelihood of external organizational or environmental factors impacting on the operations of the project team, either positively or negatively
14. **Urgency** – The perception of the importance of the project or the need to implement the project as soon as possible

Figure 1, below, is a development of the original figure as presented by Pinto and Slevin in 1986 (Pinto & Slevin, 1986a). It has been modified in this thesis to also illustrate how all the 14 factors identified in the work by Pinto and Slevin in 1988 together affect project success. The figure illustrates that seven factors occur in a sequence, as opposed to randomly occurring (Pinto & Slevin, 1986a). These seven factors are illustrated in the left part of the figure, with arrows indicating the sequence in which they occur. A few of the factors need to be present in all steps, such as ensuring good communication, relaying feedback and monitoring progress as well as being able to trouble-shoot anything that has not been planned for. The arrows shows the flow of information and sequences. Finally, the four external factors have been added to the right of the figure,

indicating that these affect project successes independently of the 10 project internal factors.

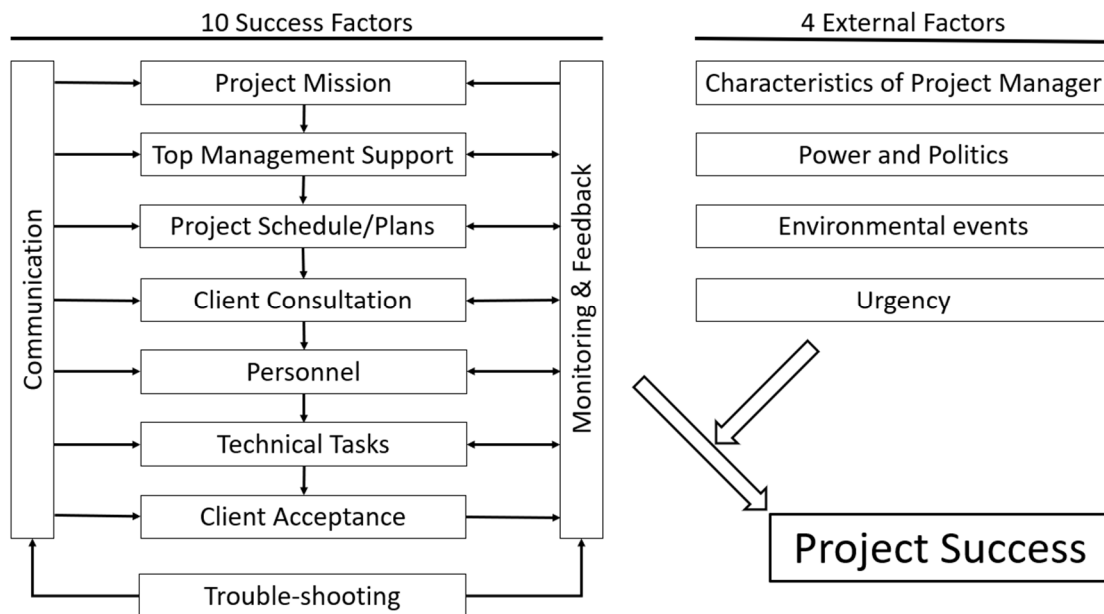


Figure 1 - Illustration of the 14 factors that lead to project success

2.3. Critical success factors

In the next sub-chapters, we will briefly introduce each of the 14 critical success factors in more detail.

2.3.1. Project mission

The project mission statement is where the project broadcasts what it intends to accomplish with the project. The project mission statement needs to express the purpose and clearly define the goals for the project, by simply stating what the organization wants to do and how it intends to do it to help the project achieve its expectations. The mission statement should be precise, the goals specific, measurable and understood by all.

Pinto and Slevin (1986) identified that a well worked out project mission with common understanding by all, in itself represents a factor for project success. The project mission should be worked out together with key stakeholders to ensure that the project and stakeholders have a clear and common idea of the purpose, outcome and objectives of the project.

Implementation of new projects can burden organizational resources. Hence, the project mission and objectives need to be clearly defined so that everyone involved understand how a successful project can be beneficial to the organization (Pinto & Slevin, 1986a). The greatest opportunity to influence the project lies in the initiation phase (Dvir & Lechler, 2004). In this phase, the project goal and objectives are defined, and project stakeholders are mapped, and their expectations assessed. In this early phase of a project, it is important to create a common understanding of the purpose and objectives of the project to ensure dedication to them (B. Hussein, 2018).

All the important information regarding the purpose, objectives and outcome of the project is captured in the project charter. It is a concise statement that describes the main functions and the result of the project. In sum, what the project rationale is. The objectives are the specific and measurable goals the project needs to achieve. The outcome describes the intended beneficial gains of the project (B. Hussein, 2018).

The project charter is a document that authorizes the existence of the project and provides the project manager with the authority to use necessary organizational resources to complete the project.

Having more focus on the front-end of the projects is becoming more important to improve the project success. Studies on project success factors have emphasized the importance of the front-end planning of projects, having a clear definition of the purpose, objectives and the outcome of the project in an early phase among all key stakeholders is a key to success (Muller, 2017).

Well-designed projects stand a better chance to succeed than inadequately designed ones. Investing more resources in the initial stages therefore seems to pay off. These are not controversial statements; they express common understanding and are supported by a great number of studies (Olsson & Samset, 2006).

Keeping in mind that most project today are initiated for business purposes with a clear goal focusing on better business and organizational performance, it is becoming more vital than before to align objectives of the project to the stakeholder objectives. This

should be done early in the project phase and stated in a project charter with a clear objective and mission statement.

Summary:

Project mission relates to the mission statement that clearly defines the purpose of the project, the goals of the project and the strategic choices to get there.

2.3.2. Top Management Support

Top management support is critical throughout the entire project period, and not just during initial phases of the project. For major projects one will usually find the project owner within the ranks of top management. The project owner is the person who is responsible for the project in the organization. There are many studies that show what is required of a project manager to ensure project success. However, the project owner role is much less studied (Crawford et al., 2008). An abundance of earlier research documents that unconditional top management support is deemed to be the most critical success factor in major projects (Dvir & Shenhar, 2007).

In the early phase of a project it is critical that the project owner is involved during the kick-off sessions; participating in the various activities and meetings associated with the start of major projects. This will show the project team that top management support is there. Furthermore, the project owner should continue to stay involved by attending relevant status meetings throughout the entire project, working in symbiosis with the project manager. A project owner that has understood his or her role in facilitating for the project manager, is an active owner, and is of great help. However, he needs to be aware of his role, and that the project manager has his role. The project manager is responsible for the day-to-day execution and the project owner is to facilitate for this. It is also critical that the project owner is able to ensure separation of his role as the project owner and his corporate governance role. Erling Andersen (2012) has identified through research projects which attributes the project owner should have to ensure project success. He has summarized these into the following 9 attributes (Andersen, 2012):

- Appropriate seniority and power within the organization
- Political knowledge of the organization and political savvy

- Ability and willingness to make connections between project and organization
- Courage and willingness to battle with others in the organization on behalf of the project
- Ability to motivate the team to deliver the vision and provide ad hoc support to the project team
- Willingness to partner the project manager and project team
- Excellent communication skills
- Personal compatibility with other key players
- Ability and willingness to provide objectivity and challenge the project manager

As can be seen by the list above, there are two distinct roles that the project owner has: Governing and supporting role (Crawford et al., 2008). In his/her governing role, he/she is responsible for ensuring the mission, goals and plans are clear and known. He/she is also responsible for ensuring that a project that will lead to failure, is stopped/terminated in due time. In his/her supporting role, his/her most important role is to motivate and support the project manager and his/her team. Furthermore, he/she provides for the resources, ensures decisions are made in the parent organization that support project success, and allows for formal decisions to be made in the project.

Summary:

Top management support relates to the willingness of top management to provide the necessary resources, authority and power for project success.

2.3.3. Project Schedule/Plans

Project planning as a process includes tasks and activities that documents and illustrates how the project's result will be delivered.

Pinto and Slevin (1986) identified that the need of a well-thought out and workable plan for the project represents a vital factor for project success. The plan should include all necessary resources to complete the project which need to be allocated. Furthermore, the project plans need to allow for necessary slack to allow for trouble-shooting and overruns. Finally, an optimal way of measuring progress must be in place.

Hussain (2018) describes project planning as a process that documents and describes an appropriate course of action for realization of the project goal. And Kerzner (2013) points out that there are four important prerequisites for a good planning process:

- The planning process must be systematic and structured
- It should be flexible to deal with unique situations
- It must be disciplined and go through audits and assessments
- Project planning is an iterative process

Further Kerzner (2013) suggests that the planning should be performed as an iterative process with responsible project team members and should result in plans that are understood by those in the project team who will perform the various project tasks.

When the plan is implemented, it is essential that the project sees it as a roadmap to be followed. The plan represents a highly important and necessary element to successful project execution and should function as the feedback mechanism on how the project is performing (Pinto & Slevin, 1988a).

Hussain (2018) recommend using different planning tools for visualization of how the project plans contribute to reach the project goals, and how to illustrate the contribution of each project team member. These planning tools include the following:

- A milestone-plan
- A project work-break-down structure
- Network diagram
- Resource chart
- An S-Curve

The plan should show the key points, have an accountability framework, and show what will happen at each stage. These planning tools can help to create mutual understanding and facilitate communication with various stakeholders (B. Hussein, 2018). A good plan does not guarantee project success, it only records what is agreed with the project owner to make the project succeed. Dvir and Lechner (2004) warn against considering the outcome of using these tools as the final truth. They emphasize that projects are

prone to frequent changes, and therefore it is important to have a good process for trouble shooting and change control.

Summary:

Project schedule/plans relates to the detailed specification of the individual action steps required for project implementation.

2.3.4. Client Consultation

In completing any project, understanding, and interacting with the end user of the result of the project is always key. Therefore, “client” here refers to whomever will be using the results. It is important to realize that the term “client”, most commonly associated with external customers, could also be internal customers, such as a department within the same company. Since projects are created for the benefit of the client, whomever the client is deemed to be, internal or external, it is imperative to foster close and frequent contact throughout the entire project phase: The client must be allowed to help define the problem to be solved. Likewise, the client needs to regularly be involved throughout the execution of the project, to ensure things are progressing according to the needs of the client (Pinto & Slevin, 1986a).

The consultations with the client must encompass open and honest communications, active listening and readiness to receive feedback. It is imperative that this goes on throughout the entire project life cycle, as the client must be able to continually help steer the project in the direction required to ensure the benefits to the client is maximized at the completion of the project.

At the onset of the project, it is important to understand who the client is and what the client wants. In some cases, it might be a case of understanding who the client is. However, it could also be about you want see could be useful for the client, as is the case with many high-tech organizations that develop new gadgets and apparatuses that we, the clients, did not know we needed.

Finally, during the execution of the project, it is important to have regular meetings scheduled with the client to ensure the client received updates, and timely communication. Also, this allows the project team to listen to input from the client and receive timely feedback on progress and developments so far.

Summary:

Client consultation relates to the communication, consultation, and active listening to all impacted parties, throughout the entire project.

2.3.5. Personnel

When projects are planned, and schedules made, this can sometimes be done without consideration to available resources. This can lead to project plans which are not possible to achieve. When decisions are made on basis of these plans, the project will strive to cope with these constraints related to selection of resources.

Pinto and Slevin (1986) identified that selection of project team members represent an important factor to project success. As it often occurs when initiating new projects, we cannot always be sure we have necessary people with the right skills and capabilities. As a result, attention should be given to selection of key project personnel with required capabilities and provide needed training for team members to increase the likelihood for a successful project.

Successful execution of projects make many factors come into play. Selection and staffing of the project with the right team is one of these factors. It is not an understatement to say that the destiny of a project lies entirely with the project team. It is therefore imperative that team member selection should be done with attention to what the project need to deliver to meet the project objectives (Tirumala & Schumacher, 2003).

Today more and more of the projects are performed by teams working together to ensure that the project is completed in a timely and successful manner. No other single factor has as much predictive power of the success or failure of your projects than the health of your project team (Flahiff, 2014).

Since organizations more and more rely on teams to improve efficiency and quality in performing of projects, performing effective leadership is an important success factor. Some essential leadership processes in teams include building commitment of shared objectives, values, organizing team activities, enhancing team member skills and role clarity, building mutual trust and cooperation, identifying needed resources, maintaining confidence and optimism and facilitate external stakeholders (Yukl, 2013).

Summary:

Personnel relates to the recruitment, selection, and training of the necessary personnel for the project team.

2.3.6. Technical Tasks

There are two sides to “technical tasks”: First, it relates to ensuring the people implementing/executing the project have the required skills to solve the technical problems that need solving. Second, it relates to ensuring the required technology is available to implement the project.

For any project to be successful, the people working on the project need to have the right skills and training available. An important consideration to make while assigning technical problems to project team members is to ensure the right person is assigned the correct technical problem. Furthermore, it is essential identify and plan for required training in order to be able to solve the problems to be addressed.

Likewise, it is critical to ensure that the required technology is available. When Boeing set about to design and build the B-777 wide-body aircraft, which was to compete with the Airbus A-330 and A-340, they acquired the CAD software CATIA from Dassault to design and develop the aircraft (Dvir & Shenhar, 2007).

In order to assess the need for technology, it is critical to document and detail the technology that is required, and to ensure that the project team members understand all aspects of the technology necessary for success. Finally, it is important to ensure

provisions are made to update technology as minor project changes occur (Pinto & Slevin, 1986a).

Summary:

Technical Tasks relates to the availability of the required technology and the required expertise to accomplish the specific technical tasks that need to be undertaken in the project.

2.3.7. Client Acceptance

The first step in managing customer expectations is to find out what the customers need rather than what they want. This will enable discussions to determine customer priorities with regards to deliver the project to client expectation. However, the project must remember the order of importance. For the project manager, priorities (in order) are scope, schedule and budget. On the other hand, the customer's priorities are budget, schedule and scope (Pinto & Slevin, 1986a).

Many fail to keep the customer engaged after initial requirements are set in the kick-off meeting. It is important to keep the customer engaged and involved in all project phases through design reviews, status meetings, testing, implementation and lesson learned sessions. This involvement enables the customers to participate in all the decisions that affect the scope, schedule and budget, and at the end the customers get what they need to the price they are willing to pay. Client acceptance is a step in project implementation that must be managed like any other steps (Pinto & Slevin, 1986a).

Pinto and Slevin (1986) identified "client acceptance" as one of the critical factors for project success and defined it as the act of selling the final project to its ultimate intended users. Here are some considerations that should be addressed:

- Have I considered in advance a strategy to sell this project to the client?
- Do I have leeway to negotiate?
- In the event of problems, do I have trouble-shooters in place to help the client?
- Does the organization see the project as one-time event, or is the organization helping to identify other potential clients?

Proper expectation setting involves establishing a relationship with the client and creating a project culture with open communication. Establishing a positive relationship with the client at the beginning of the project is key. This will improve team morale and prevents future rework. This will often be the difference between a successful project and one laden with misunderstandings and destructive communication (VanEpps, 2009).

Summary:

Client acceptance relates to the act of “selling” the final project to its ultimate intended users, not just at the conclusion of the project, but throughout the entire project phase.

2.3.8. Monitoring and Feedback

Once a project plan is established, it is important to set out how you will keep track of it’s development and achievements. Structured monitoring is of particular importance. Monitoring and control are the processes of reviewing and reporting of project progress to meet the defined performance objectives for the project and are performed throughout the project (PMI, 2017). This will allow the project team to recognize actions required to address any performance issues to get the project back on track. Another benefit is to provide the key stakeholders with correct information to understand the current state of the project.

Pinto and Slevin (1986) identified “monitoring and feedback” as one of the critical factors for project success, and the importance of the project having a project monitoring system in place to receive feedback on how the project is proceeding.

Where differences occur to agreed plan, actions need to be taken to return the project back to plan. The monitoring and feedback system allow the project manager to be on top of any problems, to initiate corrective measures for getting the project back on track.

Pinto and Slevin (1986) suggest that having the control system in place will ensure quality along the project phases. The following considerations should be addressed along the way:

- Does the project get regularly feedback from the team members on project status?
- Is the team members performance regularly evaluated?
- Is the project ahead of, behind or on schedule?
- Are all project team members kept up to date regarding shortfalls in the schedule?
- Are formal feedback channels established?
- Is the monitoring system working, or are we told what we want to hear?

Summary:

Monitoring and feedback relates to the timely provision of comprehensive control information at each phase in the implementation process of the project.

2.3.9. Communication

According to Project Management Body of Knowledge, communication is a multidimensional activity. The dimensions are internal and external, formal and informal, horizontal and vertical, official and unofficial, oral and written, verbal and non-verbal. Communication requires skills like active listening, questioning and better understanding, educating, negotiation, summarizing, persuading and many other skills. By developing organizational skills in all dimensions, communication can be more effective and efficient (PMI, 2008).

The efficiency of the communication is related to the value accomplishment. In organizations and projects there are a lot of shared targets. Smooth communication is required to accomplish these targets. Projects managers consider communication to be a tool for creating trust and openness between the stakeholders. The speed of the project deliveries is also related to the speed of information flow. Organizations, stakeholders and the project teams are normally dispersed on the basis of their location. Therefore, in the virtual settings communication is one of the most critical success factors in order to get things done (Verburg, et al., 2013).

There is a great variation in the mind set and the responsibilities of the key players in an organization, therefore communication becomes challenging. Different cultures and

values can also cause miscommunication between the stakeholders. Communication is also a tool for knowledge sharing. In projects, communication management is done by making a detailed communication plan. The means and dimensions are defined, and to be successful in a project, the communication management needs to be done effectively (Dinsmore & Cooke-Davies, 2006)

According to theory, we can say that communication is one of the key factors to link the organizational strategy with the projects.

Summary:

Communication relates to access to an appropriate network and necessary data to all key factors in the project implementation.

2.3.10. Trouble-shooting

In any project there is a constant need for adjusting, fine tuning and trouble-shooting during every single step of project implementation. Few people are going to contest the importance of being able to deal with unexpected events, as no project operates without glitches, positive or negative.

With negative glitches we mean challenges that in some way will take time and resources from the project to come back on track. With positive glitches, we mean unexpected events that allow the project to capture value that had not been planned for. Regardless of which type of deviation that is encountered, it is important to ensure that each project member is empowered and technically competent to deal with it. For any deviation of positive character, the benefits need to be captured and realized efficiently. Likewise, each member shall be able to quickly deal with challenges, ensuring unnecessary escalation that will further hurt project implementation.

It is imperative to ensure all team members are aware of their role to be on a constant look-out for anything that deviates from plans, and to empower all project members to quickly address required corrective actions. Finally, it is critical to be able to understand

if there are any potential problems that could terminate the project (Pinto & Slevin, 1986a).

Summary:

Trouble-shooting relates to the ability and capacity to handle deviations from plans and unexpected events, both negative and positive.

2.3.11. Characteristics of the Project Manager

Most research on success factors fail to identify the characteristics of the project manager as an important factor leading to project success (Turner & Müller, 2005). However, most of the factors imply that there is a competent project manager leading the project. Project managers need to excel in three different areas: Administratively, interpersonally and technically. Furthermore, it is imperative that the project manager has the authority to perform his or her duties (Pinto & Slevin, 1988a).

There are seven traits that effective project managers have (Turner & Müller, 2005):

- Problem-solving ability
- Results orientation
- Energy and initiative
- Self-confidence
- Perspective
- Communication
- Negotiating ability

In the work done by Dvir and Shenhar (2007), where they looked at 18 highly successful strategic projects, they identified the project manager as one of the most critical factors in ensuring project success. In their summary of the skills and qualifications that the project manager should have, they write: “A successful leader should have high personal skills, excellent communication qualifications, and connections to upper management. These personal qualifications together with top management’s blessing and support enable the leader to turn a strategic project into a great project. In addition, most project managers in our study could be described as *visionaries who stretch the boundaries of the possible*, yet, are able to engage in credible discussions with clients,

higher management, political authorities, and other relevant stakeholders.” (Dvir & Shenhar, 2007)

The above summary by Dvir and Shenhar (2007) and the work done by Krahn and Harman (2004), point to the fact that being a project manager is a complex task to fulfil. Rather, it is difficult to be a project manager due to the combination of changing environments (internal and external) as well as changing project characteristics, in combination with being able to hold the traits and functioning excellently interpersonally, administratively as well as technically (Dvir & Shenhar, 2007; Krahn & Hartman, 2004).

Summary:

Characteristics of the project manager relates to the competence of the project manager, both administratively, interpersonally, as well as technically, and the amount of authority available to perform his or her duties.

2.3.12. Power and Politics

This is an external factor that represents issues that are often considered beyond the control of the project team, but nevertheless considered important for project success. It can be defined as the degree of political activity within the organization and perception of the project as furthering an organization member’s self-interests. (Pinto & Slevin, 1988a).

Many organization experience politics that can create situations of conflicting interests between the organization and the project. This conflict of interest can, in worst cases lead the project to fail. In dealing with possible conflict of interest issues, the project manager needs to recognize the political landscape and power structures surrounding the project, including key stakeholders and the formal and informal rules that constitute conflict of interest. To understand the political side of the organization, and how the game is played, is important to maintain constructive political alliances and support from the project stakeholders (Pinto, 1996).

Organizational departments and project stakeholders are not likely to offer their help and support for a project unless they perceive it is in their interests to do so, and project

managers who know how to use politics is destined to be more effective, than those project managers not exploiting the political arena (Pinto, 1996).

Every project has stakeholders who are, or will be, impacted by the project in a positive or a negative way. To increase the project success rate, the process of mapping stakeholders, analysis of their expectations and involvement should be done as early in the project phase as possible.

Summary:

Power and politics relates to the ability to deal with conflict of interest between the project objectives and key stakeholder objectives.

2.3.13. Environmental events

With environmental events, Pinto and Selvin (1988) point to external environmental and organizational factors that can impact the project. Furthermore, they point to both positive and negative factors. An example of a positive environmental event might be a change in the political environment which benefits business and makes your project more valuable, either with regards to easier implementation, or larger benefit realization.

In his conference paper on *Time Management* Mohammad Ali Niroom and Rad (2013) highlights the effort that every project undergoes to make realistic schedules that take into consideration everything that may somehow take place during the duration of the project (Rad, 2013). It is imperative to try to take as much as possible into consideration in the scheduling and planning phase. This in order to ensure that progress, once the project has started, is according to plan. However, there will always be external events that in one way or another affect progress. These are events that are outside of the control of the organization running the project. Events will have different effects depending on their duration, location, type, and outcome. The only certain characteristic is that it has not been planned for, and as such, the project team needs to

be equipped to make the best out of the situation, regardless if it is a positive or negative environmental event.

Summary:

Environmental events relates to the likelihood of external organizational or environmental factors impacting on the operations of the project team, either positively or negatively.

2.3.14. Urgency

The time window for some projects are critical due to the market situation or because of requirements from the client. A time constrained project implies the necessity to deliver within specified time to achieve the project success or the organizational benefits/ success. This factor represents a critical issue that are often considered beyond the control of the project team, and study done by Pinto and Slevin in 1989 suggest the importance of creating a perception of the importance of the project or the need to implement the project as soon as possible, can be important for achieving project success (Pinto & Slevin, 1989).

If the project manager manages to create a “sense of urgency” for the project among key stakeholders, this will be important because “urgent projects” have a much greater ability to collect needed resources and additional funding when needed, than projects which are viewed as routine (Pinto & Slevin, 1989).

Pinto and Slevin (1989) implies that the “urgency factor” is more important to create in the early stage of the project, and it is important that the project manager attempt to instill this “sense of urgency” to following parties: the project team members, the key stakeholders who controls needed resources and the client the project is intended to.

Summary:

Urgency relates to the perception of the importance of the project or the need to implement the project as soon as possible.

2.4. Chapter summary

In this chapter, we first summarized the various success factors that have been identified in literature. We then detailed the reasons why we have chosen to focus on the 14 factors identified by Pinto and Slevin in 1986 & 1988. We concluded this chapter by deep diving into each of the 14 factors, allowing for a better understanding of the various responses from our survey.

3. Methodology

In this chapter the aim is to present the methodology applied for developing the thesis problem statement. We will also describe how the questionnaire was developed with selected pre-defined factors, how the background questions were framed and implemented and how the pre-test runs were used to adjust the survey. Finally, the chapter describes the approach for collecting and analyzing the data from the survey.

3.1. Research Approach

There are two typical approaches to research: Deductive approach and inductive approach. In the deductive approach, a hypothesis is first created based on experience and on current theory. It is then tested in the real world to confirm or reject the assumption. The criticism of this approach is that researchers are looking for something specific, and therefore risk to not notice other important aspects or information. In an inductive approach, the researchers start by gathering empirical data from the real world, and then create a theory based on what is found. In this approach, it is easier to keep an open mind, and allow for reality to create the foundation of the theory (Jacobsen, 2005).

As we aim to validate the importance of already established success factors, our approach will be more of a deductive approach. Based on the literature reviews we carried out, combined with our own experiences in working life so far, we created our problem statement that we aim to answer in this thesis. To answer our problem statement, we will need to conduct a study.

There are two conventional ways of carrying out studies: Qualitative or quantitative. Qualitative research is primarily used to gain understanding, opinions and motivations. In qualitative research the empirical data is often words. With quantitative research, researchers use empirical data which can be measures and analyzed using statistical methods. With this data facts can be formulated, and patterns uncovered. Quantitative data collection methods are much more structured than for qualitative research. A common method to collect quantitative data is through online surveys (Jacobsen, 2005). In relevance to the problem statement, finding the right way to design the research is vital to understand how to collect and analyze the data collected from the respondents

(Johannessen, Tufte, & Christoffersen, 2010). Hence, to perform an analysis of today's relevance of the established success factors, an online survey was developed based on the selected established factors.

A benefit of carrying out quantitative research is that it is easier to validate than in qualitative research (Jacobsen, 2005). However, the sample size needs to be of adequate size to provide credible data. In general, one can say that a quadrupling of the sample size halves the uncertainty in the data. Under 100 respondents is usually too little (Jacobsen, 2005).

Finally, to allow for a little bit of an inductive approach as well, and to ensure we open for new learnings, we allowed for one free text answer in our online survey. In this box, respondents were encouraged to add any other factors which had not been covered yet. As such, there is an element of qualitative study as well.

3.2. The Questionnaire

The questionnaire is operationalized by selecting the established 14 factors from the research work done by Pinto and Slevin (Pinto & Slevin, 1986b, 1988b). Each of the 14 factors are pre-coded with a scale ranging from 1 to 10, where 1 corresponds with "low effect" and 10 corresponds to "high effect". For each of the 14 factors, the respondents were asked to grade the effect each factor had in ensuring project success. The respondents were asked to grade the factors based on their experience from the last successful project they were involved in. To strengthen the validity of interpretation and ensure that the content emerges as intended, detailed description of each factor was included for each factor to be measured. To check the validity of the questionnaire, one open question was included in the survey where respondents could name other factors from their work experience that could contribute to project success.

We also realized that there will be different perceptions depending on who answered the question, what region he or she works in, what role he/she had, and so on. We therefore developed a few background questions that help us in sorting the data and drawing conclusions from our survey. This would enable us to analyze if the respondents gave different scores on the factors based on various attributes. In order to ensure that these background questions did not prevent people from completing the survey due to

unwillingness to share data on personal questions, such as gender, age group, years of experience, and so on, we gave the respondent the opportunity to choose the option “Prefer not to say”. Furthermore, in a few of the questions, we also gave the opportunity for the respondent to write in their own answer option. This pertained to the question relating to which industry the respondent was associated with, and what role the respondent had had in the last successful project he/she was a part of.

Johannessen et al. (2017) states that quantifying and measuring data by a questionnaire cannot simply be considered more objective and reliable than qualitative data. This is because the questions that the respondents are going to consider can be interpreted in different ways, except when asking for specific information such as age or gender. However, the use of pre-coded questionnaire is well suited and appropriate to investigate our problem statement.

An early decision was made to use social media platform LinkedIn as the main access to respondents. LinkedIn is a social networking site designed specifically for the business community. The goal of the site is to allow registered members to establish and document networks of people they know and trust professionally. LinkedIn is the world's largest professional network with more than 562 million users in more than 200 countries and territories worldwide (“LinkedIn,” 2019).

By using LinkedIn, we have the possibility to easily reach out to respondents on the social media platform globally. The aim was to reach as many respondents as possible from different industry sectors and regions. Another benefit from the approach using social media platform is the opportunity to gather information from many respondents on a relative short time period. To maximize response rate, the survey was distributed by personal messaging on the LinkedIn platform to our 1st connections. On LinkedIn, each of your direct contacts appear as 1st connections, either because you have accepted an invitation from them, or because they have accepted an invitation from you. By reaching out to our 1st connections, we ensured that each responded received his or her personal invitation to participate in the survey.

On LinkedIn users also have access to their own feed. The LinkedIn feed contains updates from your network, companies you follow, recommended content, and

sponsored content. Our intention was also to post the questionnaire to our own feeds, to increase the distribution.

The tool used for developing and issuing the questionnaire to the respondents was Microsoft Forms ("Microsoft Forms," 2019). Microsoft Forms is a tool that is distributed through the Office 365 (O365) suite and as such, was made available to us thanks to the access students at the University in Stavanger (UiS) have to the Microsoft O365 suite of products. Forms allows users to create questionnaires, polls and quizzes. Furthermore, it allows for easy distribution either by emailing a link directly to the questionnaire, poll or quiz. The respondents do not have to have Forms in order to reply to the questionnaire, it simply pops up as a website that allows the respondent to respond, either through a web browser on a computer or smartphone. With Forms being an O365 product, it seamlessly integrates with other O365 tools, such as Excel. Forms presents results in various tables and graphs, however, for a deeper analysis, the data was exported to Excel, and then imported into software from SAS Institute for further analysis. A data scientist specialist provided support to structure the data and corresponding analysis in the software from SAS Institute.

To validate the questionnaire, a pre-survey was performed with 3 persons and the questionnaire was adjusted accordingly. The first version of the questionnaire was sent out to two persons in two different industries, different locations, and with very different backgrounds. Both provided similar types of feedback: The initial questionnaire was repetitive and that some of the questions were not entirely clear. The questionnaire was adjusted accordingly and was sent out to a third person. The feedback received the third time was very minor, however it did end up in further fine-tuning to ensure all questions were short, precise and clear. The pre-surveys provided us with valuable feedback on how to best formulate the questionnaire to ensure consistent answers from all the respondents.

3.3. Respondents

By reaching out to our personal 1st connections on LinkedIn, we were able to target respondents in several industries and regions, with varying degrees of project experience, both from large, strategical projects, as well as smaller non-transformational projects. Our aim was to get a wide set of data that we could then

analyze to see if the respondents answered differently based on region, industry, and project size, as well as project experience. We quickly noticed that we had an overwhelming majority of male respondents. This was not unexpected as most of our 1st connections are male. To ensure we increased the variety we therefore specifically targeted women in our larger networks, outside of LinkedIn, such as colleagues at work, or other women we encounter in our day-to-day lives. We specifically targeted women with project experience, regardless of size of project, industry, or region.

3.4. Analysis

In order to carry out a detail analysis of the responses we received in our survey, we have used software from SAS Institute. SAS Institute has developed a suite of analytics software (which are called SAS) which is used to access, manage, analyze and report on data ("SAS Institute," 2018). The exported Excel document from Microsoft Forms was imported into SAS, and SAS was then used to analyze the data.

The following methods were used:

1. A Principal Component Analysis (PCA) ("Principal component analysis," 2019) was used in an effort to reduce the variable diversity and to try to find patterns in the data.
2. An ANOVA ("Analysis of variance," 2019) was used to analyze differences among group means with Duncan's Multiple Range Test (MRT) ("Duncan's new multiple range test," 2018) to compare sets of means.

To try to simplify our analysis, we used method 1 above, the PCA method. This is a technique that reduces the variable diversity and tries to find patterns in the data. Running a PCA is an example of unsupervised machine learning. Using PCA, the 14 success factors are compared against each other, and were given an eigenvalue score based on how strong of a presence patterns have in the data. Eigenvalues are often used in the context of linear algebra or matrix theory. The term "eigen-" is adopted from German, meaning "characteristic" ("Eigenvalues and eigenvectors," 2019). Eigenvalues of a matrix can be calculated by finding the roots of the characteristic polynomial. To create the factors the PCA scores are rotated orthogonally.

If the eigenvalue score is above 1.0, then that factor is chosen, as a higher eigenvalue score indicates the presence of patterns. This also means that there is statistical significance in the data that warrants further analysis. Furthermore, for each of the factors with an eigenvalue score above 1, the 14 success factors are given a score between 0 and 1. If that value is above 0.4, then that success factor plays an important role in the pattern that is found. Furthermore, if a success factor only scores above 0.4 on one factor, then that is a very good factor as it has a unique pattern that is not affected by other factors (O'Rourke & Hatcher, 2013).

With the 10 variables that defined the person responding to the 14 success factors, we used ANOVA, as this provides a statistical test of whether the population means of several groups are equal. ANOVA is useful for comparing three or more group means for statistical significance. We have chosen a standard 95% confidence interval in our analysis.

The reason for using ANOVA analysis instead of manually comparing the data that came in is to get a certain level of objectivity with regards to where the difference in the data lies. The ANOVA analysis identifies the factors that, with statistical significance, the respondents have answered differently on. Those are the factors that we have decided to focus on in our analysis chapter. And by using Duncan's MRT, we were able to identify interesting aspects of the data gathered by grouping subsets of means, where in each subset means were found to not be significantly different from each other.

3.5. Chapter summary

We recognized that our research study was going to be of a deductive type due to the nature of our problem statement. We also concluded that the best approach would be a quantitative study, as that would provide input from the largest number of respondents, as well as provide basis for numerical comparison and analysis. We therefore constructed a pre-coded questionnaire that included relevant background questions that would allow us to understand the respondents replies to the 14 main questions concerning the factors that affect project success.

Prior to issuing the questionnaire through social media platform LinkedIn, we carried out a pre-survey on a few selected respondents from different regions and walks of life. This allowed us to adjust the survey before issuing the main survey to the respondents.

Statistical analysis of gathered data was done using software from SAS Institutes suite of analytical software to investigate the factors relevant to project success based on the respondent's gender, age, project experience, role and which region they belong to. The data gathered and analyzed are structured in tables for better visualization of the results. This will be further described in the next chapters.

Finally, the main objective to analyze the data in this way is to use mathematics to understand the results of our survey. The ANOVA analysis highlights differences as found in the data that are further discussed in chapter 5.

4. Empirical Data

This chapter presents the empirical data collected from the online survey questionnaire. It begins with simple bar graphs representing the various attributes of the respondents. It then presents the empirical data on the 14 success factors.

4.1.Context questions

The first 10 questions in the questionnaire focused on who the respondent is where he/she works, in what industry, years of experience and so on. These are all presented below.

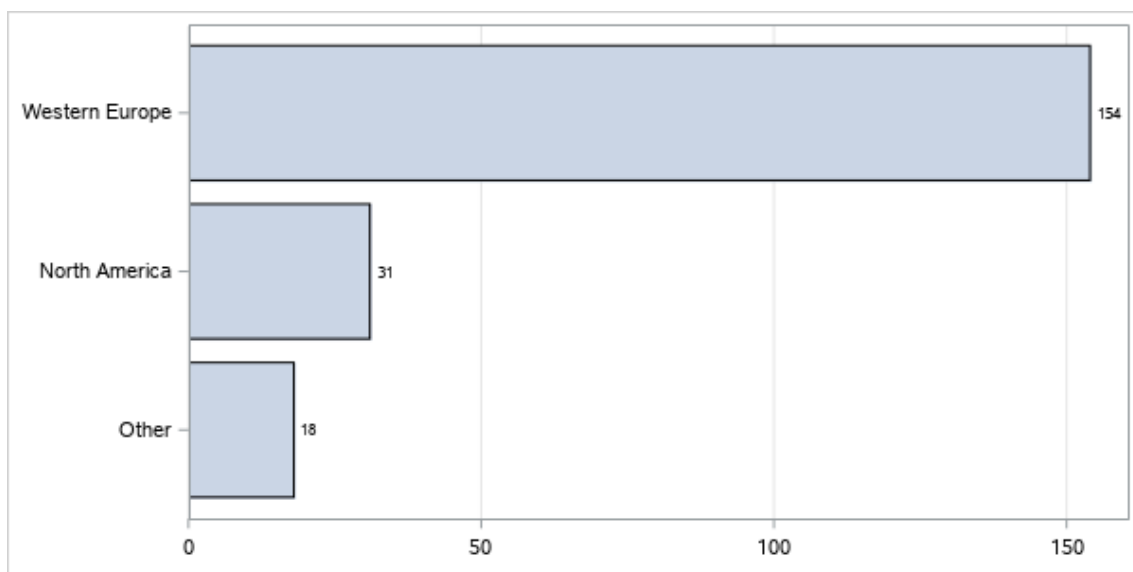


Figure 2 – Respondents sorted by Region

The bar chart above (Figure 2) shows that 154 of the respondents came from Western Europe, 31 respondents from North America, and 18 came from various countries. These were grouped together as “Other”. The majority of this “Other” group came from Asia and Australia. We had hoped to get a better distribution of respondents; however, the results are not unexpected based on whom we have as our 1st connections in LinkedIn.

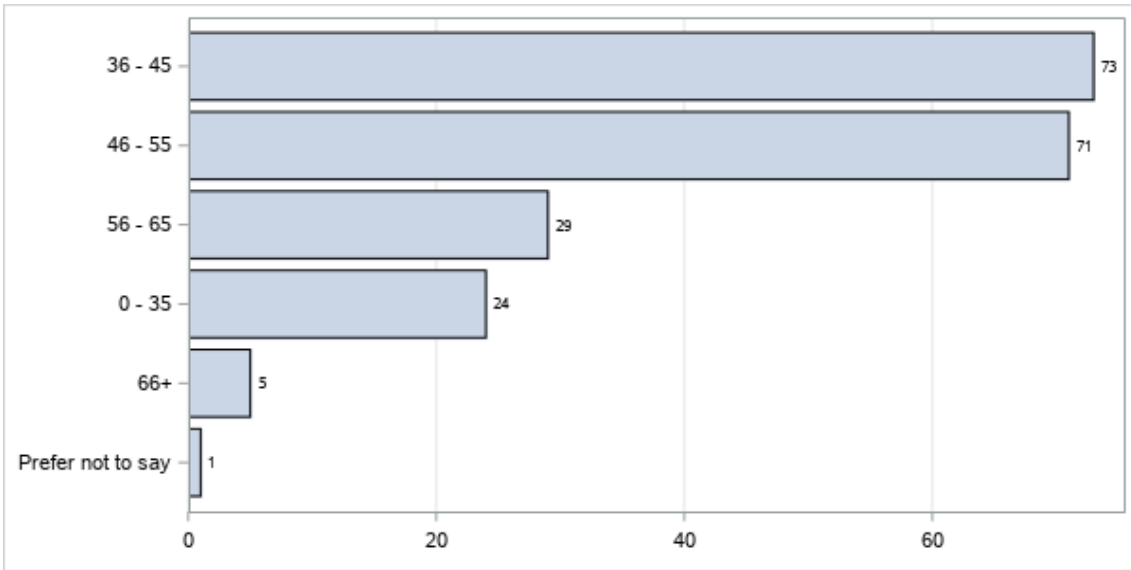


Figure 3 - Respondents sorted by Age Group

The bar chart above (Figure 3) presents the age groups of the respondents. A clear proportion of the respondents falls within the age of 36 to 55 which indicates that the respondents as a group has a fair amount of experience working in project organizations.

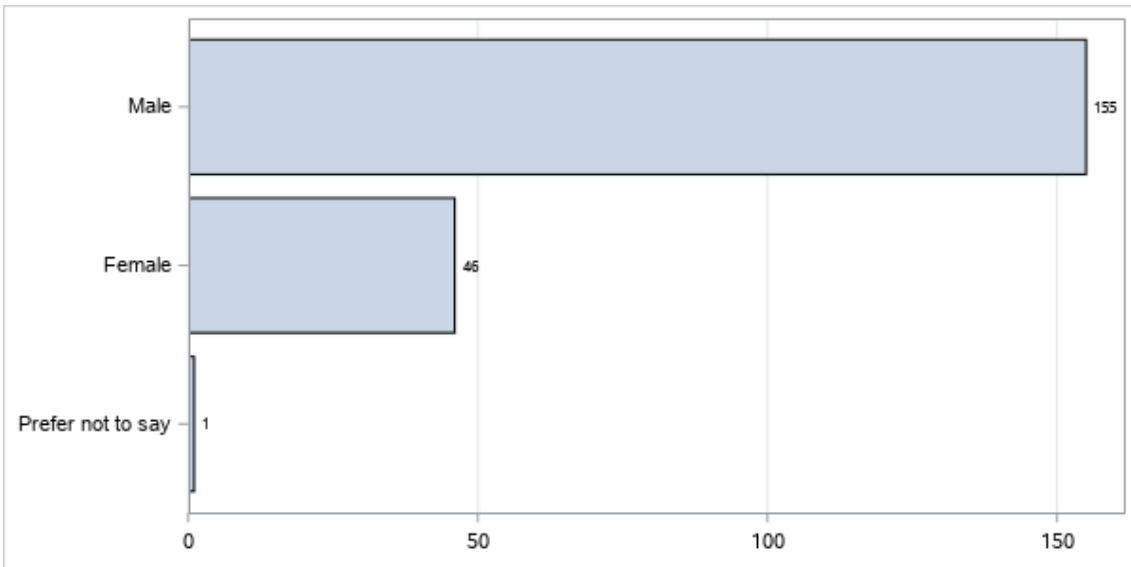


Figure 4 - Respondents by Gender

The bar chart above (Figure 4) presents the gender for the respondents answering the survey. We had 155 (77%) male respondents and 46 (23%) female respondents, and one responded who preferred not to share. Our aim was to achieve 25% women, as we initially noticed an overwhelming response rate from men. We therefore targeted women specifically, and this ensured we were able to reach significant mass, and almost reach our target of 25% female respondents.

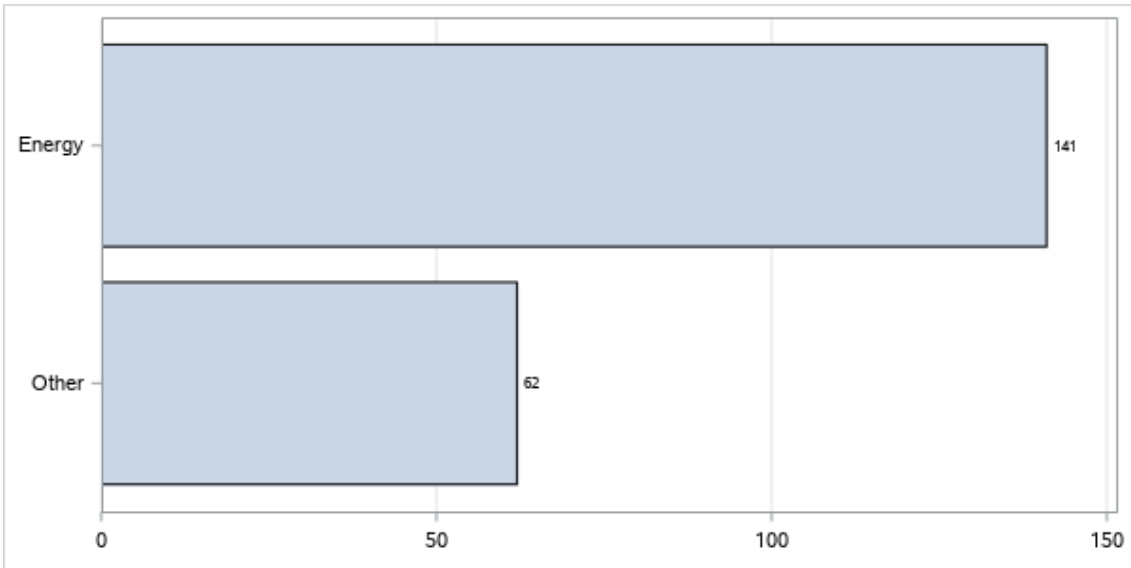


Figure 5 - Respondents sorted by Primary Industry

The bar chart above (Figure 5) shows just two industry groups: Energy and Other. The “Other” group comprises everything from teachers to health care workers. It is a fragmented group. We chose to group everyone that was not in the energy (Oil & Gas) group, as there were not enough respondents from the other groups to allow us to carry out detailed analysis. For a glimpse of what other industries answered, and how few belong to each of the other groups, please see Appendix B, where we present the empirical data, as gathered in O365 Forms. This is further discussed in Chapter 9, Limitations.

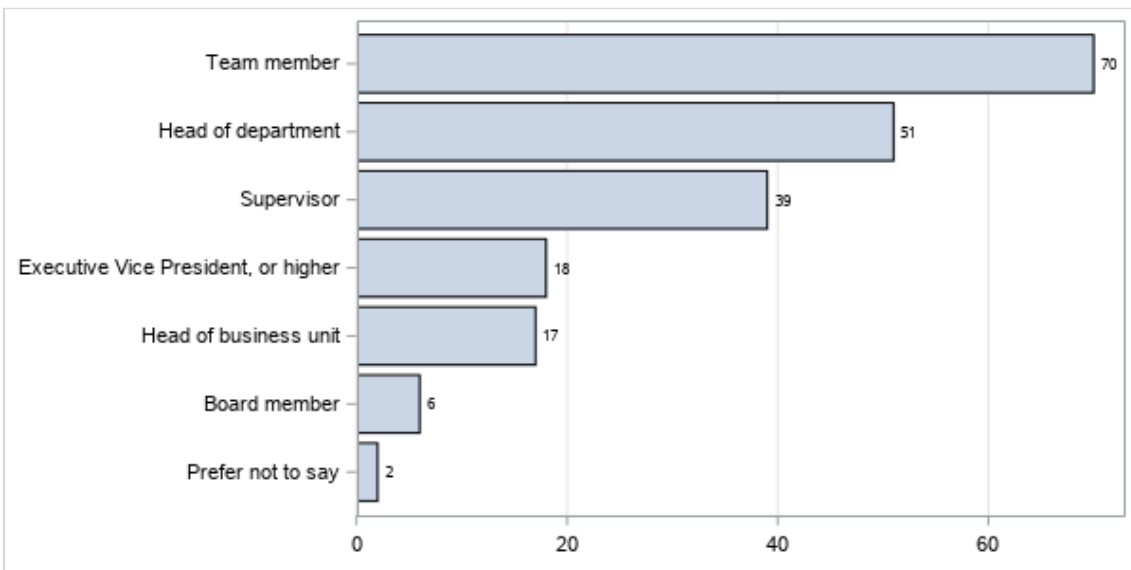


Figure 6 - Respondents sorted by Organizational Title

This bar chart (Figure 6) provides a clear overview of where the respondents belong in the organization. Over half of the respondents belong to a project as a team member. However, the survey has managed to capture respondents from all levels of an organization.

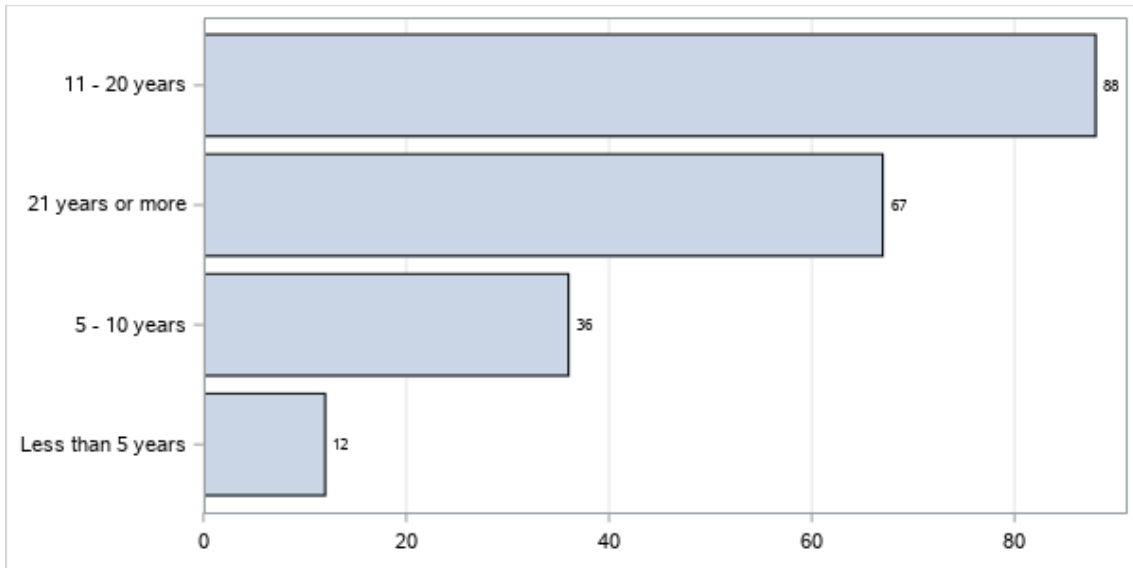


Figure 7 - Respondents sorted by Project Experience

This bar chart (Figure 7) provides an overview of the project experience of the respondents. The majority have more than 11 years of experience. However, the survey also managed to capture respondents with less than 5 years of experience. In general, the survey has managed to reach out to a group with project experiences from less than 5 years to 21 years or more.

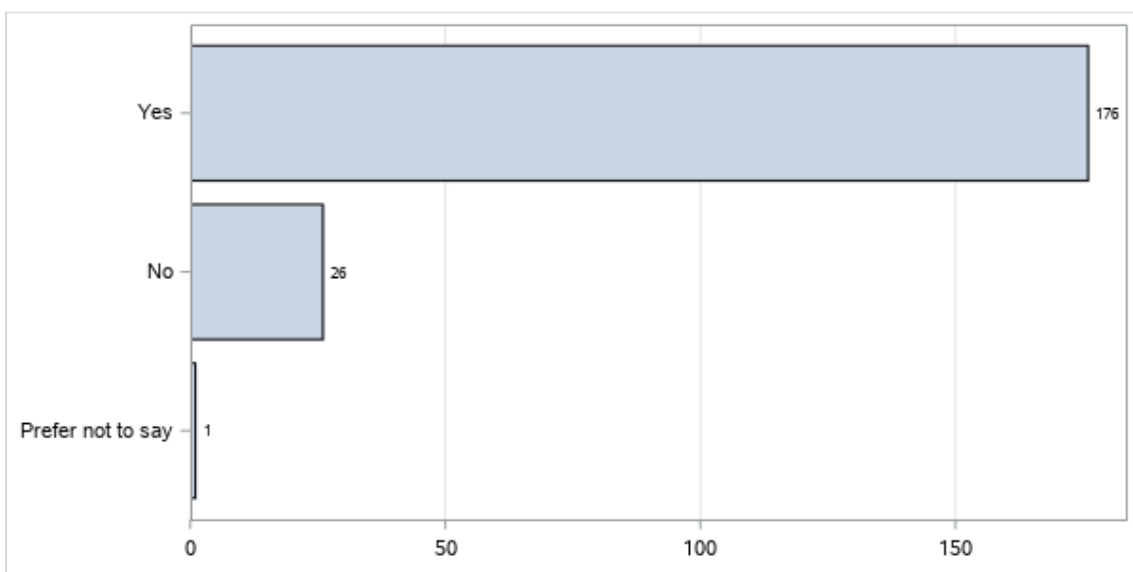


Figure 8 - Respondents per classification of successful project as strategic, or not

In the bar chart above (Figure 8), it is evident that most respondents established that their last successful project was a strategic project. This confirms what has been highlighted in our earlier theory chapter (see Chapter 2): Projects are an ever more important factor for companies to succeed in a fast changing, ever more digital, world.

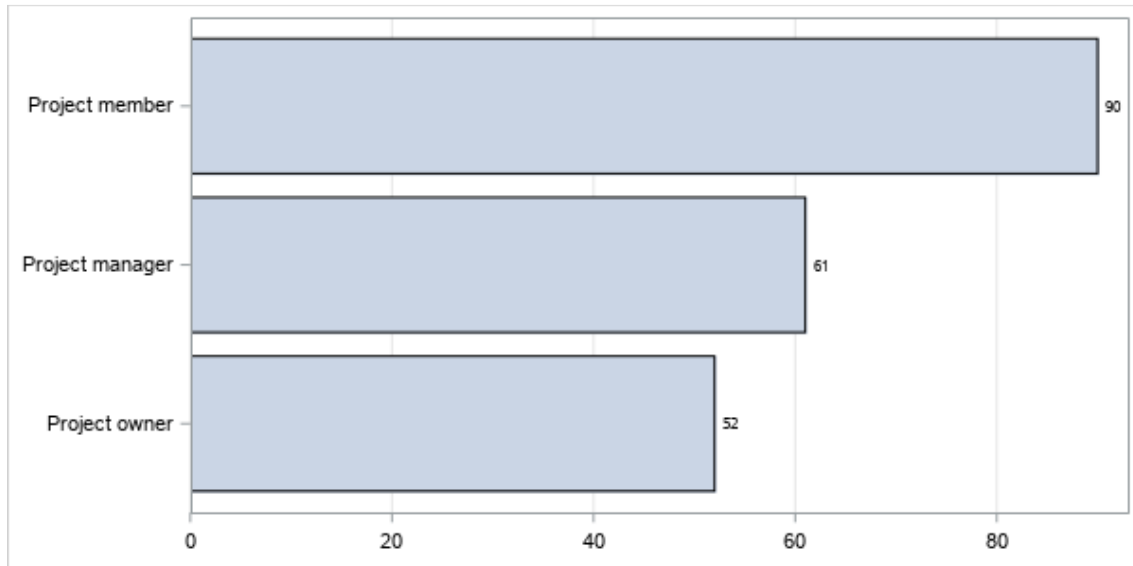


Figure 9 - Respondents sorted by Project Role

The bar chart above (Figure 9) shows the respondents primary roles in their last successful project. The distribution of answers is good, with an even distribution between all categories. It should be stated that the authors have classified some of the respondent into one of these three groups, as many respondents used the opportunity to use the free text box to answer this question. However, based on their written answer, it was easy to categorize them into one of the three options presented above.

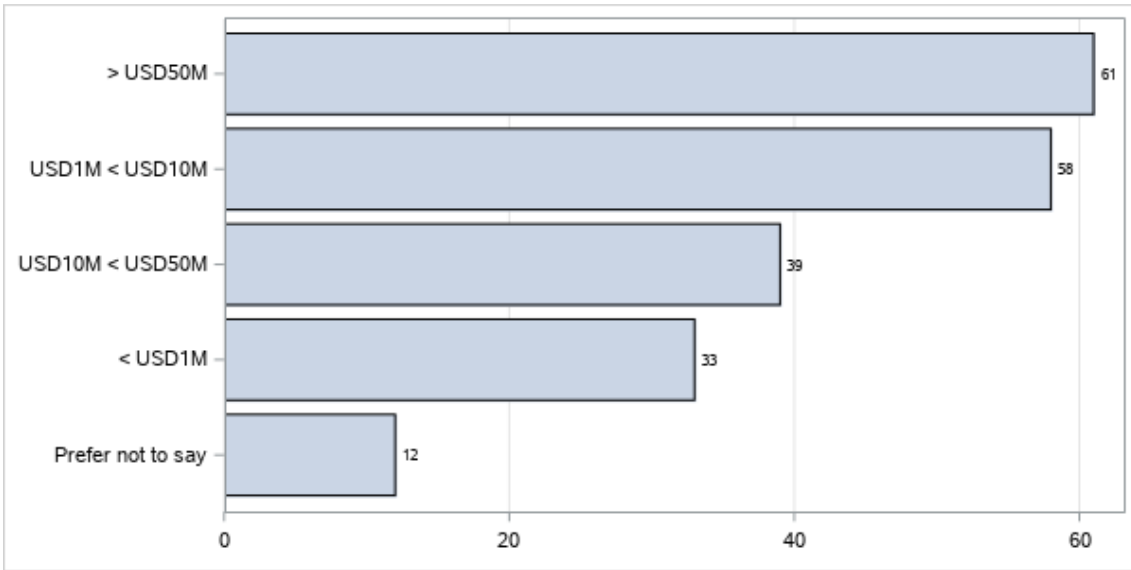


Figure 10 - Respondents categorization of Project Size

The bar chart above (Figure 10) demonstrates another even distribution of answers. This is good and allows for further analysis and comparison. The group which preferred not to say became statistically significant, as they represent almost 6% of all respondents.

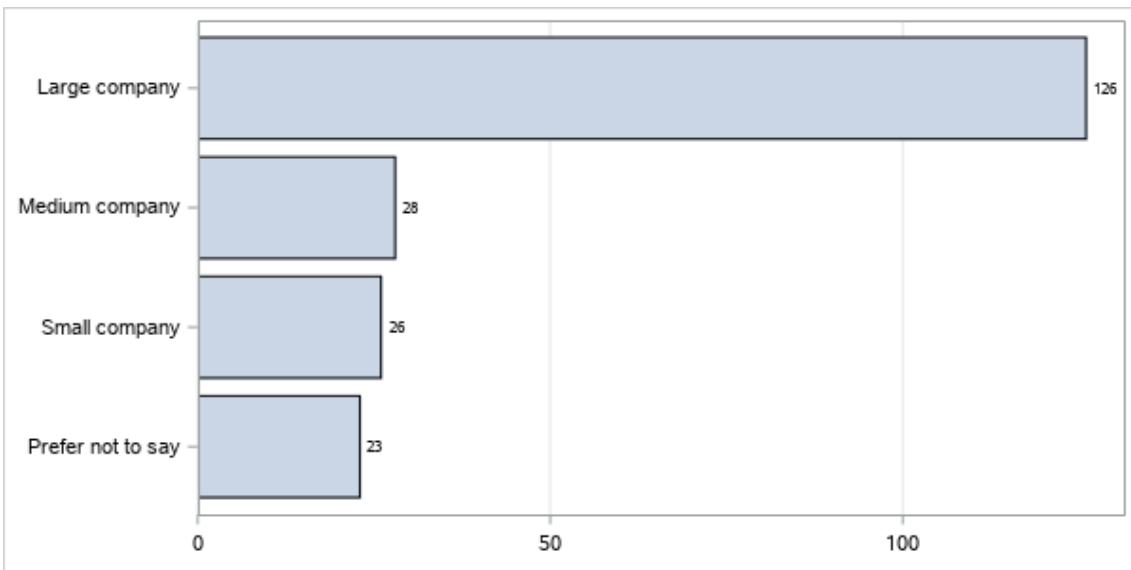


Figure 11 - Respondents sorted by Company Turnover

The bar chart above (Figure 11) indicates that a large proportion of the respondents work in large companies with annual turnover greater than USD 100M. It is further noticed that over 11% of the respondents answered, “prefer not to say”. We suspect that a few of the respondents chose this option as it was the easiest one. Not everyone reflects over the actual size of the company they work for.

4.2.Success Factors

Presented below is the high-level summary of the average score each of the 14 success factors received based on how the respondents rated their importance for project success. The bar graph is sorted by importance, indicating that our research shows that the most important factor in ensuring project success is the ability to carry out troubleshooting. See Figure 12, below. Furthermore, the graph shows that most of the 14 success factors have very high average scores except for one; Environmental Events. This success factor received considerably lower scores, and as such, had a much lower average value than all of the other factors. This is further discussed in Chapter 8, Further Research.

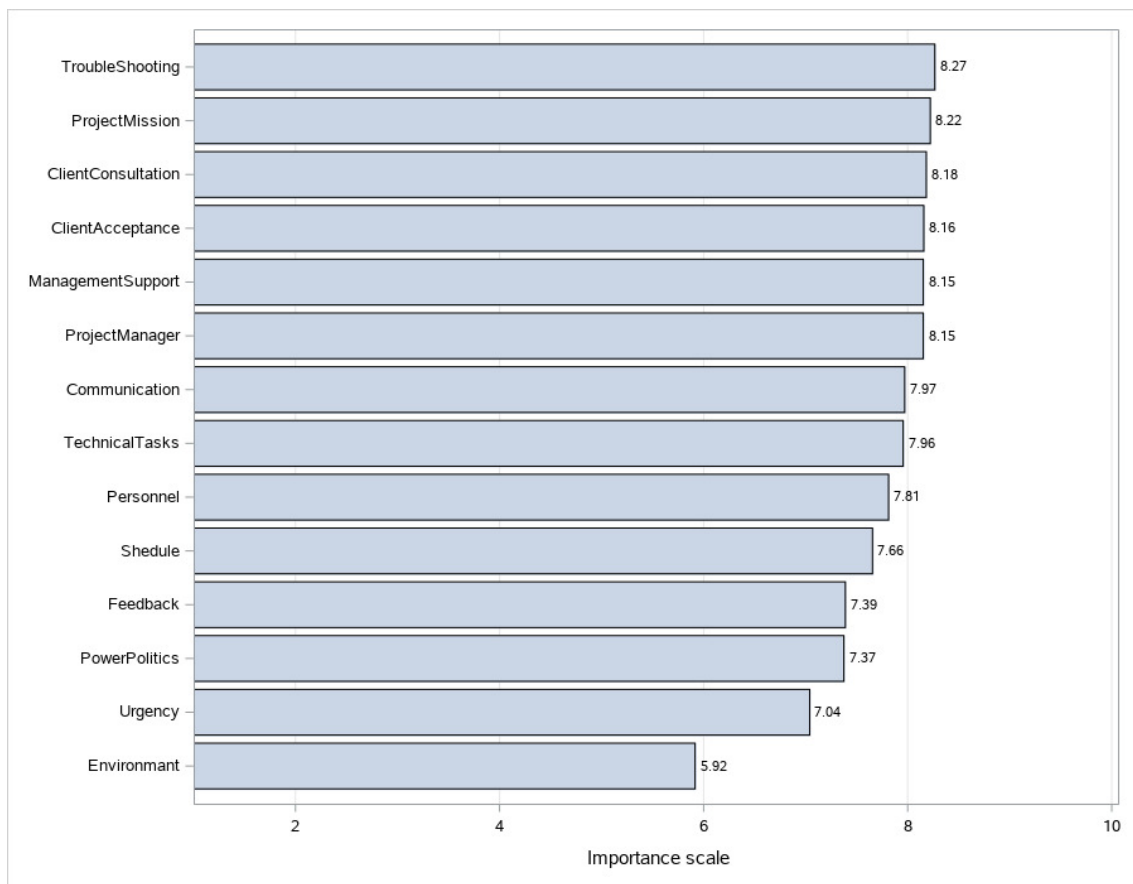


Figure 12 - Average score per factor

Another way to present more of the data collected is represented by the matrix seen in Figure 13. In this matrix, each little circle corresponds to one reply from one person on that one factor. As an example, let us focus on the success factor “Client Acceptance” (the column all the way to the left in Figure 13). Two people gave this success factor a score of 1, while only one person gave it a score of 2. Furthermore, none of the

respondents gave this success factor a score of 4. However, as you go further up in this row of the matrix, it becomes evident that an overwhelming number of respondents gave this success factor a score of 10, as is indicated by the number of circles on this score.

By representing the responses in this way, we can easily visualize how the respondents scored each factor, as the density of circles illustrate how many gave each particular score for the 14 factors. This way of representing the data allows us to visualize all answers in one single figure.

The black, horizontal, line is the mean value of each factor, and the yellow band is plus/minus one standard deviation, from the mean. The factors are organized alphabetically in this representation.

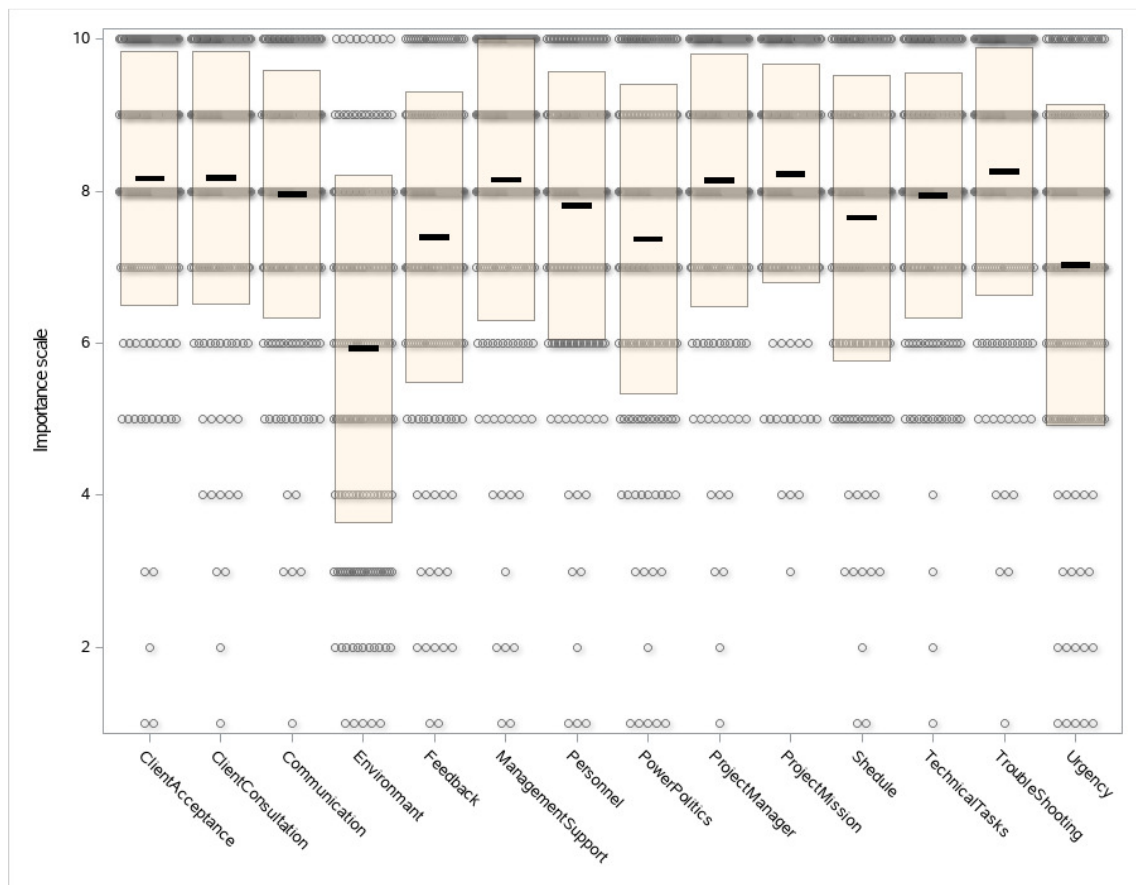


Figure 13 - All 203 responses to the 14 success factors represented in one matrix

In addition to these 14 success factors, the survey allowed for each respondent to add other factors that they had experienced led to project success. 56 out of the 203 respondents named other factors than the original 14 factors in the survey. When reviewing these, we recognized that most of the additional factors could easily be

categorized within the existing 14 success factors. However, 9 of the respondents named factors that could not easily fall within the original factors, these factors were categorized together into a group named “organizational culture”. This new factor will be described further in chapter 5.10.

5. Analysis

In this chapter, we review our findings from our analysis of the empirical data presented in the previous chapter.

5.1. Success factors are still valid

Each of the respondents were asked to rate the importance of each success factor on project success using a scale of 1 to 10. The graph below presents the percent of answers that each of the 10 scale levels were given, when looking at all the answers combined. As is clearly seen in Figure 14 below, most answers were given a score of 7 or above, indicating that the success factors are still valid today.

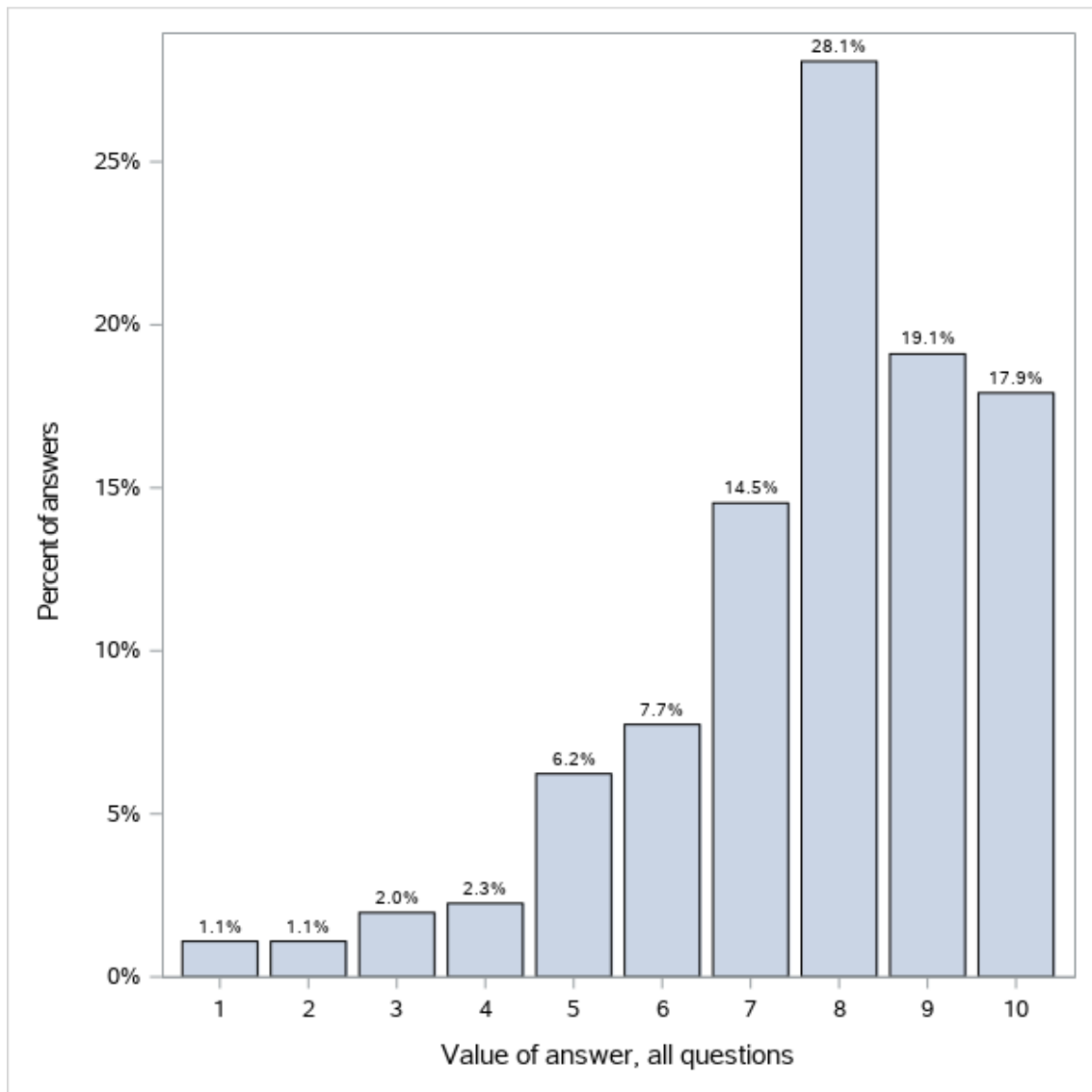


Figure 14 - Value of answers to all questions

5.2. ANOVA and PCA

In the figure below (Figure 15), results from running an ANOVA analysis of the entire set of questions is presented. It shows, amongst other things, that one factor can with statistical significance be said to differentiate itself from the other success factors when it comes to how it affects project success, and that is the Environment Events factor. This was also the factor that scored the lowest, as is presented in Figure 12 in chapter 4.2. The different vertical lines in the figure below are significant, as they show success factors that are more important than other success factors according to the empirical data gathered in our survey.

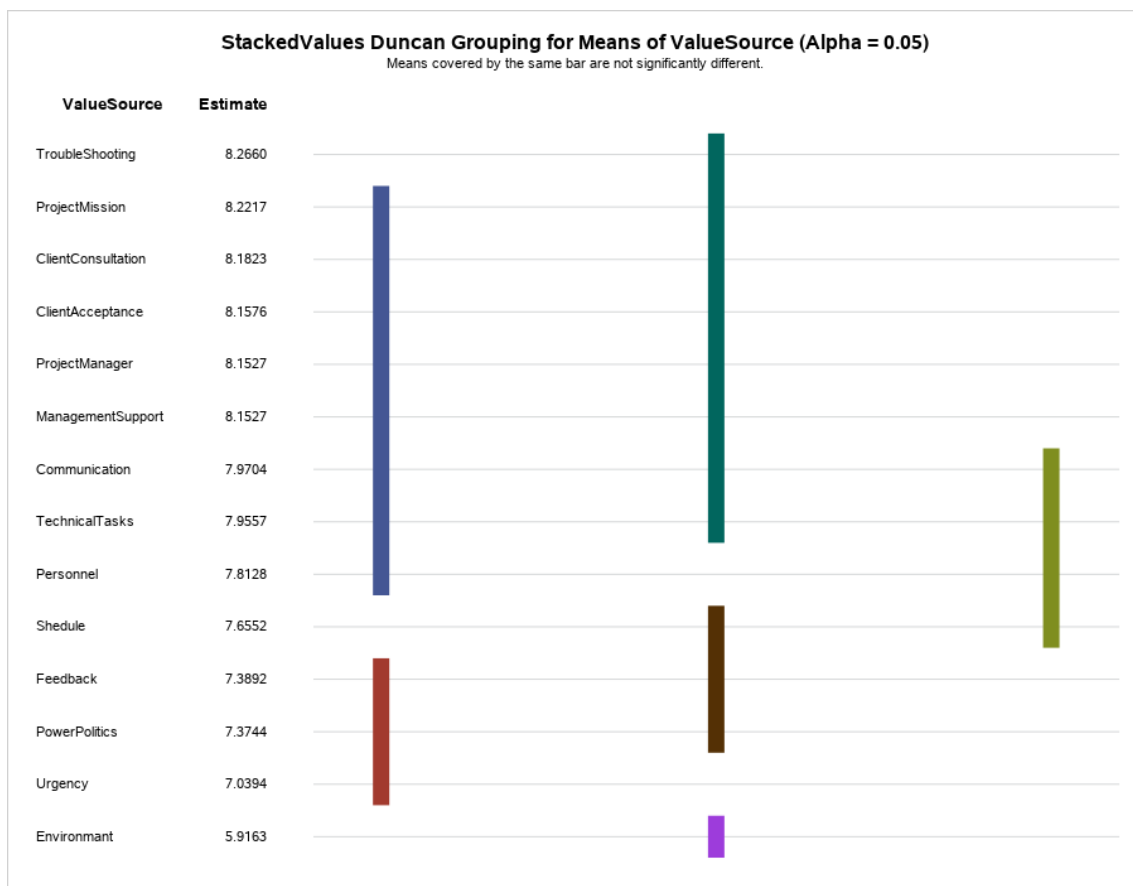


Figure 15 - Entire answer set ANOVA analysis

The factors that share a vertical line indicate factors that, with statistical significance, do not differentiate – in other words, they are as important. Looking at the figure above, one can say that Trouble-shooting and Technical Tasks are as important to ensure project success. However, we can say with statistical significance that Trouble-shooting and Personnel are not similar, as they are not represented by the same bar. Which

means that Trouble-shooting is a more important factor than Personnel, Schedule, or any of the other factors below.

We then focused on the principal component analysis. This was done in an effort to reduce the required work to be carried out in order to identify interesting aspects of the empirical data gathered. The first step in this process is to find the eigenvalues, as is represented by the table below.

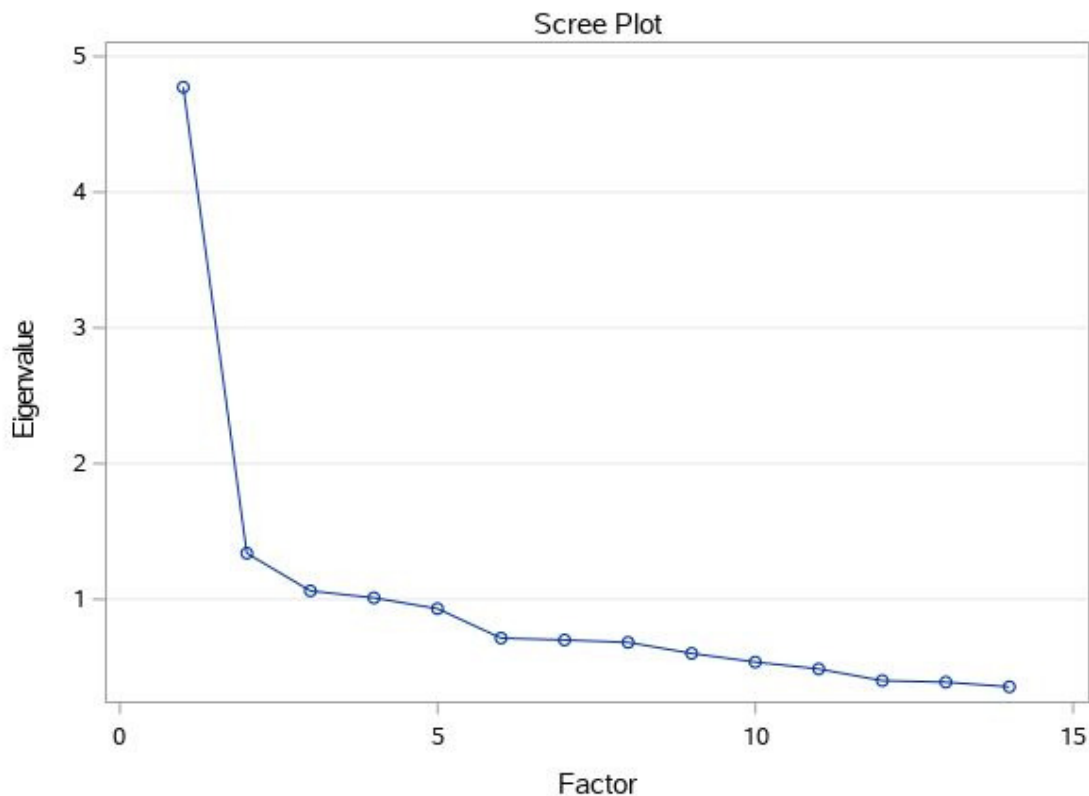


Figure 16 - Eigenvalue chart

As is seen by the scree plot above (Figure 16), only 4 factors came out with a score higher than 1. A score higher than 1 indicates that this one factor has greater importance than an individual variable alone does, in explaining the outcome of the survey. These four factors are then run against each other and scores between 0 and 1 are assigned based on the presence of patterns in the data. The result of this analysis is given in the Table 2, below:

Question	QuestionTxt	Factor1	Factor2	Factor3	Factor4
ProjectMission	Project mission - Initial clarity of purpose, goals and strategic choices to get there	0.10289	0.70189	0.10312	0.18193
ManagementSupport	Top management support - Willingness of top management to provide the necessary resources and authority/power for project resources	0.45633	0.30274	0.27802	0.17473
Shedule	Project schedule/plans - A detailed specification of the individual action steps required for project implementation	0.16209	0.73500	0.14588	0.11609
ClientConsultation	Client consultation - Communication, consultation, and active listening to all impacted parties	0.68666	0.11961	0.16355	0.11262
Personnel	Personnel - Recruitment, selection, and training of the necessary personnel for the project team	0.17408	0.47616	0.27223	0.42898
TechnicalTasks	Technical tasks - Availability of the required technology and expertise to accomplish the specific technical action steps	0.03021	0.21305	0.07428	0.77314
ClientAcceptance	Client acceptance - The act of "selling" the final project to its ultimate intended users	0.79222	0.02026	0.03656	0.12652
Feedback	Monitoring and feedback - Timely provision of comprehensive control information at each phase in the implementation process	0.50164	0.48703	0.05515	0.41116
Communication	Communication - access to an appropriate network and necessary data to all key factors in the project implementation	0.52585	0.46405	0.14881	0.07556
TroubleShooting	Trouble-shooting - capacity to handle deviations from plans and unexpected events	0.18819	0.02826	0.10965	0.76714
ProjectManager	Characteristics of the project manager - Competence of the project leader (administratively, interpersonally, and technically) and the amount of authority available to perform his/her duties	0.54700	0.29601	0.08646	0.25862
PowerPolitics	Power and politics - Ability to deal with conflict of interest between the project objectives and key stakeholder objectives	0.25618	0.33357	0.66004	0.05440
Environmant	Environmental events - The likelihood of external organizational or environmental factors impacting on the operations of the project team, either positively or negatively	-0.04438	0.20762	0.82578	0.00137
Urgency	Urgency - The perception of the importance of the project or the need to implement the project as soon as possible	0.11713	-0.25407	0.69660	0.33674

Table 2 - Four factors identified based on Eigenvalues > 1

With the PCA, we have reduced the number of variables to four, by combining variables that together make a pattern. Furthermore, by color-coding the table above, it is easy to visually see which of our success factors affect the four factors that came out with an eigenvalue score higher than one. The cells with a solid color indicate success factors

that play a strong role in the patterns found in the data. The multi-colored cells affect more than one of the four factors, and as such, they cannot be said to be as strong, as they also affect others. Based on what success factor has a solid colored cell, we can state that the four factors can be summarized as follows:

- Factor 1: Communications factor
- Factor 2: People factor
- Factor 3: External events factor
- Factor 4: Technical factor

The PCA shows us that there is a certain context in what our respondents have answered. It further confirms that our data is reliable in the sense that it proves internal context within the questionnaire. The four factors, and which individual success factors contribute to the patterns found, indicate that the answers provided in the questionnaire makes sense, as there are natural links between them. Take for example factor 2, *people factor*, and factor 4, *technical factor*, where they overlap is with the success factor that deals with personnel. Notice also that the feedback success factor plays a role in factor 1, *communications factor*, as well as factor 2, *people factor*, and factor 4, *technical factor*. Intuitively this makes sense and proves that the answers collected in the survey are reasonable.

We then carried out ANOVA analysis on these four statistical factors. However, the survey responses were just too similar to create very clear patterns that could have simplified further analysis. We therefore ended up carrying out a full ANOVA analysis on all the 14 factors, based on the 10 who, what, when, how context questions (question 1 – 10 in the survey. See Appendix A.)

This led to some interesting findings. These findings, and our interpretations of what they mean, are discussed in detail below. However, first some general observations. Our analysis found that 8 of the 14 success factors had differences with statistical significance that allowed us to draw conclusions. These 8 are:

- Project mission
- Management support
- Schedule
- Personnel
- Technical tasks

- Client acceptance
- Communication
- Power and politics

For the other 6 success factors, the analysis did not show enough of a difference in the results to allow us to draw any detailed conclusions related to these. In other words, the answers received from the respondents were too similar, and as such, there were no differences that with statistical significance could be analyzed.

Below we present the 8 success factors, and the results related to these.

5.3. Project Mission

In chapter 2.3.1 we learned that *project mission* relates to the mission statement that clearly defines the purpose of the project, the goals of the project and the strategic choices to get there.

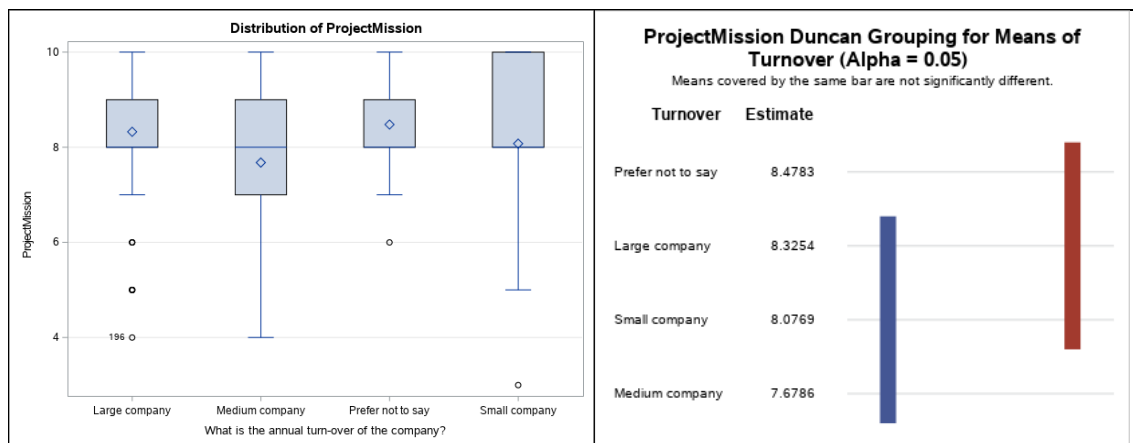


Figure 17 – Project Mission vs Company Size

When comparing Project Mission to the Turnover of the company in which each respondent was employed, we found no linearity. This particular success factor could have been interesting to pursue further in deep-dive interviews to better understand why the spread was uneven. See also Chapter 8, Further Research.

5.4. Management Support

In chapter 2.3.2 we learned that *management support* relates to the willingness of top management to provide the necessary resources, authority and power for project success.

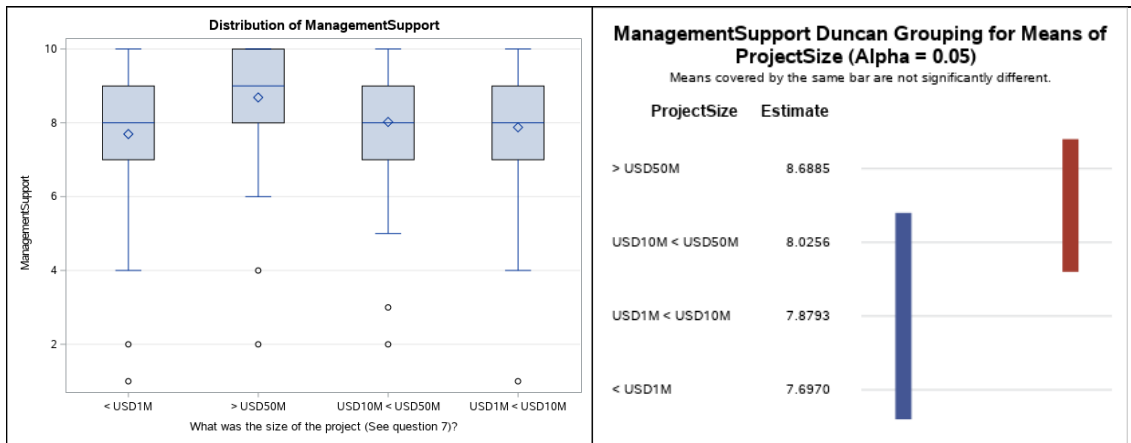


Figure 18 – Management Support vs. Project Size

When comparing project size versus management support, we found the results to be linear: The larger the project size, the more critical it is to have proper management support to ensure project success. Intuitively, this makes sense, as the larger projects will be more resource demanding, and as such, will require proper management support. However, small projects can be run almost without management knowing about them.

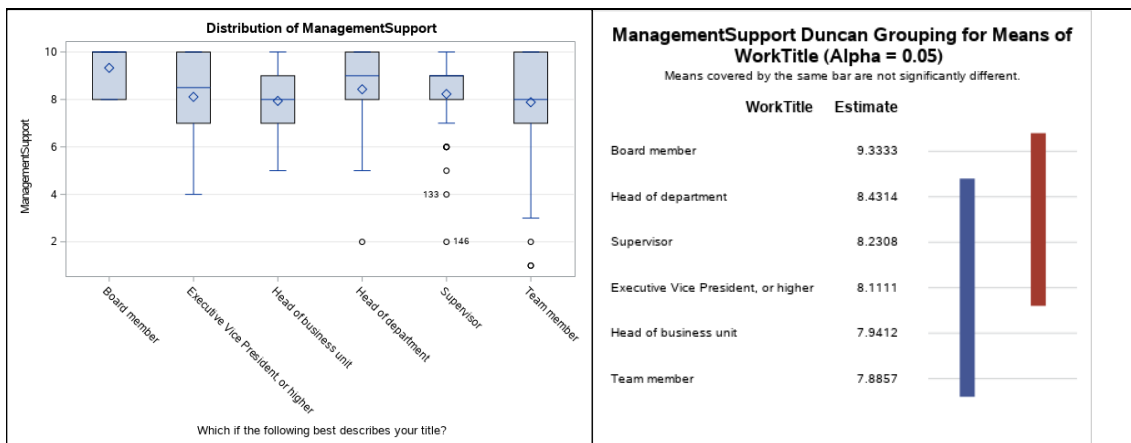


Figure 19 – Management Support vs. Work Title

When it comes to management support and the work title the respondents had, there are some interesting findings. A board member recognizes that management support is key when ensuring project success. However, more interestingly, we found that EVP's and head of business units rate management support as not as important in ensuring project success. This conflicts with literature, and the research work carried out in other studies, that point to management support being one of the most important factors in ensuring project success. Perhaps the EVP's and the head of business units that responded to the survey do not recognize the important role they have? Or perhaps they don't recognize that what they are doing for projects is management support?

5.5. Schedule

In chapter 2.3.3 we learned that *project schedule* relates to the detailed specification of the individual action steps required for project implementation.

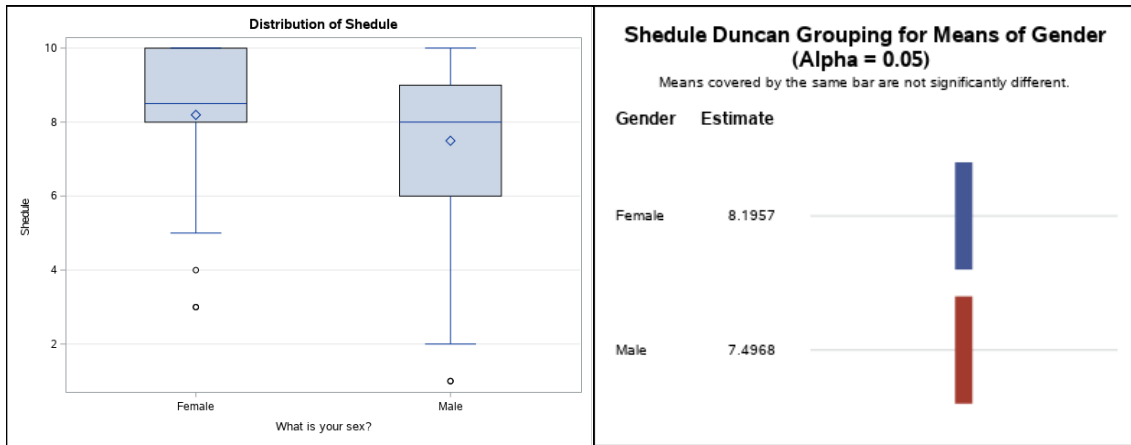


Figure 20 – Schedule vs. Gender

The first interesting result we found with project schedule is that gender makes a difference when looking at the importance of a schedule for project success. Here women rated schedule as more important factor in ensuring project success, as opposed to men.

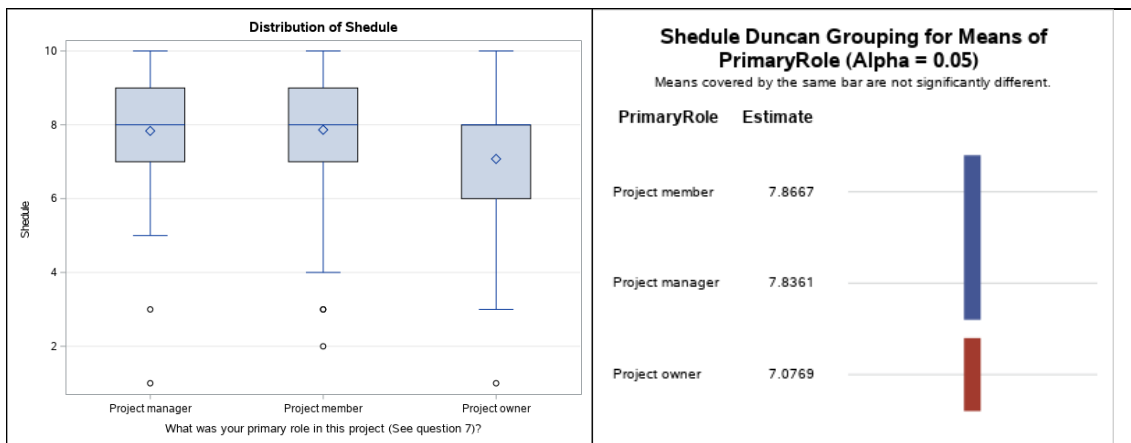


Figure 21 – Schedule vs. Project Role

Our analysis also shows that a project owner says that a project schedule is not as important as the project manager or project member think it is. This is not an unexpected answer, as the project member and project manager are constantly focused on the schedule, and meeting individual milestones throughout the entire execution, whereas the project owner is more concerned about the bigger picture and meeting the end goal.

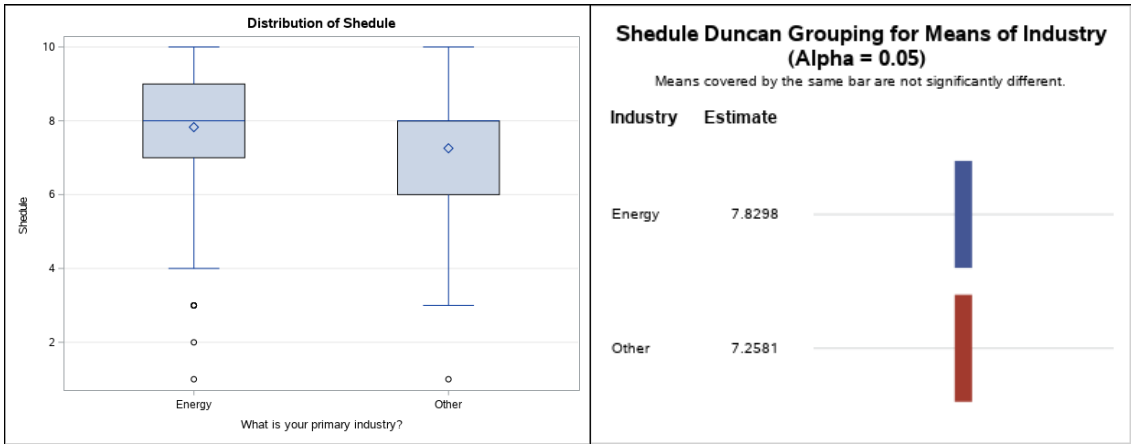


Figure 22 – Schedule vs. Industry

Our analysis also showed us that the energy sector believes schedules are more important for project success than respondents from all other industries. We are not surprised by this finding, as the energy sector often has very strict timelines that are associated with “first drill”, “first oil” and so on.

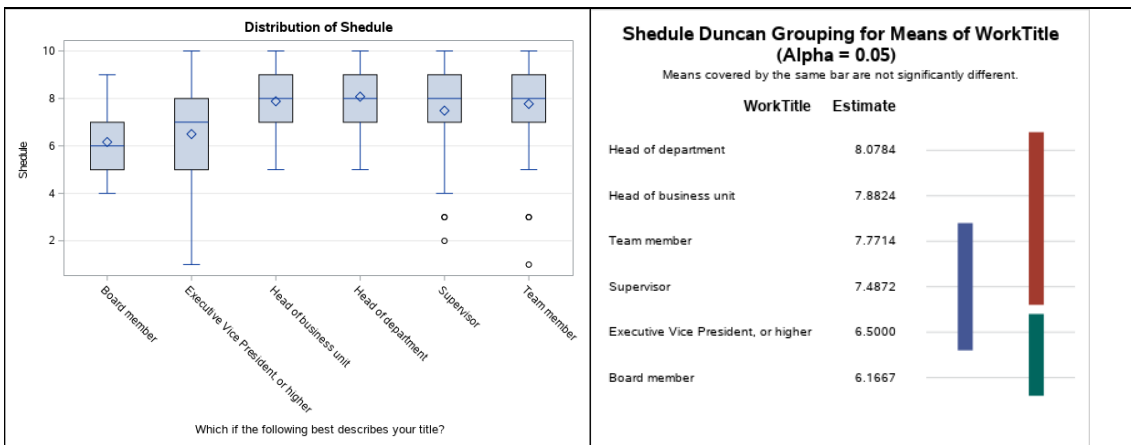


Figure 23 – Schedule vs. Work Title

When looking at schedule versus the work title that the respondents had, it is interesting to see that the two highest levels in any organization, the EVP’s and the board members, do not rate schedule as an important factor for project success. The people that probably feel the pressure of a tight schedule are the ones that rate this as an important factor.

5.6. Personnel

In chapter 2.3.5 we learned that *personnel* relate to the recruitment, selection, and training of the necessary personnel for the project team.

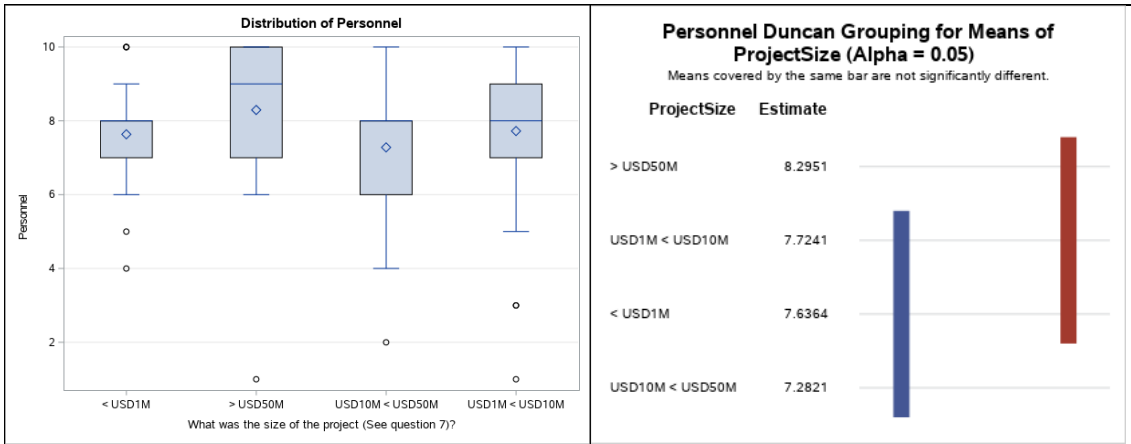


Figure 24 – Personnel vs. Project Size

When analyzing our empirical data, we did not find linearity between project size and personnel. However, we did find that for the largest projects the respondents rates personnel as an important factor in ensuring project success. It was surprising to see that medium to small projects did not rate this factor as more important, as they are usually limited by the number of people they have accessible for such projects, and as such, it is more important that the personnel available are able to deliver according to the project needs.

5.7. Technical Tasks

From chapter 2.3.6 we learned that *technical tasks* relate to the availability of the required technology and the required expertise to accomplish the specific technical tasks that need to be undertaken in the project.

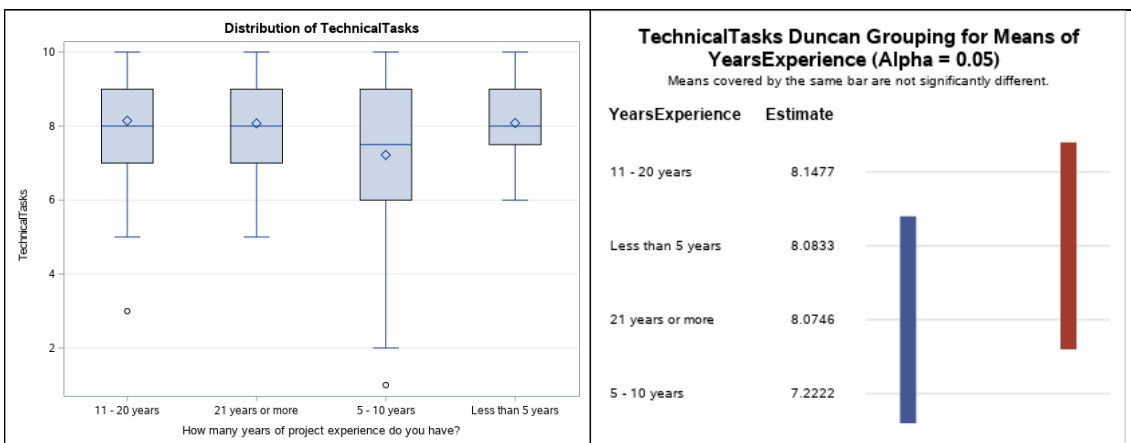


Figure 25 – Technical Tasks vs. Years of Experience

However, when analyzing this factor against the years of project experience that our respondents had, the results were not as expected. In fact, the answers were very scattered, and are difficult to interpret. This could be another candidate for further

analysis in the form of deep-dive interviews of a representative group from each of the four levels of project experience to better understand why the results are as they are. Unfortunately, the limited time we had to complete this study did not allow for such deep-dive interviews to be carried out.

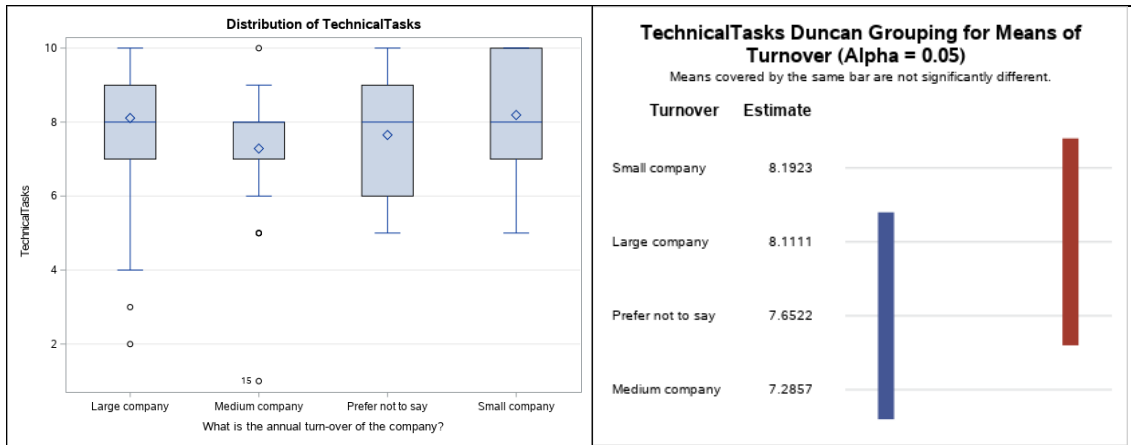


Figure 26 – Technical Tasks vs Company Size

Our analysis of the empirical data shows that when comparing the *technical tasks* success factor with the size of the company the answers were as expected: For large and small companies, the ability to carry out technical tasks is important. Our take on this is that the largest companies we have responses from are technological companies that are focused on being in the forefront of technological development. Further, the small companies are often start-ups that have a technology that differentiates them from the rest. As such, this technology is every important for them. For the medium sized companies, they know where to turn to get the right technology competency, as such, they don't rate it as important of a factor, as they don't carry this competency in-house, but will go out on the market and find it. They therefore consider this as less critical in ensuring project success as compared to the proud large companies that are in the forefront of a lot of the large-scale development, and the small start-ups that have that one technological advantage.

5.8. Client Acceptance

In chapter 2.3.7 we summarized *client acceptance* as: The act of "selling" the final project to its ultimate intended users, not just at the conclusion of the project, but throughout the entire project phase.

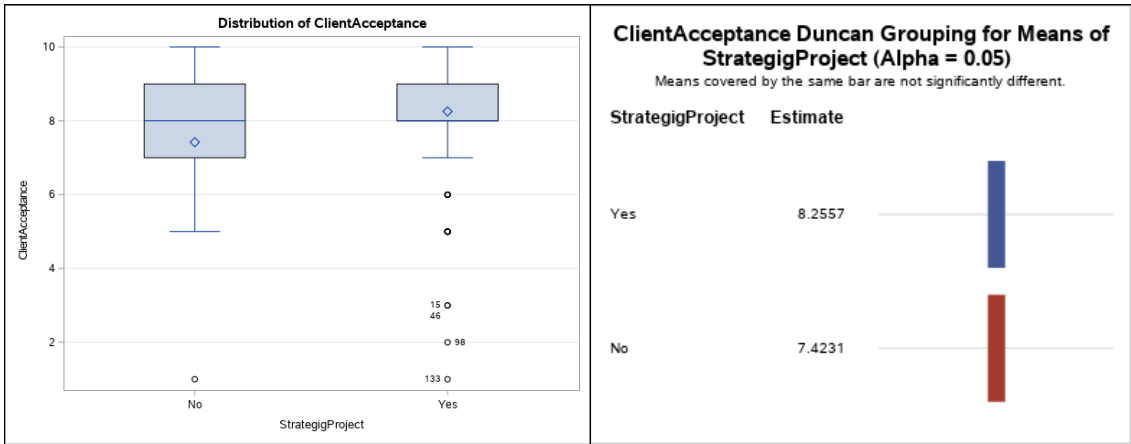


Figure 27 – Client Acceptance vs. Strategic Project

When analyzing the responses from our survey we found that for strategic projects, client acceptance is more important than for non-strategic projects. The difference between the “Yes” and the “No” is quite substantial, yet as expected. One would expect that strategic projects are more dependent on client acceptance for them to be successful, as opposed to non-strategic projects. And with “non-strategic” we mean projects that do not generate competitive advantage.

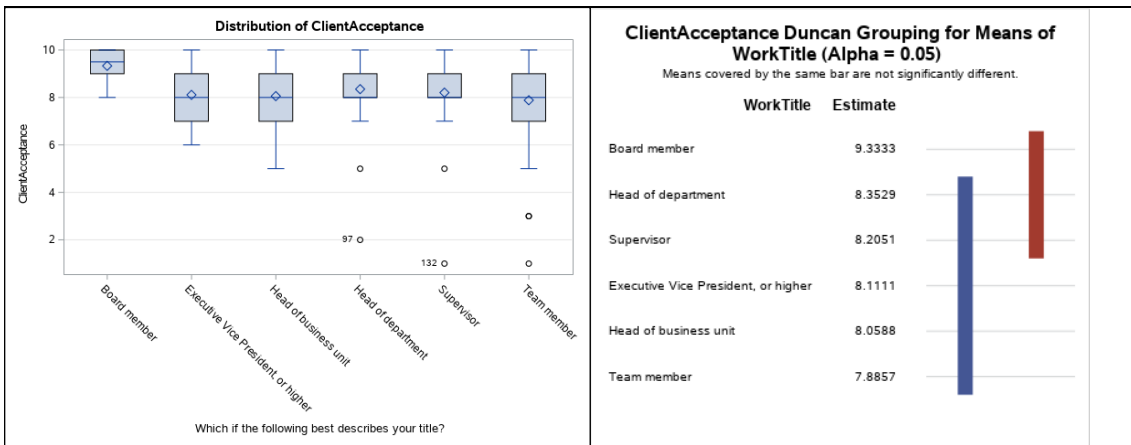


Figure 28 – Client Acceptance vs. Work Title

When comparing work title versus client acceptance, the findings were as expected: The board members think that client acceptance is very important. Likewise, a team member, who’s probably not directly involved with the client, does not think that Client Acceptance was an important factor in ensuring project success.

5.9. Communication

In chapter 2.3.9 we learned that *communication* relates to access to an appropriate network and necessary data to all key factors in the project implementation.

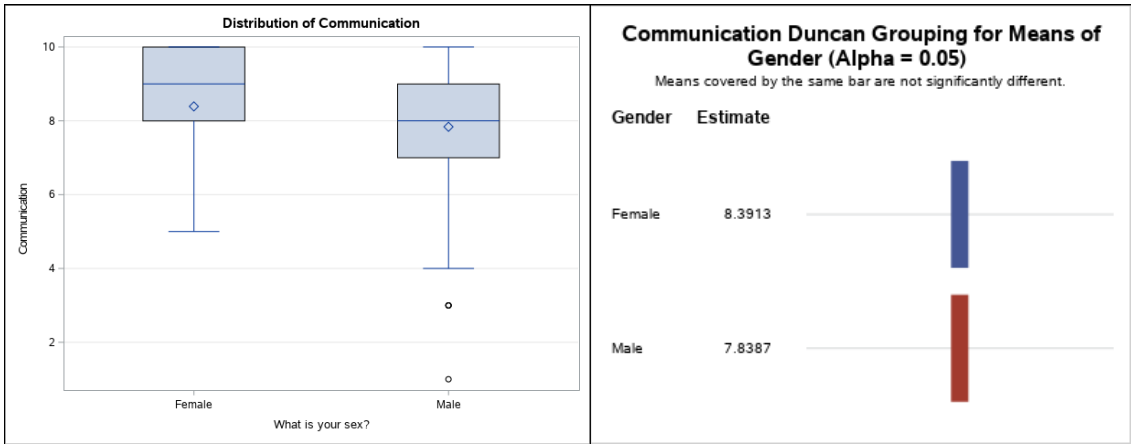


Figure 29 – Communication vs. Gender

According to our analysis, women rate communication as a more important factor for project success than men do.

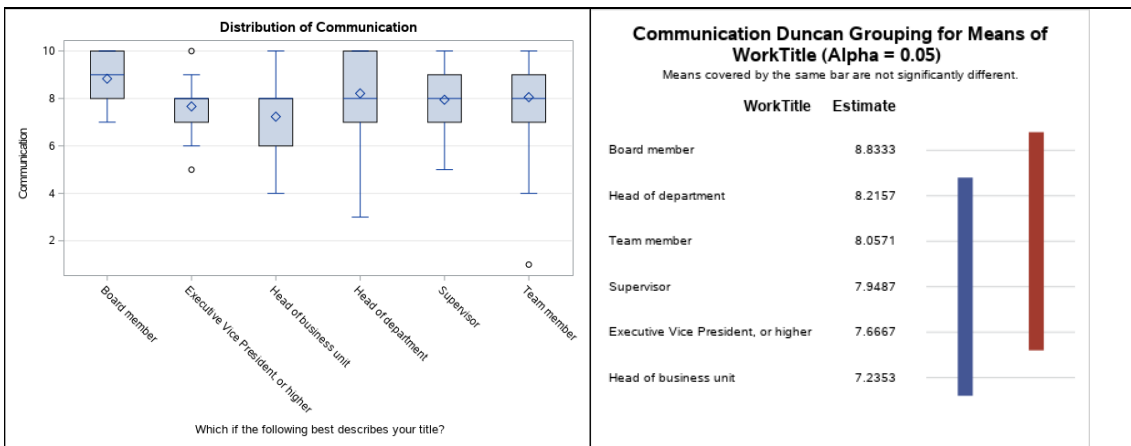


Figure 30 – Communication vs. Work Title

When comparing Work Title versus Communication, we had some interesting findings. The head of business units and EVP's scored surprisingly low on this factor. Intuitively, these would be the levels where you would expect a continuous flow of information from the projects. However, as is seen in the table and graph above, these two groups do not think that communication is as important of a factor for project success as the board member, which would not see updates as frequently, yet rates this factor higher than all other groups.

5.10. Power and Politics

In chapter 2.3.12 we summarized *power and politics* as the ability to deal with conflict of interest between the project objectives and key stakeholder objectives.

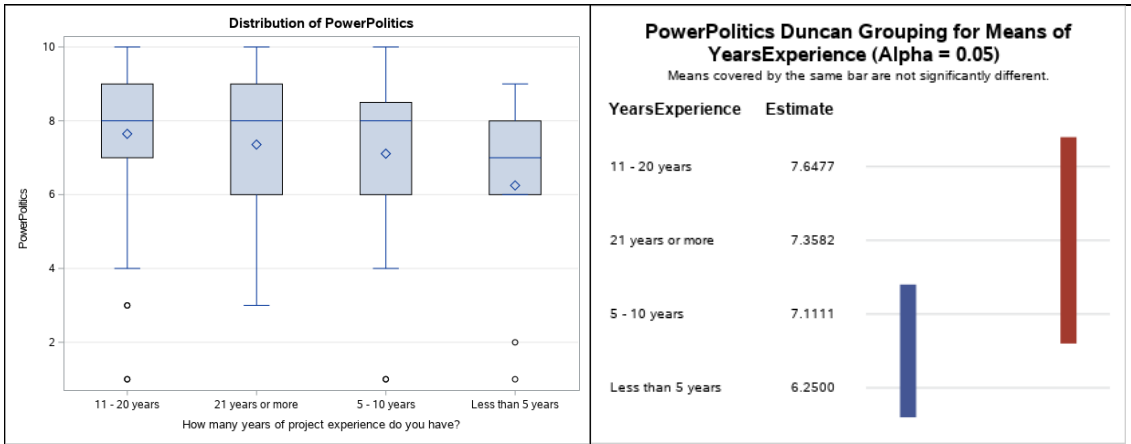


Figure 31 – Power & Politics vs. Years of Experience

When comparing this to years of project experience that the respondents had we find that the group that finds that power and politics is not as important for project success is the least experienced group. This is not surprising, as this is the group that would get the least exposure to these aspects of projects. The respondents with more experience understand the importance of power and politics in ensuring project success.

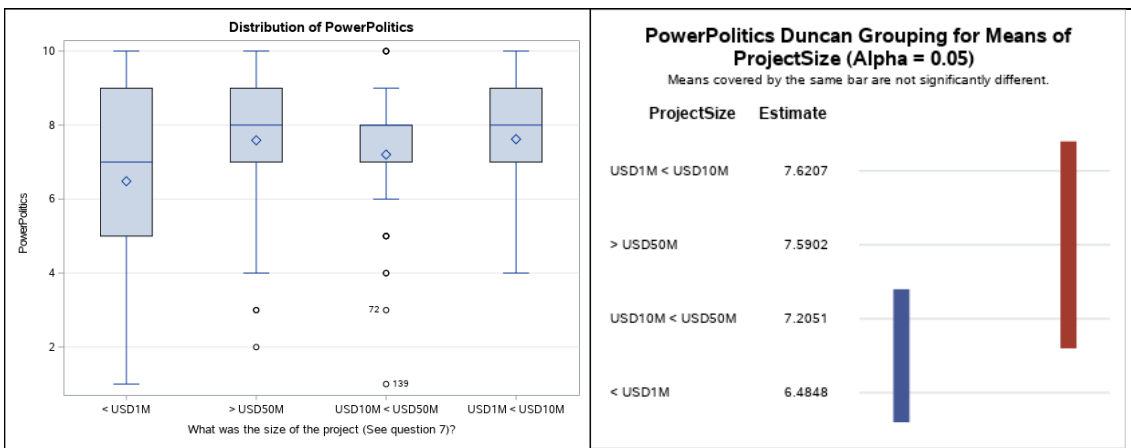


Figure 32 – Power & Politics vs. Project Size

When comparing power and politics to the project size we again did not find linearity, however, we did find traces that point to the fact that if a project is large enough, then power and politics is not allowed to affect the outcome. However, for medium sized projects, power and politics seem to play an important role in ensuring project success. The smallest projects also assigned the lowest importance to power and politics. This can be explained by the fact that there tends to be less conflict of interest between the objectives of these smaller projects and the objectives of the stakeholders.

5.11. Potential new factor: Organizational culture

From the survey, 9 of the respondents named factors that could not easily fall within the original success factors. These factors were categorized together into a group named “organizational culture”. It must be understood that the validity of this finding is limited due to only 9 out of 203 respondents mentioning this as a new potential factor. However, it must be stressed that the respondents primarily were asked to focus on the original 14 factors. The reason behind the background question where the respondents were asked to name other potential factors not mentioned in the original 14 project success factors, was to identify other new potential factors contributing to project success in 2019. As a further discussion it is worth mentioning that according to Ingasson & Jonasson (2019) research have conclusively shown that culture shapes your approach to how problems are solved and how various tasks are tackled (Ingasson & Jónasson, 2019). To further validate this finding; in an article from Collins & Porras (2005), they are describing how strong cultures correlating more often with success than weak cultures (Collins & Porras, 2005). Hence, understanding the organizational culture in the context of the project environment could be essential to run a successful project.

This finding of organizational culture in the context of the project environment as a factor contributing to project success could be part of a future survey, see chapter 8, Further Research. Finally, it is worthwhile to point out that none of the other lists of success factors listed in Table 1, in chapter 2.2, address organizational culture as a factor necessary for project success.

6. Conclusion

We present here our conclusions.

6.1. Survey conclusions

The main conclusion that we can draw is that the success factors that were identified over 30 years ago, are still valid in 2019. Overall, most respondents rated the majority of the 14 factors high, or very high (7 or above), as is illustrated in Figure 14, in Chapter 5.1. The exception being Environmental Events. This consistently scored lower. See also Figure 15, in chapter 5.2, where the ANOVA analysis showed that environmental events was the only factor that, with statistical significance, differentiated from all other critical success factors as not as important when considering project success. See also our “Further Research” chapter below.

The survey not only asked about the importance of the 14 success factors in a recent project, it also allowed for each respondent to provide some context as to whom he or she is, what region they work in, what role they have, how much experience they have, and so on. This was done to see if there would be significant differences in how each respondent rated the importance of each success factor based on their settings, experience and situation. Some generalizations had to be carried out in order to group the respondents into groups with a big enough size to become statistically significant. This effort of grouping is further detailed in Chapter 9, Limitations.

To limit the number of analysis activities that had to be carried out we first attempted to carry out a Principal Component Analysis (PCA), a data reduction technique, on all 14 critical success factors based on the 10 context questions. However, our data set was too similar to be able to discern any new information from the PCA. We therefore ended up carrying out ANOVA (Analysis of Variation) on all 203 responses to the 14 critical success factors based on each respondent’s context answers (who, what, where, when).

Analyzing the importance of the 14 critical success factors based on the context questions provided some interesting results. Some of these results were intuitive, and as expected, but some of them were not entirely clear and could probably be followed up in further detail. See also Chapter 8, Further Research.

Here under follows a summary of some of our findings from analyzing the 14 critical success factors compared to the 10 context questions:

- Management Support:
 - With regards to Management Support, which in literature often is mentioned as the most important factor, see Chapter 2.3.2, we found that the size of the project dictated the importance of Management Support: The larger a project was, the more important it was to have appropriate Management Support
 - When comparing Management Support against Role in Company that the respondents had, we had interesting findings: Contrary to literature, Executive Vice Presidents and Heads of Business Units rated this success factor as not as important as others. Perhaps they do not recognize the important role they have in ensuring project success?
- Schedule:
 - Women rated Schedule as significantly more important than men did when accounting for which critical success factors must be in place for a project to become successful
 - The two highest levels in any organization rated Schedule as less important than the lower levels. We found this to be quite interesting. Having said that, the people that probably feel the pressure of a tight schedule were the ones that rated this as more important
 - Furthermore, it was the Project Members and Project Managers that rated Schedule as more important than the Project Owners. We find this to be as expected, as the Project Members and Project Managers constantly are focused on the schedule, whereas the Project Owner is more concerned with the bigger picture, and meeting the end goal
 - When looking at the industries, the Energy industry said that a Schedule was more important than the Other industry group. From our own experience, knowing the intense focus on “First Drill” and “First Oil”, we are not surprised

- Client Acceptance:
 - Our analysis shows that for Strategic Projects, that is projects that generate competitive advantage, Client Acceptance was more important than for non-strategic projects
 - Likewise, when looking at Client Acceptance based on the Work Title the respondents had, the answer was as expected: The highest level of an organization rated this as very important, while the lowest level, the team member who likely is not in direct contact with the client, does not rate Client Acceptance as very important in ensuring project success
- Communication:
 - Women rated Communication as significantly more important than men did
 - Furthermore, it was interesting to see that a Board Member rates the Communication factor as much more important than the Head of Business Unit. We did not expect to see such a large deviance here. In fact, we would assume that the Head of Business Unit rated Communication at least as high as the Board Member did, if not higher
- Power and Politics
 - Here we had an interesting finding in that the if a project is large enough, then Power and Politics is not allowed to affect the outcome of a project
 - Our analysis also shows that Years of Project experience affects how Power and Politics is viewed: The group with the least experience did not rate Power and Politics as important. However, the group with more experience gave this success factor a significantly higher score, indicating that they know that there is a “game to be played”

Finally, our research also points to a new success factor which was not identified in the 1980’s. This potential new success factor in a project environment context is called Organizational Culture. We must stress that only 9 of our 203 respondents pointed to this new critical success factor, however, we found that it correlates nicely with more recent research from the last decade, which shows that culture shapes your approach to how problems are solved. In Chapter 2.3.5, we refer to research from 5 years ago, and write that the health of your project team has everything to say with regards to your

project being a success or not. As project teams are ever more global, culture will play a big part in ensuring the health of your project teams. As such, the new critical success factor, Organizational Culture in the project environment context, seems to fit into the category of critical success factors that are required to ensure project success.

7. Implications

In this chapter we will focus on two different implication aspects from our survey. First, we will focus on managerial implications from our work. We will then discuss the methodical implications that can help future studies in ensuring effective data collection through online surveys.

7.1. Managerial implications

It is difficult to create a universal list of project success factors which could be suitable for all type of projects. Different type of projects will require a wide range of different skills, techniques and competences to achieve project success. However, our study shows that the 14 critical success factors defined by Pinto and Selvin in the 1980's are still valid today.

Our study shows that that the two critical success factors that had the highest average score in 2019 are (see Figure 12, Chapter 4.2):

1. Trouble-shooting: Project capacity to handle deviation from plans and unexpected events and,
2. Project Mission: Clarity of the purpose of the project with clear goals and with a defined roadmap on how to get there.

The responses from the open question on the questionnaire also indicates that the existence of a good organizational culture in the context of the project environment could potentially play a vital role in achieving project success.

Organizations that would like to adopt findings from our study, should consider that our research indicates that the 14 critical success factors are still valid today, over 30 years later. Particularly if also Organizational Culture in the context of project environment is considered to be an additional critical success factor. Embracing these findings will likely result in organizations running projects more efficiently, and, as such, more prone to succeed. And if the project can be classified as a strategic project, then the outcome of a successful project also leads to competitive advantage.

7.2. Methodical implications

We had decided that we were going to first reach out to our 1st connections in LinkedIn, sending them a link to our online survey, and asking them to kindly participate. We were

then going to post the same survey on our LinkedIn feeds, looking for the survey to be spread further, and even more feedback being received.

We had an interesting observation with regards to using the built-in messaging system in LinkedIn. There is no method of sending one email to all 1st connections in LinkedIn directly. Instead, if you want to reach to all your connections, you have to reach out to them one at a time. To make this process as efficient as possible, a generic message was generated, and a link to the survey was added to this message. Then this message was distributed to all of our connections, one at a time, using the copy + paste functionality found in all computer systems. This led to the initial wave of respondents. However, after a while, we noticed that the rate of responses was falling quickly. To try to compensate for this, the generic message was cancelled, and personalized messages, containing the first name of the recipients were generated. This ensured that the pace of people participating in the survey again increased.

When we had 175 respondents, we decided to post the survey on our feeds. One of the authors published the survey initially on his feed. The second author then found this feed and republished it on his feed. In addition, a colleague of one of the authors, who has a very large 1st connection network in LinkedIn, agreed to post it on his feed as well, in the hopes of drastically increasing the number of respondents. However, we were quite disappointed by the response rate once we published the survey on these different feeds. LinkedIn shows that over 1500 people viewed the post as it arrived on their feed, however, only approximately 20 people completed the survey. In other words, only about 1% of the people that saw the survey on their feeds, completed it. This is in stark contrast to the approximately 40% that completed the survey when they received a personal invitation to participate through the LinkedIn messaging system.

An implication of our experience with LinkedIn direct mail versus LinkedIn feed is that one will ensure a significantly better response rate if one connects directly to 1st connections on LinkedIn rather than posting a survey on the LinkedIn feed.

Furthermore, future surveys that use LinkedIn as a platform should consider notifying 1st connections in advance, at least a week ahead, prior to introducing them to the survey. This will likely further increase the rate of response.

8. Further Research

We went through several different tactics with regards to encouraging people to answer our questionnaire. Our experience showed that the likelihood of a person replying to our survey increased by a factor of 40 when the survey was sent out directly, using the built-in messaging system in LinkedIn as opposed to posting the survey on our LinkedIn feeds. Furthermore, adding the first name to the LinkedIn message further increased the chances of a willingness to participate in the survey. This warrants further research with regards to the methods used to collect the data, and what it takes to get people to respond to surveys in the age of social media.

Another aspect that might be worth looking into is the relatively poor score that the factor Environmental Events received. Could it be that the world is better equipped to deal with environmental events in 2019, then it was in the mid-80's? Do environmental events affect the outcome of a project less now than what was customary in the 1980's, when Pinto and Slevin carried out their research? (Pinto & Slevin, 1986b)

Further research in the form of in-dept, one-on-one interviews might be warranted to better understand the success factors where the responses were very varied, as is indicated in Chapter 4.2 and 5.3.

Finally, with recent research pointing to Organizational Culture, in the project environment context, as being important, and the findings from our survey supporting this, perhaps it would be worthwhile to further focus on this aspect to understand if this is a new factor that should be included in the list of critical success factors necessary for project success.

9. Limitations

We had hoped to be able to reach out to a much wider audience. In the end, our efforts led us to divide the respondents into two industry groups: Those working in the Energy sector (mostly Oil and Gas) and those working in other sectors. We had too few respondents from the 7 other sectors we had defined in our survey. Furthermore, 20% of our respondents added their own industry in the “Others” text box. As such, we did not have significant mass to be able to compare the 7-8 different industries we had hope to be able to compare. As such, there are significant limitations, as we combined all the various industries that were not related to Energy, in one large group that consists of everything from teacher and health workers to management consultants and aerospace engineers.

Furthermore, we had also hope to have more respondents from more regions globally. We had responses from most regions, however, a few regions were represented by only a handful of respondents. As such, they did not represent a large enough mass to be statistically significant. As such, we were only able to split into 3 regions: Western Europe, North America and Others.

Finally, in the category Company Size, we found that over 11% answered “prefer not to say”. We suspect that for this question, most of the “prefer not to say” respondents chose this as the easy answer, as not everyone reflects over the turnover of the company they are employed at.

As such, there are some limitations to our survey that need to be considered when looking at implementing the results in future projects.

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11. Appendix A: Questionnaire

Here follows a copy of the questionnaire used

Project Success Questionnaire

In conjunction with studies at the University of Stavanger, we are carrying out research relating to project success factors. We are focusing on a wide range of industries and a wide range of projects (small or large). We ask that you think back to one successful project that you have been involved in recently (within the last 5 years), either as the project owner, project manager or a project team member.

The relevance of our work is to understand if the predictive factors for project success identified 30+ years ago, are still valid in 2019.

We hope that you can take 5 minutes to answer the following questionnaire. This questionnaire is completely anonymous. We appreciate your willingness to participate!

/Helge Sandbekken and Jonas Rydland

* Required

1. In which region are you personally located? *

- Asia-Pacific
- North America
- Latin America
- Western Europe
- Eastern Europe
- Middle East and Africa
- Prefer not to say

2. What is your age group?

- 0 - 35
- 36 - 45
- 46 - 55
- 56 - 65
- 66+
- Prefer not to say

3. What is your sex?

- Male
- Female
- Prefer not to say

4. What is your primary industry? *

- Aerospace & Defense
- Automotive & Transportation
- Construction
- Consumer Products
- Energy
- Health Care
- Industrial Manufacturing
- IT
- Other

5. Which if the following best describes your title? *

- Board member
- Executive Vice President, or higher
- Head of business unit
- Head of department
- Supervisor
- Team member
- Prefer not to say

6. How many years of project experience do you have? *

- Less than 5 years
- 5 - 10 years
- 11 - 20 years
- 21 years or more
- Prefer not to say

7. Thinking of a recent (within the last 5 years) successful project you were a part of, could this be classified as a strategic project? *

With "strategic project" we mean projects that generate competitive advantage.

- Yes
- No
- Prefer not to say

8. What was your primary role in this project (See question 7)? *

- Project owner
- Project manager
- Project member
-

9. What was the size of the project (See question 7)? *

- < USD1M
- USD1M < USD10M
- USD10M < USD50M
- > USD50M
- Prefer not to say

10. What is the annual turn-over of the company? *

- Small company: Below USD10M in revenues
- Medium size company: Between USD10M and USD100M in revenue
- Large company: Above USD100M in revenues
- Prefer not to say

11. For the rest of this questionnaire, we would like you to again focus on the successful project you thought of in question 7.

We would like to understand your perception of what effect the following factors had on ensuring that success.

Please rate each factor on a scale of 1 - 10.

12. Project mission - Initial clarity of purpose, goals and strategic choices to get there *

Low Effect 1 2 3 4 5 6 7 8 9 10 High Effect

13. Top management support - Willingness of top management to provide the necessary resources and authority/power for project resources *

Low Effect 1 2 3 4 5 6 7 8 9 10 High Effect

14. Project schedule/plans - A detailed specification of the individual action steps required for project implementation *

Low Effect 1 2 3 4 5 6 7 8 9 10 High Effect

15. Client consultation – Communication, consultation, and active listening to all impacted parties *

Low Effect 1 2 3 4 5 6 7 8 9 10 High Effect

16. Personnel – Recruitment, selection, and training of the necessary personnel for the project team *



17. Technical tasks – Availability of the required technology and expertise to accomplish the specific technical action steps *



18. Client acceptance – the act of “selling” the final project to its ultimate intended users *



19. Monitoring and feedback – Timely provision of comprehensive control information at each phase in the implementation process *



20. Communication – access to an appropriate network and necessary data to all key factors in the project implementation *



21. Trouble-shooting – capacity to handle deviations from plans and unexpected events *



22. Characteristics of the project manager – Competence of the project leader (administratively, interpersonally, and technically) and the amount of authority available to perform his/her duties *

Low Effect 1 2 3 4 5 6 7 8 9 10 High Effect

23. Power and politics – Ability to deal with conflict of interest between the project objectives and key stakeholder objectives *

Low Effect 1 2 3 4 5 6 7 8 9 10 High Effect

24. Environmental events – the likelihood of external organizational or environmental factors impacting on the operations of the project team, either positively or negatively *

Low Effect 1 2 3 4 5 6 7 8 9 10 High Effect

25. Urgency – the perception of the importance of the project or the need to implement the project as soon as possible *

Low Effect 1 2 3 4 5 6 7 8 9 10 High Effect

26. Are there any other factors not mentioned previously in this questionnaire that you deem important for project success? Please specify below.

Enter your answer

Submit

12. Appendix B: The results from the questionnaire

Find below the responses received

QuestionsResponses **203**


Project Success Questionnaire

203
Responses

09:34
Average time to complete

Active
Status

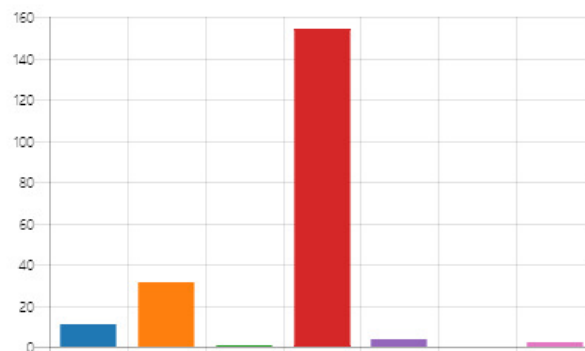
...

View results Open in Excel

1. In which region are you personally located?

[More Details](#)

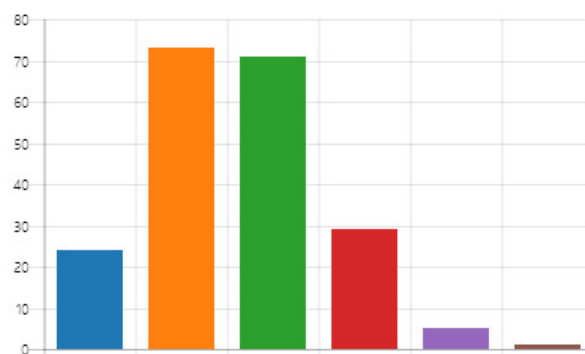
● Asia-Pacific	11
● North America	31
● Latin America	1
● Western Europe	154
● Eastern Europe	4
● Middle East and Africa	0
● Prefer not to say	2



2. What is your age group?

[More Details](#)

● 0 - 35	24
● 36 - 45	73
● 46 - 55	71
● 56 - 65	29
● 66+	5
● Prefer not to say	1



3. What is your sex?

[More Details](#)

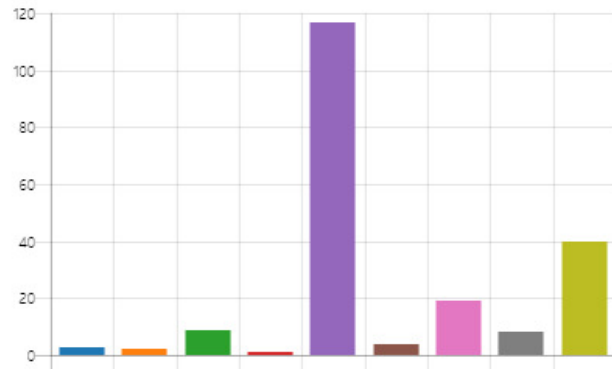
● Male	155
● Female	46
● Prefer not to say	1



4. What is your primary industry?

[More Details](#)

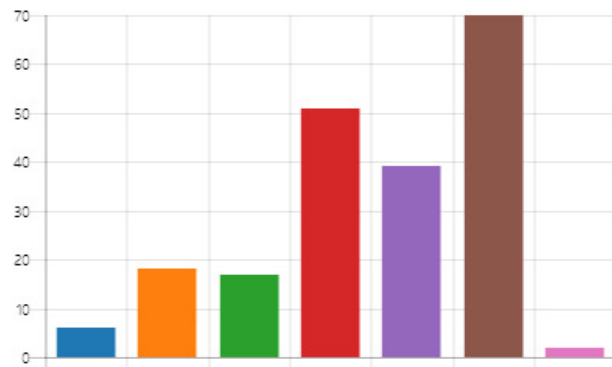
● Aerospace & Defense	3
● Automotive & Transportation	2
● Construction	9
● Consumer Products	1
● Energy	117
● Health Care	4
● Industrial Manufacturing	19
● IT	8
● Other	40



5. Which if the following best describes your title?

[More Details](#)

● Board member	6
● Executive Vice President, or hi...	18
● Head of business unit	17
● Head of department	51
● Supervisor	39
● Team member	70
● Prefer not to say	2



6. How many years of project experience do you have?

[More Details](#)

● Less than 5 years	12
● 5 - 10 years	36
● 11 - 20 years	88
● 21 years or more	67
● Prefer not to say	0



7. Thinking of a recent (within the last 5 years) successful project you were a part of, could this be classified as a strategic project?

[More Details](#)

● Yes	176
● No	26
● Prefer not to say	1



8. What was your primary role in this project (See question 7)?

[More Details](#)

● Project owner	48
● Project manager	56
● Project member	83
● Other	16



9. What was the size of the project (See question 7)?

[More Details](#)

● < USD1M	33
● USD1M < USD10M	58
● USD10M < USD50M	39
● > USD50M	61
● Prefer not to say	12



10. What is the annual turn-over of the company?

[More Details](#)

● Small company: Below USD10...	26
● Medium size company: Betwe...	28
● Large company: Above USD10...	126
● Prefer not to say	23



11. For the rest of this questionnaire, we would like you to again focus on the successful project you thought of in question 7. We would like to understand your perception of what effect the following factors had on ensuring that success. Please rate each factor on a scale of 1 - 10.

[More Details](#)

12. Project mission - Initial clarity of purpose, goals and strategic choices to get there

[More Details](#)

203
Responses

8.22 8.22 Average Rating

13. Top management support - Willingness of top management to provide the necessary resources and authority/power for project resources

[More Details](#)

203
Responses

8.15 8.15 Average Rating

14. Project schedule/plans - A detailed specification of the individual action steps required for project implementation

[More Details](#)

203
Responses

7.66 7.66 Average Rating

15. Client consultation – Communication, consultation, and active listening to all impacted parties

[More Details](#)

203
Responses

8.18 8.18 Average Rating

16. Personnel – Recruitment, selection, and training of the necessary personnel for the project team

[More Details](#)

203
Responses

7.81 7.81 Average Rating

17. Technical tasks – Availability of the required technology and expertise to accomplish the specific technical action steps

[More Details](#)

203
Responses

7.96 7.96 Average Rating

18. Client acceptance – the act of “selling” the final project to its ultimate intended users

[More Details](#)

203
Responses

8.16 8.16 Average Rating

19. Monitoring and feedback – Timely provision of comprehensive control information at each phase in the implementation process

[More Details](#)

203
Responses

7.39 7.39 Average Rating

20. Communication – access to an appropriate network and necessary data to all key factors in the project implementation

[More Details](#)

203
Responses

7.97 7.97 Average Rating

21. Trouble-shooting – capacity to handle deviations from plans and unexpected events

[More Details](#)

203

Responses

8.27 8.27 Average Rating

22. Characteristics of the project manager – Competence of the project leader (administratively, interpersonally, and technically) and the amount of authority available to perform his/her duties

[More Details](#)

203

Responses

8.15 8.15 Average Rating

23. Power and politics – Ability to deal with conflict of interest between the project objectives and key stakeholder objectives

[More Details](#)

203

Responses

7.37 7.37 Average Rating

24. Environmental events – the likelihood of external organizational or environmental factors impacting on the operations of the project team, either positively or negatively

[More Details](#)

203

Responses

5.92 5.92 Average Rating

25. Urgency – the perception of the importance of the project or the need to implement the project as soon as possible

[More Details](#)

203

Responses

7.04 7.04 Average Rating

26. Are there any other factors not mentioned previously in this questionnaire that you deem important for project success? Please specify below.

[More Details](#)

57

Responses

Latest Responses

"ability adapt each day to different problems to solve and be able to s...

"The contract and technical clarification period was quite extensive fo...