



SCHOOL OF
ECONOMICS AND
MANAGEMENT

Project Resilience in the Face of Crisis

A study of project management in Sweden

by

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Abstract

The purpose of this thesis is to explain and analyze the project resilience practices developed and demonstrated in project management during times of crisis, as well as to analyze the correlations of these practices with project success, both in the short and long term. This project is also part of the Swedish Project Review, a longitudinal study benchmarking trends and areas of improvement in project management in Sweden. The research for this study was conducted through a deductive approach, using a mono-method quantitative research design. To develop the hypotheses, the relevant determinants of project resilience were found through a review of the best available knowledge. The empirical data for this study was gathered through the use of a questionnaire distributed among professionals working in the field of project management from organizations of various revenues and industries in Sweden. The results support that the six determinants correlate positively with project resilience, both individually and integrated. A correlation was also found between project resilience and both short- and long-term project success. Additionally, it was found that the integrated determinants were correlated with both short- and long-term project success. On the basis of these results, it can be concluded that contingency planning, risk monitoring, flexibility, empowerment, communication clarity, and learning are indeed linked to project resilience and that integrating these practices is linked to project success in the short and long term.

Keywords: project resilience, project management, project success, crisis, emergent risks, resilience, contingency planning, risk monitoring, flexibility, empowerment, communication clarity, learning, PMI, PMBOK Guide, Sweden

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1 Introduction

From the Egyptian pyramids, built thousands of years before the common era, to the Trans Anatolian Natural Gas Pipeline, winner of the Project of the Year Award in 2020 (Project Management Institute, 2021b), humans have devised and carried out projects for millennia. Before, after, and in between these projects, humans have also faced crises of all different sorts, from wars to economic depressions and from terrorist attacks to plagues (Boin, Hart, Stern & Sundelius, 2016). As observed today, numerous projects of varying magnitudes have still prevailed despite these challenges. At the same time, other projects have been discarded and decommissioned. As shown in Figure 1.1, when project management is eclipsed by crisis, there can either be project vulnerability (a gray area) or project resilience (a yellow area). This thesis focuses on project resilience, its correlational factors, and its relation to project success.

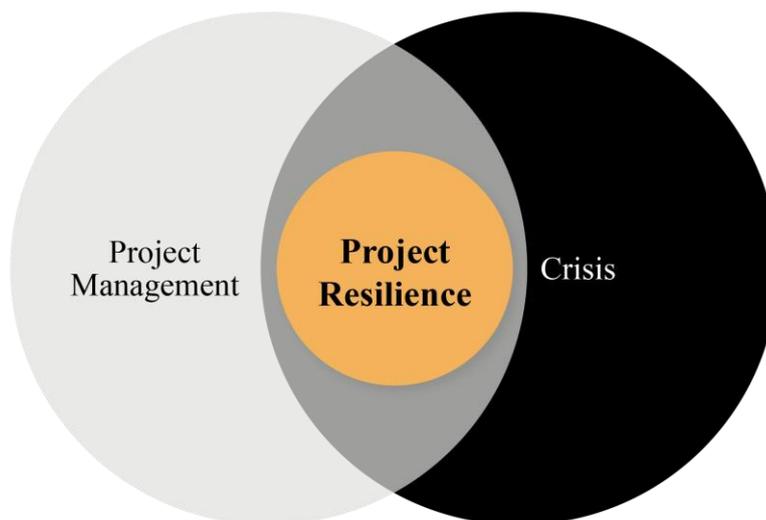


Figure 1.1 The scope of this study: project resilience at the intersection of project management and crisis

1.1 Background

During the *Machine Age*, the world witnessed the evolution of management philosophy in line with the industrial revolution (Brynjolfsson & McAfee, 2014). With roots in economics, management has first served as a productivity-boosting function for the nation's prosperity (Kiechel, 2012). The emergence of modern cities, electrical telecommunications, mass

transportation, and industrial manufacturing companies gave rise to scientific management with its backbone in the relationship between people and work (Kiechel, 2012)

In 1911, Frederick Winslow Taylor emphasized the model of minimizing the input of human effort while maximizing the outcomes by eradicating inefficiency in organizational operations (Kiechel, 2012). During this time, Henri Fayol established management principles, which are called functions of management today (Witzel, 2003). Joining this movement, Henry Lawrence Gantt, sometimes referred to as the father of project management, created a project scheduling diagram, now called the *Gantt chart*, for his infrastructure project (Kiechel, 2012). Kutsch, Hall and Turner (2015) express that it was a world-renowned innovation in the 1920s and has remained fundamental in project management until today.

Having engineering professionals as the primary contributor and audience, project management has been significantly influenced by scientific management (Kiechel, 2012). With this respect, many emergent project management associations formalized best practices and methodologies based on rigid systems and structures (Kutsch, Hall & Turner, 2015). In 1969, the Project Management Institute (PMI) was founded in the United States as a non-profit professional organization, the first one in the world to provide means for project managers to connect, share and discuss project information and issues (Kutsch, Hall & Turner, 2015).

Because project management has its roots in engineering, project success has long been attributed to efficiency and effectiveness with agreed-upon objectives (Project Management Institute, 2017). The *iron triangle*, the compliance of cost, time, and quality, has inseparably been linked to the success of project management since the 1950s (Atkinson, 1999). Nonetheless, delivering the agreed quality within a set budget and time is not necessarily sufficient to secure project success and business continuity (Kutsch, Hall & Turner, 2015), especially in unstable times.

While technology is moving at a breakneck speed, the world has become increasingly volatile, uncertain, complex, and ambiguous (VUCA) as time progresses (Tiefenbacher, 2019). External crises have the potential to slow down, stagnate, or even disrupt how projects are carried out, particularly when the level of urgency and the end of those crises cannot be anticipated (Project Management Institute & Project Business Foundation, 2020). While office-based teams have to adapt to remote coordination by adopting new digital tools and flexible processes, managers also need to adjust their communication and collaboration approaches in real-time (Edmondson & Mortensen, 2021). It is evident that flexibility and contingency are mandatory, as strict rules and procedures from pure engineering have no longer been adequate to manage this interconnected and fast-paced VUCA crisis as change is inevitable (Blay, 2017).

Emergent risks cannot be foreseen but mismanaging them can put projects or entire organizations on the verge of collapse (Weick & Sutcliffe, 2007). However, organizations and their project teams can proactively build the ability to flexibly respond and prepare for disturbances caused by external risks and project complexity (Blay, 2017). This ability is called *project resilience*. Although project resilience is not a new concept, it has recently gained more

recognition as a critical factor to ensure project continuity and reduce organizational vulnerability (Chandler, 2014).

Project resilience is a long-term capability of an organization and project team to maintain project continuity during unexpected times (Blay, 2017). Outside of project resilience, emergent risks can cause vulnerability. As project vulnerability increases in a VUCA world, many projects are threatened by the disruption caused by crises, and project teams face unprecedented challenges. This trend highlights project resilience as a crucial matter for the future.

Project resilience is a complex topic, as it is understandably not possible to know how resilient a project is until after it has been impacted by turbulences. Nevertheless, there are guidelines for developing project resilience in conference papers, research studies, books, and even project management standards (Arecchi & Baker, 2012; Blay, 2017; Hillson, 2014; Kutsch, Hall & Turner, 2015; Project Management Institute, 2017). There are not many empirical studies that have tested the veracity of these guides on live cases post hoc; however, the COVID-19 pandemic, being a contemporaneous example of a major crisis, serves as an appropriate context to conduct these investigations. There is also a research gap in how project resilience correlates with project success, either directly or indirectly. In order to address this, a clear definition of project success must be used. Accordingly, the research purpose emerges from these gaps.

1.2 Research Purpose

The purpose of this thesis is to explain and analyze the project resilience practices that were developed and demonstrated in project management in 2020-2021, as the whole world faced a major crisis. A second purpose is to analyze how these practices are correlated with project success, both in the short and long term. In addition, this thesis is part of a longitudinal study on project management trends in Sweden, putting emphasis on project resilience in 2021.

1.3 Research Questions

- First Research Question: What determinants are linked to project resilience?
- Second Research Question: How is project resilience correlated with project success during a time of crisis?
- Third Research Question: What correlation does the integration of these determinants have with project resilience and project success?

1.4 Delimitations

This project, both as a cross-sectional and a longitudinal study, is delimited to Sweden as the context. It is also delimited to professionals working in the project management industry, which spans a wide range of sectors; however, it is not limited to project managers. Lastly, the thesis is delimited to the COVID-19 pandemic as the main crisis, taking into consideration that its effects in Sweden have been different than in other countries.

1.5 Outline of the Thesis

This thesis consists of five principal chapters. Chapter 1 is a brief introduction of the relevant topics and the purpose of the study. Chapter 2 incorporates a review of the best available knowledge from existing literature, leading to the theoretical framework used in this thesis. Chapter 3 offers an overview of the methods employed to conduct this study. Chapter 4 presents the results obtained from the survey, along with an analysis of the data and a discussion of its relevance and applicability. Lastly, Chapter 5 comprises a summary of the conclusions drawn from the findings, as well as opportunities for future research.

2 Literature Review

This chapter is divided into six sections, starting with the theoretical model as a frame of reference to the rest of the chapter. The following three sections cover relevant aspects about project management, crisis, and resilience, respectively. The fifth section converges these three concepts and explains the six determinants of project resilience that were selected for the first half of the theoretical model. The chapter then ends with a brief summary.

2.1 Theoretical framework

The following theoretical model has been developed through a review of relevant literature, which is presented in the subsequent sections of this chapter. As introduced in the previous chapter, project resilience has relevance at the intersection of project management (explained in section 2.2) and crisis (explained in section 2.3). Displayed in Figure 2.1 are six determinants (independent variables; explained in section 2.5) expected to positively influence project resilience (mediating variable; explained in section 2.4), which would then contribute to short- and long-term project success (dependent variables; explained in section 2.2).

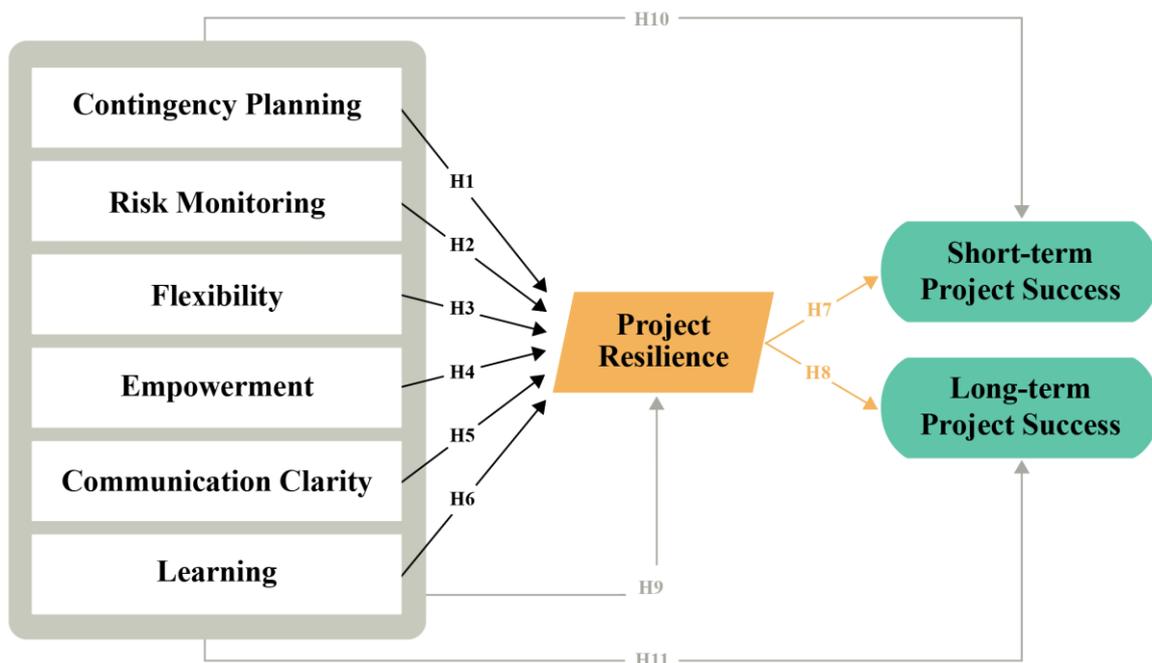


Figure 2.1 Research theoretical model

The theoretical framework of this study, as displayed in Figure 2.1, illustrates the following hypotheses:

- **H1:** Contingency planning is positively correlated to project resilience.
- **H2:** Risk monitoring is positively correlated to project resilience.
- **H3:** Flexibility is positively correlated to project resilience.
- **H4:** Empowerment is positively correlated to project resilience.
- **H5:** Communication clarity is positively correlated to project resilience.
- **H6:** Learning is positively correlated to project resilience.
- **H7:** Project resilience is positively correlated to short-term project success.
- **H8:** Project resilience is positively correlated to long-term project success.
- **H9:** The integrated project resilience determinants are positively correlated to project resilience.
- **H10:** The integrated project resilience determinants are positively correlated to short-term project success.
- **H11:** The integrated project resilience determinants are positively correlated to long-term project success.

Hypotheses 1-6 and 9-11 focus on the six determinants that have been deemed the most pertinent to project resilience through a review of the best available knowledge. There are indeed other actions, techniques, skills, and practices that foster project resilience; however, these six factors emerge as the main ones for this study's theoretical framework. Hypotheses 7-8 focus on the correlation between project resilience as a variable of its own and the different definitions of project success. Hypotheses 10-11 focus on the correlation between the project resilience determinants and the different definitions of project success, circumventing project resilience as a mediating variable.

2.2 Project Management

A project is usually defined as an undertaking with a start and a finish point (Kutsch, Hall & Turner, 2015). Continually, internal and external influences are molding the field of project management; across different sectors, industries, geographies, and periods of time, it is impossible for project managers to apply a one-size-fits-all approach to deliver their projects successfully (Laufer, Little, Russell & Maas, 2018). At the same time, the increasingly VUCA state of the world demands adaptability and courage to try new approaches and methods from both organizations as a whole and the individuals in them (Tiefenbacher, 2019). Nevertheless, organizations and individuals still rely on project management standards for suggestions on how to lead their projects successfully (Eberle, Meyer & Rosen, 2011). The following section introduces an overview of these standards, channeling them into the most relevant for this study.

2.2.1 Project Management Standards

Hübner, Volk and Schultmann (2018) have compared major project management standards issued by different organizations. They explain that some of these standards are globally recognized, while others are used only in certain countries; some can be applied in most projects, while others are specific to an industry or sector. They then classify them into *de jure* standards, *de facto* standards, *special* standards, and *Maturity-Models*. What they refer to as *de jure* standards are those published by official bodies, while *de facto* standards are those produced by professional communities. They call *special* standards those used in specific application areas and *Maturity-Models* those that evaluate project success in regard to attainment of quality and objectives.

The most general and global project management standards are those that Hübner, Volk and Schultmann (2018) refer to as *de facto* and *de jure*. They describe that the stark contrast between these two is that *de facto* standards, usually called *bodies of knowledge*, are mainly based on experience, as their content stems from actual project management practitioners who have discussed, compiled, and consolidated information and experiences. Kutsch, Hall and Turner (2015), however, point out that these *bodies of knowledge* have limitations and disadvantages. For instance, project managers cannot employ probability based on historical data to estimate risks in the future (Kutsch, Hall & Turner, 2015), as VUCA circumstances blur the hindsight that experience provides. Nevertheless, they also point out that project management *bodies of knowledge* indeed provide significant benefits and tend to increase project success rates.

Since this thesis follows a research philosophy of pragmatism, aiming at finding practical and applicable knowledge, experience-based *de facto* standards have been used as the main sources. Comparing the different *de facto* standards, Hübner, Volk and Schultmann (2018) conclude that A Guide to the Project Management Body of Knowledge (PMBOK Guide) by PMI and the Individual Competence Baseline (ICB) by IPMA contain in essence the same content, although their structure and specialization differs. A similar conclusion was reached by Eberle, Meyer and Rosen (2011) when comparing previous editions of PMI and IPMA standards. They found that the two approaches are in fact compatible and can be integrated, as the ICB is composed at a higher level, so the PMBOK Guide fits within the ICB's structure.

2.2.2 Project Success

In the sixth edition of the PMBOK Guide, the Project Management Institute (2017) acknowledges that traditionally the key factors of project success have been scope, cost, and time. However, they explain that project objectives, which must be agreed upon by stakeholders and project managers, should also be measured. They then enumerate criteria that may be used as project objectives, for example, attaining nonfinancial goals and sustaining governance benchmarks, among others.

Kutsch, Hall and Turner (2015) are critical of how project management has been systematized by project management standards. They are especially wary of the way that project success is measured. They argue that even if a project is finished within budget, schedule, and scope, it can still be considered a failed project if it does not generate value for its stakeholders. Therefore, the aspect of value generation should be considered in project performance, in addition to budget, schedule, and scope compliance, which are also important (Kutsch, Hall & Turner, 2015). Prostejovska and Tomankova (2017) agree that this triple constraint is insufficient and propose a model of success criteria that includes stakeholders, context, and management, in addition to the *iron triangle* of cost, time and quality.

On their official webpage about standards, the (Project Management Institute, 2021a) illustrates that the past six editions of the PMBOK Guide have been incremental revisions focusing on project processes; however, the seventh edition will take on a whole new format based on principles orientated toward a complete value delivery. Scheduled to be released in August 2021, it reflects a disruption in project management standards, with a greater emphasis on project outcomes in addition to deliverables (Project Management Institute, 2021a).

In summary, project success can be best defined by the achievement of project objectives that generate lasting value for the organization (long-term project success). Nevertheless, the attainment of budget, schedule, and scope is still an important measure of effective project management (short-term project success). As stated in the purpose, this thesis seeks to analyze the potential correlation that project resilience has with both short- and long-term project success, as defined here. Importantly, both of these types of project success can be threatened by the inevitability of crises, which are explored in the next section.

2.3 Crisis

A crisis is defined as “a time of intense difficulty, trouble, or danger” and “the turning point of a disease when an important change takes place, indicating either recovery or death” (Lexico, 2021b, n.p.). From international terrorism to technological breakdowns and from natural disasters to fatal pandemics, crises can stifle financial growth, cause political upheavals, and threaten the lives of global citizens beyond expectation and control (Boin et al., 2016). A crisis is a transient period of disorder amidst a system’s apparently normal operation, where the usual ways of working are not sufficient for continual functioning (Boin et al., 2016).

The COVID-19 pandemic has been one of the worst global health crises in recent times (World Health Organization, 2021), posing vulnerabilities and evolutionary pressures on contemporary society and the business community. From the point of view of managers and *stakeholders*, *organizational* crises refer to prominent, unexpected, and possibly disruptive events that can jeopardize organizations’ high-priority goals, leading to an intense impact on relationships with stakeholders (Bundy, Pfarrer, Short & Coombs, 2017). A universal element related to a crisis is the sensing of rising *threats* resulting from a drastic discrepancy between desired and existing

situations (Billings, Milburn & Schaalman, 1980). Because *threats* are considered *negative risks* (Project Management Institute, 2017), Hermann's (1963) model describes three characteristics of crisis: hindrance to organization's valued goals, short decision time, and expectation or surprise.

As crises can threaten organizational goals (Hermann, 1963), project risk management aims to optimize the probability of project success by exploiting *positive risks (opportunities)* while avoiding or mitigating *negative risks (threats)* (Project Management Institute, 2017). If left unmanaged, *threats* can cause the projects to diverge from the plan and initial project objectives, resulting in various issues including delay, cost overruns, underperformances, and disreputability (Project Management Institute, 2017). Thereby, the effectiveness of project risk management is linked to project success (Project Management Institute, 2017).

According to Hillson (2014), *emergent risks* are the type of risks that cannot be anticipated or discovered until they occur. He illustrates *emergent risks* as *black swans*, referring to unexpected and rare events that cause a great magnitude of impact with a pivotal role in human history. Coined by Taleb (2007), the term *black swan* came from the saying that Europeans once presumed that black swans did not exist until their discovery in Australia. Another common term for *emergent risks* is *unknown unknowns*, stating that they arise from situations that are unforeseeable and unexpected based on past knowledge and experience (Project Management Institute, 2017).

In conclusion, experts and practitioners have defined *crisis* differently in details, but the core remains common. It is a stressful time marked by unexpected events, causing threats from national to international scales. From an organizational stance, a crisis can threaten organizations' valuable goals and increase its vulnerabilities, potentially causing project failure. The next section presents the topic of resilience, a crucial capability when dealing with crisis.

2.4 Resilience

Resilience is discipline-specific knowledge that can be conceptualized in many fields; however, there are two main foundations where resilience originated: engineering and ecology (Blay, 2017). In an engineering notion, Alexander (2013) defines resilience as the ability to resist force, known as rigidity. On the other hand, ecological resilience is defined as the renewal, reorganization, and development capacity (Blay, 2017). While engineering resilience emphasizes efficiency, stability, predictability, and recovery time to the original position (Walker, Holling, Carpenter & Kinzig, 2004), ecological resilience has a holistic emphasis on persistence and flexibility towards change as well as the dynamic and continuous development of the systems to retain elevated position and level of functioning (Gunderson, 2000; Holling, 1973).

According to Blay (2017), Figure 2.2 illustrates that engineering resilience is about achieving the results with rigid systems and fixed rules, eventually causing the loss of resilience and failure to handle disturbance. On the contrary, ecological resilience goes beyond hardening and bouncing back to an original state as in engineering resilience, since it further highlights the persistence of bouncing back and forward stronger Blay (2017). These two kinds of resilience present a foundation for others, such as organizational resilience, which is explored next.

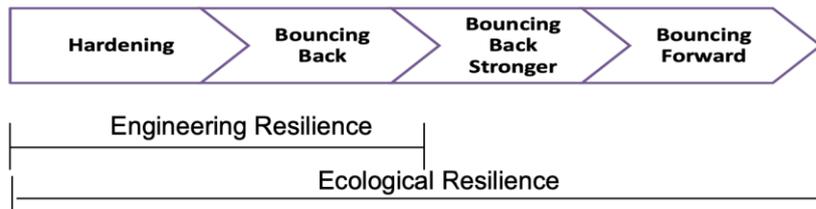


Figure 2.2 Consequences of foundations of resilience (Blay, 2017)

2.4.1 Organizational Resilience

A project is a temporary form of an organization; therefore, the application of project resilience accentuates an organizational aspect (Blay, 2017). Weick and Sutcliffe (2007) defined resilience as an organization’s or system’s inherent ability to sustain or retain steadiness, enabling it to operate after or during disastrous shocks continuously. Organizational resilience follows an engineering perspective, as it is characterized as a reactive approach responding to any deviation in the management procedures to secure stability and bounce back to normal status to achieve organizational goals (Blay, 2017). Sometimes, it is called ‘bounce-back ability’ (Hillson, 2014).

In defining organizational resilience, the term *capability* is used to explain an organization’s ability to operate interrelated tasks by leveraging the resources from the organization with aims to achieve certain goals (Helfat & Peteraf, 2003). Considering that, Blay (2017) explains organizational resilience as the capability to respond and prepare for disruptions. Converging into this thesis’ purpose, since projects are akin to temporary organizations, it is important that project management teams develop these capabilities. For this reason, the more specific term *project resilience* has surfaced.

2.4.2 Project Resilience

Aligning with the management reform throughout the past century, modern project management is shifting from a directive control method to a more collaborative and supportive approach (Project Management Institute, 2017). In this stream, the two major global project management organizations, PMI and IPMA, have accentuated their attention toward resilience

in recent years. IPMA held its second annual Global Best Practice Week in April 2021, focusing on attaining and sustaining resilience, not only for individuals but also for a team, a whole organization, and even the whole world (IPMA, 2021). Nevertheless, the word *resilience* is not mentioned in the latest version of the ICB, which was published in 2015 (International Project Management Association, 2015).

The sixth edition of the PMBOK Guide, published in 2017, has a section about project risk management developments, in which the concept of *project resilience* is introduced as the means to tackle emergent risks (Project Management Institute, 2017). PMI contends that to develop this capability, projects need to have:

- Appropriate budget and schedule contingency.
- Process flexibility and effective change management.
- Empowerment and trust of the project team.
- Proactive assessment of warning signs.
- Clear stakeholder communication when responding to emergent risks.

Additionally, according to PMI in the video “Learn More About the Upcoming PMBOK Guide — Seventh Edition” (2021, 00:01:47), there will be a shift from Process Groups to Principles in the PMBOK Guide’s seventh edition. In the same video, PMI shows that one of the twelve new Principles will be ‘Adaptability and Resiliency,’ indicating an increasing emphasis on resilience.

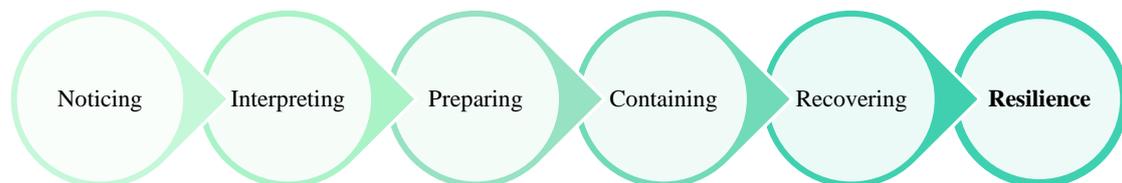


Figure 2.3 The five ‘arts’ that form “a road map towards resilience”, adapted from Kutsch, Hall and Turner (2015, p.182)

Kutsch, Hall and Turner (2015) have also come up with a more comprehensive resilience roadmap through five ‘arts’ (see the simplified adaptation in Figure 2.3). Within each of these ‘arts,’ they describe ways of leading toward project resilience. Instead of focusing on procedures or prescriptions, however, Kutsch, Hall and Turner (2015) offer an outlook on resilience mainly from a behavioral standpoint. For instance, the ‘arts’ of noticing and interpreting overlap to an extent with the PMBOK Guide’s recommendations for risk monitoring, although focusing more on soft skills. Additionally, in agreement with the PMBOK

Guide, Kutsch, Hall and Turner (2015) include the empowerment of project members under the ‘art’ of preparing, the development of readiness under the ‘art’ of containing, and stakeholder vigilance under the ‘art’ of recovering. Overall, their aim is to stimulate project managers to find their own distinctive approach to managing uncertainty.

As stated previously, project resilience’s relevance emerges at the intersection of project management and crisis. Thus, in this context, project resilience can be defined as a project’s recovery capability to ensure an organization’s business continuity. This is the definition that has been utilized for the mediating variable in the theoretical model. In the following section, the project resilience determinants are presented.

2.5 Determinants of Project Resilience

Because of its position as a global experience-based reference, the PMBOK Guide has been used as the main basis for the determinants of project resilience in this study. Five out of the six determinants derive directly from the five requirements for project resilience listed in the PMBOK Guide. These requirements are backed up by other literature that involves project resilience specifically, resilience in general, organizational resilience in a broad sense, or project management in general. The sixth determinant derives from its recurring mention in these other pieces of literature. In simplified terms, the six determinants are contingency planning, risk monitoring, flexibility, empowerment, communication clarity, and learning.

2.5.1 Contingency planning

The one knowledge area within project management that is associated the most with resilience is risk management, and there are two determinants that fall directly under this knowledge area: contingency planning and risk monitoring (Project Management Institute, 2017). Contemporaneously, in an article from the series ‘Sweden through the Crisis’ by the Stockholm School of Economics, Ivanova (2020) discusses corporate risk management, concluding that while in the short term, companies should indeed procure business continuity and a swift recovery, in the long term they should strengthen their risk management frameworks and practices if they want to remain competitive. According to the Project Management Institute (2017), project risk management includes *planning risk management, identifying risks, performing qualitative and quantitative risk analyses, implementing risk responses, and monitoring risks*. As PMI explains, these processes are iterative, so the planning processes for risk management might have to be adjusted accordingly as the project progresses.

Contingency planning is commonplace in most projects, albeit unlike depending on how high or low the risks are (Damjanovic & Reinschmidt, 2020). While most of the other determinants of project resilience relate more to soft skills (for example, empowerment, communication, learning), contingency planning refers to something more concrete. The Project Management

Institute (2017, p.399) describes that project resilience requires the “right level of budget and schedule contingency for emergent risks, in addition to a specific risk budget for known risks.” The keywords here are *emergent risks*, which are otherwise known as *unknowable unknowns*. Sensibly, it is conventional to have an appropriate level of budget and schedule contingency for *known unknowns*, but it is indeed unwieldy to plan ahead for risks that offer no anticipation. For this reason, it is a good idea that the necessary reserves are kept in different buckets, as explained in the next paragraph.

In a section of the PMBOK Guide about reserve analysis, the Project Management Institute (2017) describes the difference between *contingency reserves* and *management reserves*. According to PMI, the former is meant to address *known unknowns* in both schedule and cost contingencies, while the latter intends to address the *unknown unknowns*. PMI further describes *management reserves* as the amount of the total allocated budget withheld for management control purposes, rather than designated for the accomplishment of a specific task or set of tasks. *Contingency planning*, thus, involves allocating funds directly from the budget of the organization, not of the project itself, to address risks that might emerge without precedence (Damnjanovic & Reinschmidt, 2020). In other words, if an organization does not have an emergency fund for emergent risks, its projects will struggle to be carried out during a crisis. *Management reserve* allocation requires an evaluation from the organization’s management team, and a lack of reserves can risk bringing the project to a halt from which it might not recover (Damnjanovic & Reinschmidt, 2020), despite having an empowered and flexible project management team.

Expressly, this project resilience determinant refers to an organization’s budget and schedule contingency preparedness for emergent risks. As the term indicates, contingency planning is done preventively and for precaution; however, as a project progresses, risk responses need to be adjusted iteratively (Project Management Institute, 2017). For this reason, appropriate risk monitoring is also required.

2.5.2 Risk monitoring

Traditional risk management processes can only cope with the expected conditions which organizations can proactively prepare for (Hillson, 2014). However, to secure business continuity, organizational strategies must also focus on scanning areas of possible vulnerabilities to best handle the shocks from the unexpected (Hillson, 2014). To develop project resilience, it is mandatory to have a “frequent review of early warning signs to identify emergent risks as early as possible” (Project Management Institute, 2017, p.399).

According to the Project Management Institute (2017), potential risks can be documented in a tool called *risk register* throughout the project timeline. PMI explains that a *risk register* consists of details of identified and prioritized individual project risks, agreed-upon responses, specific actions to implement, symptoms and warning signs of risks, required budget and schedule activities to implement the chosen responses, and so on. Since pandemics have

occurred before, they can be considered known risks (Trentim, 2020). Nevertheless, project managers are less likely to identify the risks caused by the COVID-19 pandemic in a risk register; so, in this instance, they are *unknowable unknowns* (Trentim, 2020). When applying risk assessments to the impact of the COVID-19 pandemic, project managers may start from scanning external and internal factors, as well as from a macro and micro level, to have the best outlook for possible vulnerability (Trentim, 2020).

Proactive anticipation is also crucial in monitoring risks. Weick and Sutcliffe (2007) stated that small events lead to great losses where discrepancies are too minuscule to notice. However, if such deviation is identified early, the consequences could be prevented or easily treated (Weick & Sutcliffe, 2007). Paradoxically, managing the unexpected suggests that individuals need to have strong reactions to weak signals rather than only having strong reactions to strong signals (Weick & Sutcliffe, 2007). Instead of completely depending on a large database related to project planning and control systems, successful project managers employ anticipatory thinking as they rely on ‘moving-about activities,’ including small incidents and anomalies observed from face-to-face meetings (Laufer et al., 2018). Despite undisturbed periods, they practice ‘productive paranoia,’ as they are anticipating that the situation could backfire on them any time, but they are preparing to respond (Laufer et al., 2018).

To summarize, although project risk management is a broad repertoire of knowledge, this study focuses on risk monitoring of emergent risks, *unknowable unknowns*, or *black swans* to develop strong resilience during crises. Particularly, an organization including all project teams must pay attention to risk monitoring by developing anticipatory thinking, analyzing their organization’s external and external factors using both macro and micro lenses. Project teams need to frequently scan all risks causing vulnerabilities to their organizations which may lead to projects failing to achieve objectives (Project Management Institute, 2017). Having only a solid approach like risk monitoring, however, is not sufficient to develop project resilience during crises; hence, flexibility is the next area to explore.

2.5.3 Flexibility

Flexibility can be defined as the ability to bend without breaking (Lexico, 2021c). In an organizational context, flexibility is the capability to manage disruptions by allowing change whilst preserving the primary objective (Blay, 2017). In other words, flexibility allows change while encouraging renewal, reorganization, and development (Starr, Newfrock & Delurey, 2003). To develop project resilience when facing emergent risks, it is crucial to have flexible project processes to deal with the unexpected while sustaining the direction towards project objectives (Project Management Institute, 2017). The project manager must create a sense of readiness among the project team that its members learn to appreciate threats from the emergent risks (Kutsch, Hall & Turner, 2015). This can be done by empowering the project team to act with given freedom and eradicating communication barriers, hence promoting flexibility (Kutsch, Hall & Turner, 2015).

As stated by Kutsch, Hall and Turner (2015), reflections are mandatory between project iterations to find the learning from previous input and then reflect on how it can influence the overall project goals. Learning is about reflecting how goals and values evolve (Kutsch, Hall & Turner, 2015). Likewise, Edmondson (2016) suggested project leaders manage the stress between the clarity of the purpose and the possible shift of project goals. To maximize the potential of the team, she advised leaders to foster an adaptable vision and adopt a test-and-learn mindset.

The PMBOK Guide agrees that flexibility in processes and project teams is crucial; nonetheless, it also stresses the importance of sustaining overall direction toward project goals (Project Management Institute, 2017). Other experts such as Kutsch, Hall and Turner (2015) and Edmondson (2016) concur that project teams should foster adaptable visions with potentially shifting goals, as long as the purpose is achieved.

In conclusion, flexibility incorporates adaptable project processes through learning and reflection while maintaining the overall direction of project goals (Blay, 2017; Edmondson, 2016; Kutsch, Hall & Turner, 2015; Project Management Institute, 2017). Flexibility becomes easier to attain through an empowered project team that has the freedom and unhindered communication when facing a crisis. Therefore, empowerment is the next determinant to be discussed.

2.5.4 Empowerment

Amid anxiety triggered by the pandemic, Maslow's hierarchy of needs presents the framework to understand humans' motivation and needs (Maslow, 1943; Ryan, Coppola, Canyon, Brickhouse & Swienton, 2020). The pyramid begins from the bottom with basic physiological needs, then suggests upper tiers of other needs, laddering up to self-actualization (Maslow, 1943). Hence, working teams can start by building psychological safety (safety needs) and trust (belonging needs) as the foundation before encouraging empowerment (self-esteem needs) (Ryan et al., 2020).

First, psychological safety enables the sense of security, crucial for the team's empowerment (Simonet, Narayan & Nelson, 2015). It is the belief that one feels safe by sharing ideas, mistakes, and disagreement with no fear of punishment (Edmondson, 2016). Edmondson and Mortensen (2021) stated that work-from-home (WFH)/hybrid working — a blend of remote and office-based work — harms psychological safety. Team members located in different locations have different autonomy levels, abilities to socialize, and access to managers (Edmondson & Mortensen, 2021). As the line between professional and personal life has become blurry, managers leading WFH/hybrid teams can build psychological safety by sharing personal vulnerabilities and limitations at home as well as being inclusive of their team members' thoughts (Edmondson & Mortensen, 2021).

Next, healthy relationships build trust leading to a network of trusted colleagues (Kutsch, Hall & Turner, 2015). Ferrazzi (2012) argues that establishing trust in a virtual team is demanding

because the project manager or team leader has to form *swift trust*, urging that everyone has no choice but to trust one another and that success and failure are mutual responsibility. He explains that *swift trust* can be achieved by setting shared clear goals in the early stage of virtual team formation. Furthermore, he asserts that *swift trust* holds the team together before developing a long-term bonding, interpersonal trust. In high-trust teams, all teammates have an equal share of regular and predictable communication; i.e., they know who is going to be unavailable at certain times (Ferrazzi, 2012).

From the statements above, it can be inferred that developing psychological safety and trust in the team forms the basis of empowerment. Empowerment concerns growing competencies and improving the satisfaction and motivation of the team (Project Management Institute, 2017). It involves delegating decision-making to the project team members and encourage them to take ownership of the solution for better productivity, efficiency, and effectiveness (Project Management Institute, 2017). Throughout the crisis, employees closest to the issues have to be well-equipped to deal with any obstacles at hand by fostering broad expertise and effective response capability beyond specialization (Kutsch, Hall & Turner, 2015). Moreover, project team members have to be empowered through clear objectives and trust to finish tasks within appointed limits (Project Management Institute, 2017).

In synthesis, during crises project managers need to empower their project teams by enabling psychological safety and trust. Thereafter, the team members can fulfill the agreed-upon responsibilities through clear objectives while proactively growing their expertise. In an empowered project team, any stakeholders should be able to raise flags when emergent risks appear; and to do this effectively, the next determinant - communication clarity - is essential.

2.5.5 Communication clarity

Laufer et al. (2018) reveal that most experienced project managers point out *communication* as the most vital competency to lead projects. Communication is so crucial in project management that project communications management and project stakeholder management are laid out as two knowledge areas in the sixth edition of the PMBOK Guide (Project Management Institute, 2017). They used to be one joint knowledge area in the fourth edition and earlier versions but were split into two in the fifth edition. This change highlights that engaging stakeholders involves more than just disseminating information to them; in fact, managing stakeholders entails facilitating their involvement in decision-making as well as their influence throughout the course of a project (Project Management Institute, 2017). Evidently, this is especially important when dealing with risks that appear unexpectedly, triggering the need to make strategic adjustments quickly. The Project Management Institute (2017, p.399) lists as a requirement for project resilience the “clear input from stakeholders to clarify areas where the project scope or strategy can be adjusted in response to emergent risks”.

Clarity can be defined using terms such as coherence, intelligibility, certainty, and transparency; simply put, something clear is something easy to see or hear (Lexico, 2021a). As

many projects navigate in complexity, a project manager should leave as little space for confusion as possible. Arecchi and Baker (2012) explain that a resilient environment is characterized by transparent agendas among team members, as well as clear responsibilities, among other key behaviors and qualities. Kutsch, Hall and Turner (2015) describe that if stakeholders understand project managers' standpoints, their ability to notice and watch out on their behalf increases. This vigilance is instilled through communication, openness, and trust (Kutsch, Hall & Turner, 2015).

Effective communication applies in general for project success, as it is a core skill for a project manager to have (Laufer et al., 2018). Even when not dealing with crises, the members of a project team must have effective communication among themselves, as well as with external stakeholders (Project Management Institute, 2017). However, in the midst of a crisis, an organization must make swift clarifications given the new circumstances. The project might need scope adjustments to maintain direction, or it might be able to keep the status quo; either way, the important matter is that vigilant stakeholders communicate this to the project team as timely and as clearly as possible. Then, as the project team handles change, learning becomes paramount.

2.5.6 Learning

Although learning is not explicitly listed in the PMBOK Guide as a requirement of project resilience (Project Management Institute, 2017), other literature sources point out that they are indeed important factors. In their resilience roadmap, Kutsch, Hall and Turner (2015) list *learning from a crisis* as the ultimate element within the 'art of recovering.' Verganti (2020) expresses that learning is essential for survival in the 'new normal.' Arecchi and Baker (2012) mention that a resilient environment is characterized by team members who exchange feedback with honesty and timeliness. Moreover, Laufer et al. (2018) express that giving sensible and thoughtful feedback is vital to form a learning and vibrant team. For these reasons, learning is listed as the sixth determinant in this study.

Learning is a continuous process that occurs throughout the development of a project (Laufer et al., 2018). The Project Management Institute (2017) recommends the use of *lessons learned register* to manage knowledge and prevent repeating mistakes effectively. Using a register allows the project manager and the organization to have tangible evidence of what has been learned, which can easily be retrieved in the future (Project Management Institute, 2017). The learning, however, must also occur cognitively in the mind of the project manager and the project team members (Kutsch, Hall & Turner, 2015). Through trust, which is also a key to empowerment, team members soon find out who knows what, contributing to efficient knowledge-sharing and knowledge generation from past risks and their causes (Kutsch, Hall & Turner, 2015).

Hattie and Timperley (2007) state that feedback has a powerful lead toward learning. Berger and Johnston (2020) vindicate that a lack of acknowledgment toward both successes and

failures can lead to the oblivion of what is actually effective and what might require modifications. They thus recommend that organizations foster feedback-rich environments where everyone can learn about what necessitates change. As part of this learning process, feedback must be exchanged clearly and regularly, both bottom-up and top-down; it should be a loop, not a message delivery (Berger & Johnston, 2020).

Kutsch, Hall and Turner (2015) believe that learning is often downplayed in project management, despite the fact that knowledge-generation is ingrained in many projects. They, however, recommend going beyond documenting root causes in a procedural way, as in a VUCA world, crises unravel randomly. They advocate for ‘storytelling’ as an effective method that facilitates people’s sensemaking, and they also state that learning becomes superficial if reflection is not incorporated into it.

In summary, learning can indeed be considered a determinant of resilience. Learning can be done in different ways on an individual, group, or organizational level, but it is a good practice to concretize lessons learned so that they can be passed on. Feedback leads to learning and it is also done in different ways, and although it is difficult to give and take meaningful feedback (Berger & Johnston, 2020), avoiding doing so can lead to even more difficult consequences. Put succinctly, project resilience requires that an organization works actively with keeping track of the learning generated continually.

2.6 Summary

The aforementioned six determinants constitute a broad range of hard and soft skills that must be showcased by a project team, as well as preparation requirements that the organization as a whole must attain. The different factors are weaved with each other, and this study hypothesizes that their integration has an optimal correlation with project resilience. There are many other skills, behaviors, techniques, procedures, and tools that can be used to build project resilience as well; however, these six elements arise as the principal ones.

Planning contingencies, monitoring risks, maintaining flexibility, upkeeping team empowerment, sustaining clear communication, and managing learning should, in theory, lead to a reduction in organizational vulnerability in the face of crisis, as well as to an increase in project resilience. Subsequently, it is hypothesized that superior project resilience should lead to both attainment of project scope, schedule, and budget (short-term project success), as well as prolonged value for the organization’s business continuity (long-term project success).

3 Methodology

This chapter explains and evaluates the selected methods to conduct this research. Firstly, we present the research approach, incorporating the research philosophy. Then, we introduce the choices made for the research design, the strategy to collect the data, and the technique and procedure. Afterward, we explain how the data analysis was executed, justifying the statistics used in Chapter 4. We then present an outline of the methods' limitations. Lastly, the chapter closes with a summary. The 'research onion' in Figure 3.1 illustrates the research philosophy and approach of this thesis (in gray), the research design (in white), and the technique and procedure used (in black).

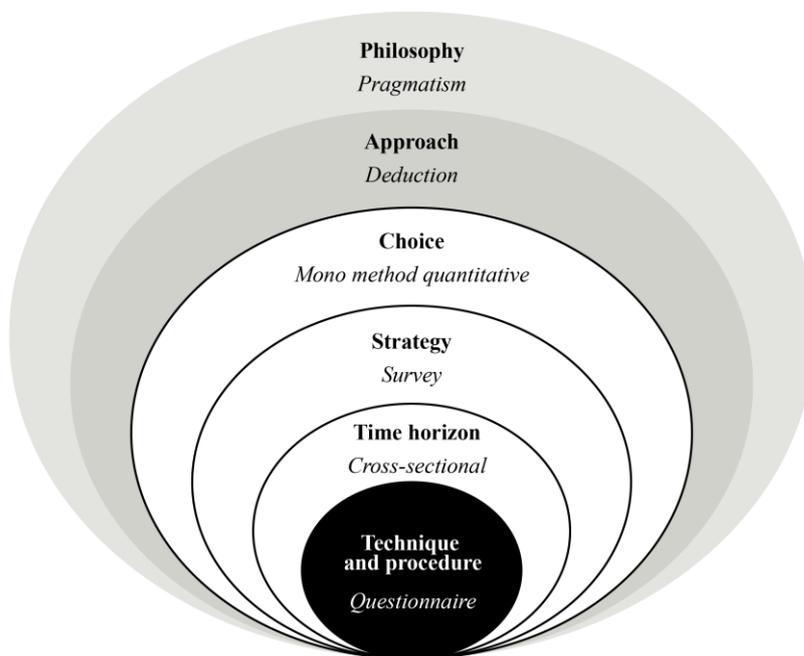


Figure 3.1 'Research onion' adapted from Saunders, Lewis and Thornhill (2019)

3.1 Research Philosophy and Approach

This study is developed from a pragmatism philosophy, valuing the practical relevance of the study with the belief that theory serves to inform practice and solve a problem. The theories used in this research are supposed to help project managers and organizations sustainably deal with emergent risks by developing certain characteristics that lead to project resilience, and we intend to test if these theories compare to reality.

Since our purpose is to analyze project resilience, its determinants, and its relation to project success, and since concepts about these topics already exist, we have followed a deductive approach to this research. This approach is driven by a theoretical framework involving testing a theoretic standpoint through data collection and analysis (Saunders, Lewis & Thornhill, 2019). In other words, we progressed from more general theories of project management, crisis, project resilience, and short- and long-term project success to develop specific hypotheses that we can test.

3.2 Research Design

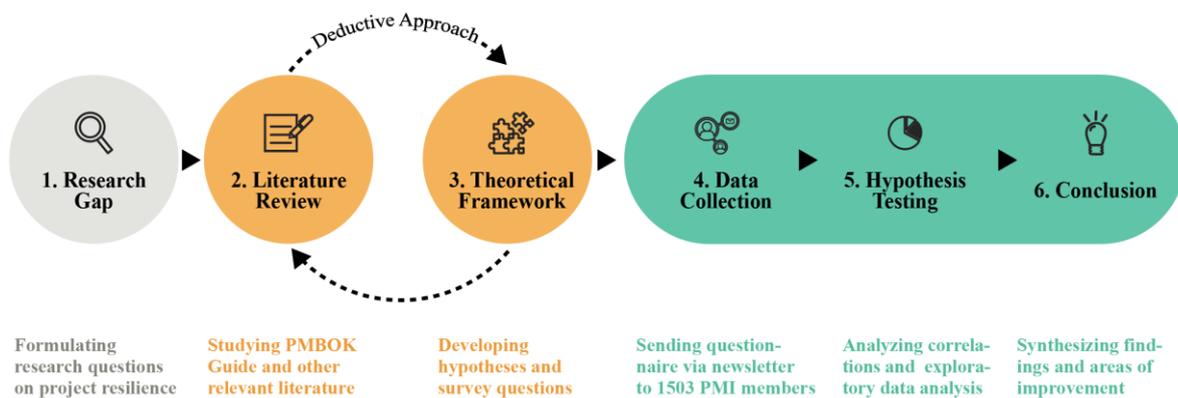


Figure 3.2 Research process for this study

The initial step of this project was to identify management problems exhibited in Figure 3.2. During this stage, we came across an editorial by Müller and Klein (2020) describing research streams of contemporary project management. One stream aims at describing the project management practices employed during the COVID-19 pandemic, promoting resilience in organizations and in society (Müller & Klein, 2020). This inspired us to explore the topic of project resilience, which then led us to develop the purpose of this thesis.

Then, we performed a thorough review of the best available knowledge regarding project management, crisis, and resilience. With a pragmatic research philosophy, we focused on experience-based project management *bodies of knowledge*, particularly PMI’s PMBOK Guide which contains a section about project resilience (Project Management Institute, 2017). The PMBOK Guide served as our principal frame of reference, while we explored other literature which confirmed and/or challenged what was written in there. The five requirements of project resilience – contingency planning, risk monitoring, flexibility, empowerment, and communication clarity – were listed and corroborated in the PMBOK Guide. The sixth factor of project resilience – learning – was not included in the PMBOK Guide but was mentioned repeatedly in other works. Through the gradual back-and-forth process between literature review and theoretical framework development illustrated in Figure 3.2, we gathered applicable knowledge in order to generate hypotheses.

3.2.1 Research Strategy

As stated in the introduction, the purpose of this research is to analyze what project resilience practices were developed and demonstrated in project management during 2020, as the whole world faced a major crisis, and what impact these practices had on project success, both short- and long-term. To attain this goal, we employed a mono method quantitative study. We used a single data collection technique, namely a survey through self-administered electronic questionnaires. Surveys are commonly used in descriptive research (Sekaran & Bougie, 2016); thus, they are an appropriate tool for our correlational study. After obtaining the quantitative data through the survey, we tested the hypotheses using a deductive approach to find correlations between the determinants and project resilience, and between project resilience and project success (short- and long-term).

3.2.2 Time Horizon

This thesis alone is a cross-sectional study, since it includes relevant data collected during the COVID-19 pandemic in 2021. Nevertheless, the survey results will also be used for a longitudinal study, namely the Swedish Project Review, which covers key project management trends and areas for improvement in Sweden on an annual basis (PMI Sweden Chapter, 2021). In collaboration with PMI Sweden Chapter and KPMG, we developed the Swedish Project Review report for 2021.

3.3 Technique and Procedure

This section on the technique and procedure used to collect data consists of three sub-sections: the background, the sampling, and the survey. The background section explains how the Swedish Project Review was done in the past and how it influences the data collection method of this thesis. The sampling section describes the sampling design and process. Lastly, the survey section provides information about the sequences of each question topic, the type of the rating scale used, and the execution of receiving data.

3.3.1 Background

From 2016 to 2020, a questionnaire was distributed every year via PMI Sweden Chapter's and KPMG's networks to collect responses for the Swedish Project Review. The target population was people who work professionally with projects in Sweden. The questionnaire consisted of approximately 40 questions was sent out to a sample of approximately 2 000 project managers in Sweden annually (yielding around 400 responses per year).

The historical data from the past four years allowed us to compare previous years' survey results for certain questions (excluding new questions). Because project managers had to handle emergent risks with indefinite durations in 2020-2021, the data from the survey in 2021 can generate salient statistical trends of how projects are managed in times of crisis.

3.3.2 Sampling

Since this thesis project is part of a longitudinal study, it has the same target population as the annual Swedish Project Review, i.e., professionals working in project management in Sweden. This target population is also appropriate for achieving our research purpose of analyzing project resilience during times of crisis. The sampling design from previous years was adopted for 2021, which involved using PMI Sweden Chapter members as the sample pool of respondents. PMI Sweden Chapter constitutes the largest project management network in Sweden (PMI Sweden Chapter, 2021), with members from a wide range of sectors and industries; thus, it is composed of a diverse group of project management professionals based in the country.

For this study, we sent the questionnaire requests to 1503 current PMI Sweden Chapter members in a newsletter format (Appendix B) through the official newsletter platform of PMI Sweden Chapter. The response rates of online surveys are generally low (Sekaran & Bougie, 2016); thus, to increase the response rate, we also sent two other reminders to the same targeted sample throughout the open time frame. As in previous years, the original goal was to obtain about 400 responses which represent almost 30% of the total number of targeted respondents. Out of the three sends to 1503 people, an average of 560 emails were opened each time. However, the total number of respondents was 143, yielding just under 10% of the total sample.

3.3.3 Survey

Every year, the Swedish Project Review questionnaire has remained mostly the same, except for Sections 1 (introduction) and 12, which are related to the theme of that particular year. Section 2 includes categorization questions, including the job roles of the respondents, and the industry and annual revenue of their organizations. Sections 3 to 11 cover other topics relevant to project management. In 2021, we added seven thematic questions about project resilience during the COVID-19 pandemic. As authors of the Swedish Project Review in past years, PMI Sweden Chapter and KPMG were involved in the process of reviewing and giving feedback to our new questions.

Because this questionnaire was adapted from the 2020 edition, the existing questions were required to be included with the purpose of result comparison. However, most of them are not used in this thesis. From all forty questions listed in the questionnaire (Appendix A), only fourteen questions were of relevance to this study. Table 3.1 displays these fourteen relevant questions, as well as the determinants and hypotheses that each question is related to. Each

relevant factor is color-coded according to the theoretical research model (Figure 2.1). The scales of the questions were kept the same as in previous years for the sake of continuing the longitudinal study, as well as for consistency. The scaling used for most of the questions was an unbalanced three-point Likert scale (low, medium, high), although some questions were in other scales.

Table 3.1 Relevant questions from 2021 survey

Question Number	Relevant Questions	Relevant Factors	Hypotheses
Section 2: Respondent demographics			
1	Which of the following best describes the total annual revenue of your organization?	For respondent categorization	
2	Which of the following best describes your job role?		
3	Please select the term that best describes the primary focus of your organization.		
Section 8: Performance and quality			
21	For the last 12 months, how many of the projects in your organization do you estimate have delivered on time, within budget and realized benefits of at least 80%?	Short-term project success	H7, H10
Section 9: Risk management			
24	How would you characterize your organization's project-related risk management maturity level?	Risk monitoring	H2, H9 - H11
25	With what frequency does your organization manage risks within projects?		
Section 11: Knowledge and leadership			
31	Does your organization acknowledge and actively work with leadership and knowledge management (lessons learned)?	Learning	H6, H9 - H11

Section 12: COVID-19 pandemic

32	To what level has your organization been affected by the COVID-19 pandemic? (Positively and negatively)	For respondent categorization	
33	How flexible have your organization's project-related processes been to cope with the emergent risks of the COVID-19 pandemic while maintaining project goals?	Flexibility	H3, H9 - H11
34	What has been the level of empowerment of your project team during the COVID-19 pandemic? (Empowerment refers to the authority given to the team members to perform tasks through clear objectives and trust.)	Empowerment	H4, H9 - H11
35	How clear has stakeholder communication been in your organization to adjust project scope in response to emergent risks during the COVID-19 pandemic?	Communication clarity	H5, H9 - H11
36	How would you characterize your organization's budget and schedule contingency preparedness for the emergent risks presented by the COVID-19 pandemic?	Contingency planning	H1, H9 - H11
38	How would you rate your organization's project recovery capability to ensure business continuity in response to the COVID-19 pandemic?	Project resilience	H1 - H9
39	How would you rate the long-term value generated by projects in your company in the last 5 years?	Long-term project success	H8, H11

With a foundation on the literature review, five of the six determinants were examined by asking the survey respondents how they consider the degree (low, medium, or high) of each determinant. Risk monitoring was the only determinant measured with two questions: one about the maturity level (low, medium, or high) of the respondent's organization's project-related risk management and the other about the frequency (on a five-point scale) in which their organization manages risks within projects.

Project resilience was measured by asking the respondents to rate as low, medium, or high their organization's project recovery capability to ensure business continuity in response to the COVID-19 pandemic. Short-term project success was measured by asking how many of the projects in the respondent's organization are estimated to have been delivered on time, within budget and realized benefits of at least 80%; the choices were 0-25%, 25-50%, 50-75%, and 75-100%. Long-term project success was measured by asking the respondents to rate the long-term value generated by projects in their company over the last five years as low, medium, or high.

The web-based survey administration software, Google Forms, was used to collect participants' responses. All questions in the questionnaire were marked as mandatory, so there were no responses with missing values. The survey period was from 21 April to 15 May 2021 (25 days in total).

3.4 Data Analysis

A quantitative analysis of the data was performed to determine the correlations among the different variables. Statistical analysis software, namely SPSS and SmartPLS, was used to perform the analysis. In addition, Microsoft Excel was used to analyze the data and create charts and graphs. The visualization of the information in clear graphs and charts allowed us to detect trends and patterns first-hand before diving into the actual hypothesis testing. We further elaborated the results of the hypothesis testing using an exploratory data analysis (EDA), as it is helpful to delve into and explain the correlations.

To check for internal consistencies in certain variables, we calculated their Cronbach's alpha in SPSS. According to Sekaran and Bougie (2016), a Cronbach's alpha above 0.60 is considered acceptable for the reliability of multi-item measures. This baseline was used to assess the internal consistency reliability of the variables for which there was more than one question. It was also used when testing the hypotheses that integrated the six project resilience determinants.

As the responses of different questions were in different scales, they were all transformed into a 60-point scale for optimal comparison, as 60 is the least common multiple of 3, 4 and 5. Sekaran and Bougie (2016) explain that Likert scales are formally ordinal scales, as the levels are not necessarily equidistant. For this reason (especially because we had a 3-point scale), Kendall's tau coefficients were used to find correlations among the relevant variables, as they are suitable for variables on an ordinal scale (Sekaran & Bougie, 2016). Also, according to Saunders, Lewis and Thornhill (2019), Kendall's rank correlation is largely used in business and management research. To interpret correlation strength, we used the conventional values proposed by Cohen (1988), which indicate that 0.1 is the benchmark for a small effect size correlation, 0.3 for medium, and 0.5 for large.

The analysis of all bivariate correlations (Hypotheses 1-11) was done using the software SPSS. The evaluation of Hypotheses 9-11 involved integrating the six project resilience determinants to analyze their combined correlation with project resilience and project success. Merging the six determinants into one variable made it possible to do a bivariate correlation analysis in SPSS for these hypotheses. However, based on the considerations laid out by Hair, Risher, Sarstedt and Ringle (2019), partial least squares structural equation modeling (PLS-SEM) can also be used to test a model involving several indicators. Therefore, the software SmartPLS was used to test Hypotheses 9-11 as well.

3.5 Limitations

The applicability of the method was sufficient for the accomplishment of the purpose; however, a mixed-method study would have proven to be illuminating. Although the quantitative results provide an idea of the trends for the different variables, a qualitative analysis of interviews with some of the respondents would have clarified ambiguities and misconceptions.

3.5.1 Sampling

Since a nonprobability sampling design was used in this project, the sample is not easily generalizable. The response rate was lower compared to previous years. One of the reasons for the lower response rate was that there were no incentives for participants to take the 2021 survey, as in previous years there was a raffle for tickets to a PMI event and/or prizes. Another reason was that in past years, KPMG was reaching out to more clients to take the questionnaire.

3.5.2 Survey

In terms of wording, the questionnaire for this thesis included only closed questions in a multiple-choice format. The 2021 questionnaire needed to follow the previous years' format and structure with only agreed-upon changes, as the survey results had to be comparable to historical data. Hence, we were limited by how much we could edit certain questions. We were also constrained by the survey's length; the questionnaire could not be too long, or the response level would decrease.

Another limitation was that we had a shorter survey time frame in 2021; this window was almost two months in previous years, compared to just under four weeks in this case. Lastly, we could not do a drop-out analysis, since all the questions were required in order for the participants to submit the survey; this was done in order to prevent incomplete responses.

3.6 Summary

In conclusion, our methodology choices were driven by our research purpose. Having pragmatism as our research philosophy, we sought to help project professionals develop project resilience in their organizations. By employing a deductive approach, we aimed to test the hypotheses derived from the literature review of relevant theories. The survey strategy as a mono-method quantitative choice helped us gain a significant number of target group representatives in a limited time frame. With comprehensive feedback and guidance from PMI Sweden and KPMG professionals, our questionnaire gained validity; however, it also has some limitations. The results are localized within the context of project management in Sweden but cannot be generalized worldwide. Overall, as discussed in the next two chapters, the methods that we used helped us reap interesting results and insights on project resilience.

4 Results and Analysis

This chapter focuses on the analysis of the results obtained from the survey. The first section describes the target population and the demographics of the participants. The second section is on the reliability of certain measurements' internal consistency. The third section focuses on each of the three research questions, discussing the corresponding hypotheses. Subsequently, the validity of the results is addressed, and the chapter concludes with a brief summary.

4.1 Demographics

As part of a longitudinal study, this thesis has the same target population as the annual Swedish Project Review, i.e., professionals working within the area of project management in Sweden. The top five industries represented in the sample are information technology, manufacturing, consulting, government, and automotive, consisting of 13%, 11%, 10%, 10%, and 8% of the responses, respectively (Appendix C).

The number of respondents in 2020 was 429, while that of 2021 was 143. Although the response turnout was lower than anticipated, a qualitative comparison between the demographics in the previous edition of the Swedish Project Review and the present results shows that the samples are indeed considerably similar. Based on the respondents' job roles (Figure 4.1) and their organization's total annual revenue (Figure 4.2), it is possible to observe that there is a relatively proportional distribution in 2021 compared to 2020. However, this is not claiming that the 2020 sample demographics are representative of the overall 2021 target population. Because the 2021 population demographics data is unavailable, it was not possible to do a χ^2 (chi-squared) goodness of fit test to assess the sample population's generalizability. Since the sample is not generalizable, it is considered a non-probability sample.

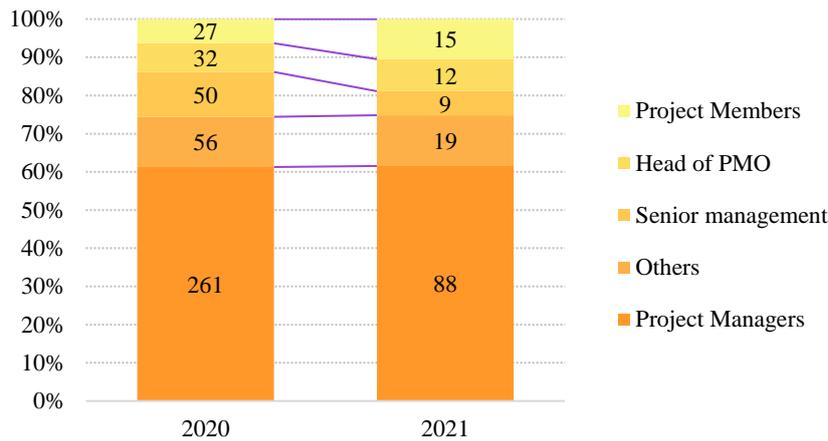


Figure 4.1 Distribution of respondents' job roles in 2020 survey compared to 2021 survey

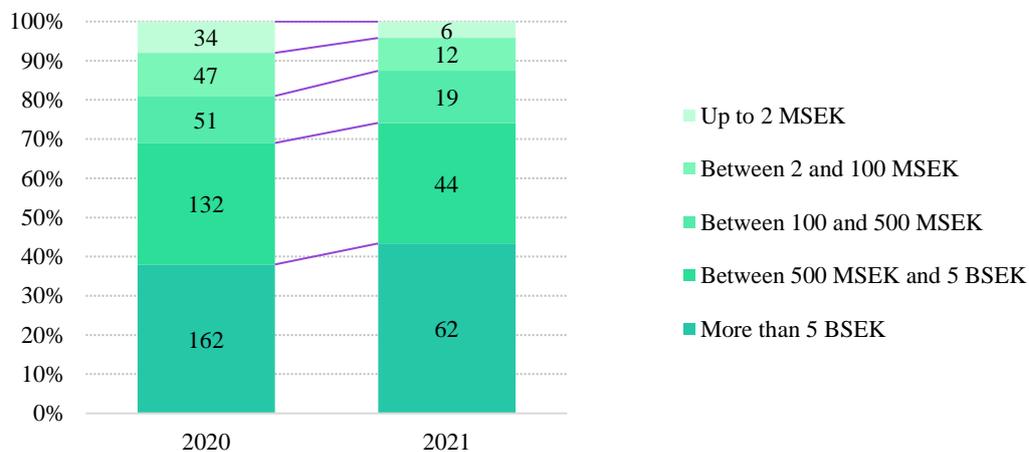


Figure 4.2 Distribution of total annual revenue of respondents' organizations in 2020 survey compared to 2021 survey

A new demographics measure added in the 2021 survey was the impact that the COVID-19 pandemic had on the respondents' organizations, as shown in Figure 4.3. All respondents were required to rate both the positive and negative impact perceived, so the total number of responses in each column is 143. Less than 20% of the respondents rated positive or negative impact as high. This indicates that the COVID-19 crisis did not have as much of a severe effect on Swedish project organizations. This could be attributed to the fact that Swedish professionals in the project management field were better prepared to switch to virtual or hybrid ways of working. This could also be the result of a high project resilience displayed by Swedish organizations, which is explored in the rest of this chapter. The presence of both positive and negative impacts on a medium-to-high level may indicate that although the pandemic brought several challenges and threats, it also generated some opportunities (*positive risks*).

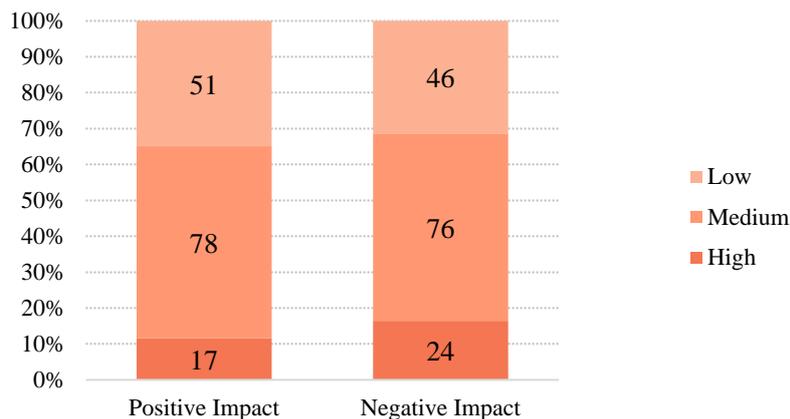


Figure 4.3 Level of positive and negative impact from the COVID-19 pandemic in 2021 survey

4.2 Measurement Reliability

As stated in the Data Analysis section of the Methodology chapter, Cronbach’s alpha has been used as a coefficient of internal consistency for the determinants that had more than one question associated with them. Table 4.1 displays that the only determinant with more than one associated question was *risk monitoring*, and its Cronbach’s alpha was calculated to be 0.705. All the other determinants had single associated questions.

Table 4.1 Measurement reliability based on Cronbach’s alpha coefficients

Determinants	Questions	Cronbach’s alpha	
Integrated project resilience determinants	Risk monitoring How would you characterize your organization’s project-related risk management maturity level? With what frequency does your organization manage risks within projects?	0.705	0.673
	Flexibility How flexible have your organization’s project-related processes been to cope with the emergent risks of the COVID-19 pandemic while maintaining project goals?	-	
	Empowerment What has been the level of empowerment of your project team during the COVID-19 pandemic?	-	
	Communication clarity How clear has stakeholder communication been in your organization to adjust project scope in response to emergent risks during the COVID-19 pandemic?	-	

	Contingency planning	How would you characterize your organization's budget and schedule contingency preparedness for the emergent risks presented by the COVID-19 pandemic?	-	
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To analyze hypotheses 9, 10, and 11, it was necessary to integrate the six determinants into one variable (labeled Integrated Project Resilience Determinants). To do so, their Cronbach's alpha was also verified, which turned out to be 0.673. As this number is above 0.60, it was deemed that the new variable had sufficient internal consistency.

4.3 Answering the Research Questions

This section outlines the answers to the three research questions in consecutive order by presenting the results of the hypothesis testing using correlational analysis. It also elaborates on interesting findings related to the variables by performing an explorative analysis.

4.3.1 First Research Question: What determinants are linked to project resilience?

This section firstly presents the correlations posed by the hypotheses, followed by the analysis of how the project resilience determinants ranked compared to one another. Further discussion is then provided for flexibility, learning, and risk monitoring. Lastly, the answer to this first research question is summarized.

The first research question prompted the following six hypotheses:

- **H1:** Contingency planning is positively correlated to project resilience.
- **H2:** Risk monitoring is positively correlated to project resilience.
- **H3:** Flexibility is correlated to project resilience.
- **H4:** Empowerment is positively correlated to project resilience.
- **H5:** Communication clarity is positively correlated to project resilience.
- **H6:** Learning is positively correlated to project resilience.

A bivariate correlation test with Kendall's tau coefficient was used to analyze this data. Even though the sample was a non-probability sample, this correlation test was useful to make benchmark comparisons. The results indicate that each determinant has a statistically significant correlation with project resilience, as the p-value is below 0.05 for each one of them, as shown in Table 4.2. Thus, Hypotheses 1-6 hold.

Based on Kendall’s tau coefficients, the determinant that is most closely correlated with project resilience is flexibility, which showed a medium positive correlation of 0.388. It was followed by contingency planning, which showed a small positive correlation of 0.295. The next three determinants - empowerment, learning, and communication clarity - also had small positive correlations. The determinant that showed the least correlation was risk monitoring, with 0.153, albeit still significant based on the p-value. All correlations ranged between 0.15 and 0.39, so they did not show to be drastically strong.

Table 4.2 Correlations of each determinant with project resilience (Kendall's tau-b)

H	Determinants		Project Resilience
H1	Contingency Planning	τ	0.295**
		p	0.000
H2	Risk Monitoring	τ	0.153*
		p	0.035
H3	Flexibility	τ	0.388**
		p	0.000
H4	Empowerment	τ	0.261**
		p	0.001
H5	Communication Clarity	τ	0.211**
		p	0.007
H6	Learning	τ	0.222**
		p	0.005
N=143 for all variables			
**Correlation is significant at the 0.01 level (2-tailed).			
*Correlation is significant at the 0.05 level (2-tailed).			

Figure 4.4 exhibits a comparison of the six determinants. The majority of respondents rated their project-related processes’ flexibility and team empowerment as high, indicating that Swedish organizations at large have used these capabilities to cope with emergent risks from the pandemic while maintaining project goals. Additionally, less than 5% of respondents rated these two factors as low. It is also noticeable that learning and contingency planning ranked the lowest among the determinants, suggesting areas of improvement for organizations in Sweden. Following these determinants, Figure 4.5 shows that about two-thirds of all respondents rated the level of project resilience in their organizations as high and only 3% as low.

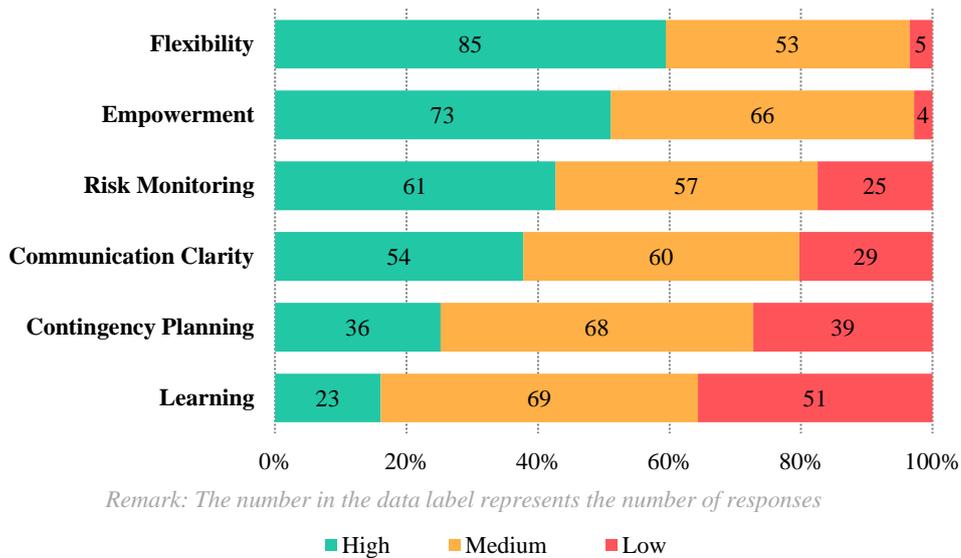


Figure 4.4 Rating of the determinants to resilience by respondents in 2020 survey

How would you rate your organization's project recovery capability to ensure business continuity in response to the COVID-19 pandemic?

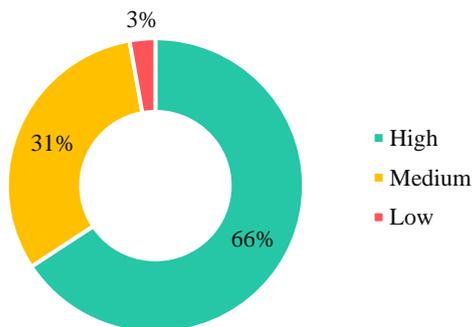


Figure 4.5 Project resilience in the respondents' organizations in 2021 survey

Appendix D contains graphs with further information about selected determinants. As the top determinant, flexibility shows to be irrespective of company size with a comparable distribution of medium-to-high flexibility across the various organization sizes. A possible explanation for this trend is that most organizations in Sweden have high change management maturity allowing even larger companies to have flexible project-related processes. For learning, all company sizes especially smaller ones tend to have less formalized learning management. This information suggests that all sizes of organizations should focus more on documenting lessons learned, as it shows correlation with project resilience. Regarding risk monitoring frequency, it is apparent that the greater the companies' annual revenue, the higher the frequency of risk monitoring, potentially implying that more available and allocated resources in bigger-sized companies allow for more frequent risk monitoring.

In summary, although it is not possible to affirmatively declare that the six determinants lead to project resilience in a cause-and-effect direction, the statistics presented in this section show that they have correlations with project resilience from higher to lower in the following order:

1. Flexibility
2. Contingency planning
3. Empowerment
4. Learning
5. Communication clarity
6. Risk monitoring

This order is for correlation strength only, and it does not necessarily align with the distribution of respondents' ranking (low, medium, high) of each determinant, as displayed in Figure 4.4. In addition to the individual correlations between the determinants and project resilience which are proven to be significant in this section, the correlation between the combined determinants and project resilience is also an interesting aspect that is explored in section 4.5. In the next section, the focus is on project success and its relation to project resilience, bypassing the determinants.

4.3.2 Second Research Question: How is project resilience correlated with project success during a time of crisis?

The second research question, 'How is project resilience correlated with project success during a time of crisis?' prompted the following two hypotheses:

- **H7:** Project resilience is positively correlated to short-term project success.
- **H8:** Project resilience is positively correlated to long-term project success.

The fact that this survey was conducted during the COVID-19 pandemic justified the clause 'during a time of crisis' in the research question. To answer the two hypotheses above, the correlations between project resilience and short- as well as long-term project success are presented. Then, the response distribution between short-term and long-term project success in 2021 is further analyzed. Finally, the year-over-year short-term project success results from 2017 to 2021 are exhibited.

As displayed in Table 4.3, the results indicate that project resilience has statistically significant correlations to short- and long-term project success, as the p-value is below 0.05 for both and below 0.01 for short-term project success. Thus, Hypotheses 7-8 hold. Based on Kendall's tau coefficients, project resilience shows only a small correlation (~0.20) with both short-term and long-term project success, so the correlations are not drastically strong.

Table 4.3 Correlations of project resilience with project success (Kendall's tau-b)

Mediating variable		Short-term project success (H7)	Long-term project success (H8)
Project Resilience	τ	0.201 **	0.195*
	p	0.009	0.016

N=143 for all variables
 **Correlation is significant at the 0.01 level (2-tailed).
 *Correlation is significant at the 0.05 level (2-tailed).

As the purpose of the thesis includes analyzing correlations between project resilience and project success, it is important to examine the discreteness of short- and long-term project success. Figure 4.6 indicates that *high* long-term project success concentrates around 50-100% attainment of short-term project success. Surprisingly, about half of the projects with 0-25% attainment of short-term project success and about a third with 26-50% also yield *high* long-term project success. Consequently, it can be inferred that some projects can generate long-term value without strictly accomplishing short-term project success (scope, budget, and schedule attainment). However, higher short-term project success tends to be linked with higher long-term project success in the last two columns. In contrast, the responses of *low* long-term project success are all between 0% and 75% attainment of short-term project success. Therefore, as the literature review indicated, short-term project success and long-term project success can indeed be regarded as discrete variables.

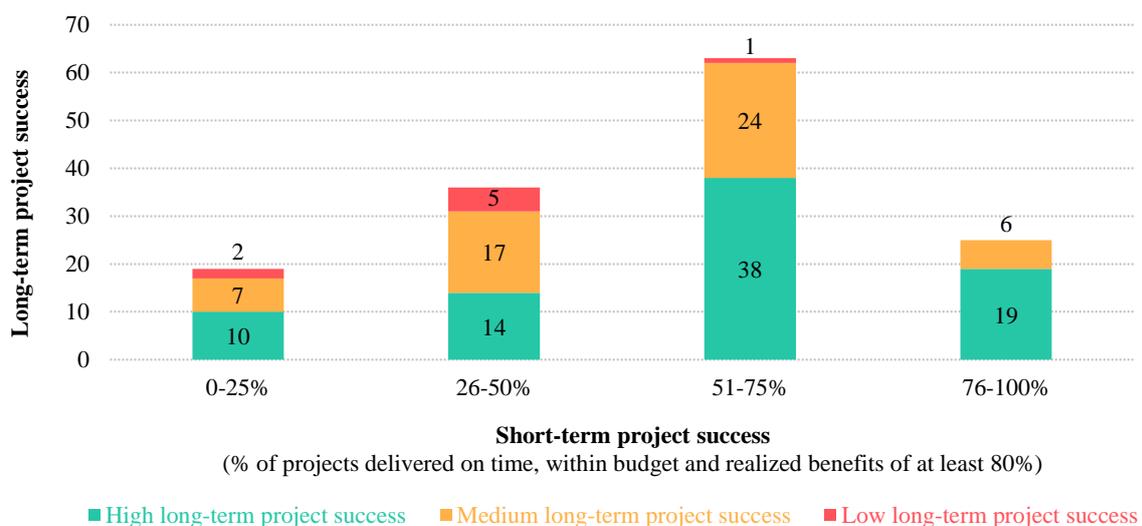


Figure 4.6 Short-term project success in relation to long-term project success in 2021

When comparing the short-term project success in a longitudinal timeframe in Figure 4.7, the trend remains fairly steady from 2017 to 2021. The most surprising aspect is that in the year 2021, there is an increase in the number of projects achieving 51-100% of the budget, time, and scope (the short-term project success) despite the COVID-19 pandemic. It can therefore be assumed that fewer projects during the pandemic years and/or people are more effective working from virtually.

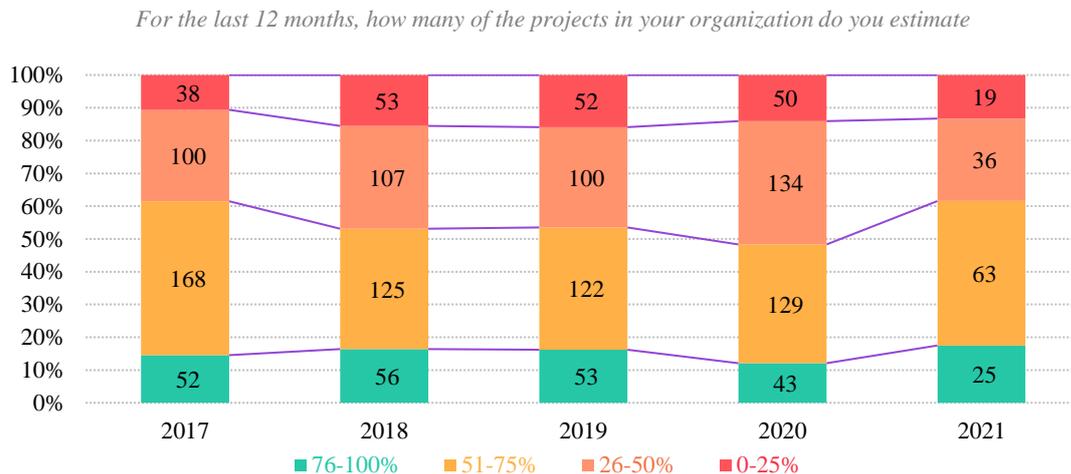


Figure 4.7 The overview of year-over-year short-term project success

In synthesis, to answer the research question, it was important to separate project success into short-term project success and long-term project success, as indicated by the literature review. The correlation between project resilience to either short-term project success or long-term project success was small, although significant indeed.

4.3.3 Third Research Question: What correlation does the integration of these determinants have with project resilience and project success?

The third research question, ‘What effect does the integration of these determinants have on project resilience and on project success?’ prompted the following three hypotheses:

- **H9:** The integrated project resilience determinants are positively correlated to project resilience.
- **H10:** The integrated project resilience determinants are positively correlated to short-term project success.
- **H11:** The integrated project resilience determinants are positively correlated to long-term project success.

Firstly, the Cronbach’s alpha of the six determinants was calculated to be 0.672, as shown in Table 4.1. Based on this inter-item consistency among the variables, they were averaged into one integrated variable and tested against project resilience and project success (short-term and long-term). As displayed in Table 4.4, the results indicate that the integrated project resilience determinants have statistically significant correlations to project resilience, short-term project success, and long-term project success, as all the p-values are below 0.01. Thus, Hypotheses 9-11 hold.

Table 4.4 Correlations of integrated project resilience determinants with project resilience and project success (Kendall's tau-b)

Independent variable		Project Resilience (H9)	Short-term project success (H10)	Long-term project success (H11)
Integrated Project Resilience Determinants	τ	0.367**	0.306**	0.210**
	p	0.000	0.000	0.002
N=143 for all variables				
**Correlation is significant at the 0.01 level (2-tailed).				

Based on Kendall’s tau coefficients, the integrated project resilience determinants show a medium positive correlation to project resilience, with a coefficient of 0.367. Additionally, they show a medium correlation with a greater degree to short-term project success than to long-term project success.

To corroborate these results, the software SmartPLS was employed to do a global analysis using partial least squares structural equation modeling (PLS-SEM). Each hypothesis was tested separately, instead of in one combined diagram, to focus on the correlations that the integrated project resilience determinants had on project resilience, short-term project success, and long-term project success individually. The SmartPLS diagrams for Hypotheses 9, 10, and 11 are shown in Appendix E. The path coefficients and the corresponding p-values from bootstrapping are displayed in Table 4.5.

It is evident that the path coefficients from the PLS-SEM show stronger correlations than the Kendall’s tau correlations show in Table 4.4, with almost identical p-values. They also support the trend that the correlation to short-term project success is greater than that to long-term project success. Besides, the correlation between the integrated determinants to project resilience is in the upper medium-range, showing a stronger correlation than any of the individual determinants showed in Table 4.2.

Table 4.5 Path coefficients of integrated project resilience determinants with project resilience and project success (PLS-SEM)

Independent variable		Project Resilience (H9)	Short-term project success (H10)	Long-term project success (H11)
Integrated Project Resilience Determinants	path coefficient	0.482**	0.447**	0.290**
	p-value	0.000	0.000	0.000
N=143 for all variables				
**Correlation is significant at the 0.01 level (2-tailed).				

4.4 Credibility of Results

As stated in the previous sections, the results indicate correlations only, but a cause-effect relationship cannot be inferred from this data. The results do not imply that the independent variables completely lead to project resilience or to project success. Instead, they show that there is a link between them.

The names of the determinants were shortened to one or two words throughout this thesis for the sake of simplicity. Nevertheless, it is important to consider what the questions related to the determinants were actually asking in the questionnaire. These questions can be reviewed in Table 3.1 in the Methodology chapter.

The majority of the questions in the survey had an itemized rating scale to gauge respondents' attitudes and opinions towards their organizations and project teams. According to Sauro (2019), a loss of validity for this study comes from the use of a three-point scale in most questions. The Swedish Project Review used a three-point scale (low, medium, high) in their previous questionnaires, and in order to benchmark the 2021 results with previous years' trends, it was decided to keep this three-point scale. Sauro (2019) stated that responding to a three-point scale can be quicker and easier. Also, since the questionnaire is already relatively long with questions from previous years, using a three-point scale may secure a better response rate. Jacoby and Matell (1971) also argue that three-point scales may be sufficient in practice.

The validity of the measures used in the questionnaire was taken into consideration. Most of the questions in the survey were carried on from previous years and were originally written by individuals from PMI Sweden Chapter and KPMG. The new questions in the survey were developed conjointly by the authors of this thesis, and then checked by stakeholders from PMI Sweden Chapter and KPMG. Some modifications were required to obtain the final version, based on the feedback received. Since the aforementioned stakeholders work within the field of project management, their input can be considered valid in the pragmatism perspective; thus, the measures used are appropriate.

4.5 Summary

In accordance with the hypothesis test results, each of the six determinants indicates positive correlations to project resilience and both long-term and short-term project success. While contingency planning, risk monitoring, empowerment, communication clarity, and learning show a small correlation to project resilience, flexibility demonstrates a medium correlation. Project resilience exhibits small, but significant, correlations to long-term and short-term project success. The hypothesis testing results using Kendall's tau-b correlations are summarized in Table 4.6. Based on a global analysis, the integrated six determinants display upper-medium correlations to project resilience and short-term project success and a small correlation to long-term project success.

Table 4.6 Summarized results of the hypothesis testing

Hypotheses	Results	Correlation (Kendall's tau-b)
H1: Contingency planning is positively correlated to project resilience.	Supported	Small
H2: Risk monitoring is positively correlated to project resilience.	Supported	Small
H3: Flexibility is correlated to project resilience.	Supported	Medium
H4: Empowerment is positively correlated to project resilience.	Supported	Small
H5: Communication clarity is positively correlated to project resilience.	Supported	Small
H6: Learning is positively correlated to project resilience.	Supported	Small
H7: Project resilience is positively correlated to short-term project success.	Supported	Small
H8: Project resilience is positively correlated to long-term project success.	Supported	Small
H9: Project resilience determinants are positively correlated to project resilience.	Supported	Medium
H10: Project resilience determinants are positively correlated to short-term project success.	Supported	Medium
H11: Project resilience determinants are positively correlated to long-term project success.	Supported	Small

5 Discussion and Conclusion

This chapter encloses the main takeaways from this thesis project, firstly concluding how the research purpose was achieved. It then presents the practical implications of the findings preceding the opportunities for future research. The chapter – and the thesis – closes with a brief concluding summary.

5.1 Research Purpose

The aim of the present research was to explain the project resilience practices in project management emerging in the crisis times during 2020-2021, as well as to analyze how these practices are correlated with both short- and long-term project success. To systematically summarize the thesis findings, the answers to the three research questions are exhibited as follows.

5.1.1 First Research Question: What determinants are linked to project resilience?

Project resilience has gained more popularity as a crucial quality for a project to survive when encountering unprecedented challenges like the COVID-19 pandemic. By conducting a review of the available literature, several factors were continually found as the determinants to project resilience, despite there being limited empirical studies testing the practicality of these determinants. Hence, hypotheses were developed to test the correlations of these factors with project resilience.

After performing bivariate correlational analyses, the six determinants - contingency planning, risk monitoring, flexibility, empowerment, communication clarity, and learning – were found to be significantly correlated with project resilience in a positive trend. Individually, flexibility emerged as the determinant with the largest connection to project resilience, showing a medium correlation, while the other determinants showed small correlations. These empirical findings have, thereby, identified that all six determinants are positively linked to project resilience.

5.1.2 Second Research Question: How is project resilience correlated with project success during a time of crisis?

Project success was split into two variables to answer this research question: short-term project success, defined as the attainment of budget, schedule, and scope, and long-term project success, defined as the accomplishment of the project goals contributing to lasting values for the organization. Project resilience, as a mediating variable in the theoretical model, showed significant correlations with both short- and long-term project success, although the coefficients were small. Thus, the correlational analysis revealed that project success has positive connections to both short- and long-term project success.

5.1.3 Third Research Question: What correlation does the integration of these determinants have with project resilience and project success?

The integration of the six project resilience determinants (contingency planning, risk monitoring, flexibility, empowerment, communication clarity, and learning) has a medium positive correlation with project resilience, as demonstrated by correlation analysis and by the path coefficients from partial least squares structural equation modeling. In regard to project success, the integrated determinants showed a medium correlation with short-term project success and a small, but still significant, correlation with long-term project success. Hence, the results for this research question show that the combination of all determinants does have a positive association with project resilience and both short- and long-term project success.

The above answers to the three research questions confirm all eleven hypotheses previously presented in the theoretical model in Chapter 2, supporting the knowledge from the literature review. Accordingly, the model is updated with correlation results in Figure 5.1 below.

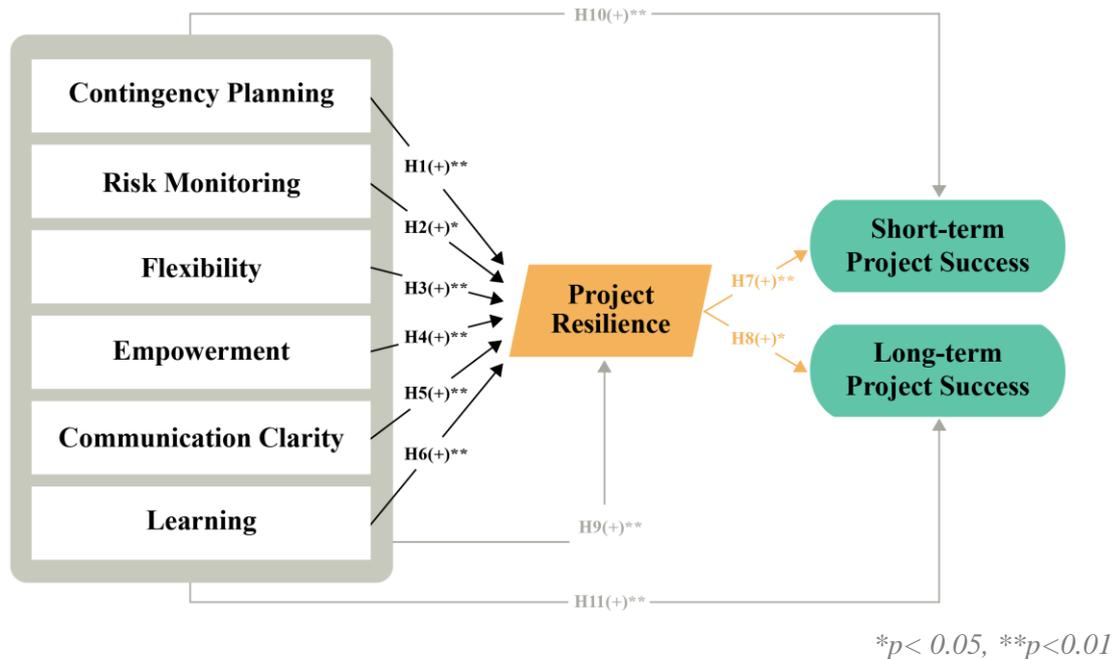


Figure 5.1 Theoretical model with the summarized hypotheses test results

5.2 Practical Implications and Contributions

Overall, this study strengthens the idea that project resilience can secure project success despite disruptions caused by the unexpected. The findings have significant implications for the understanding of how project resilience can be developed. Therefore, these research findings offer a pragmatic approach for project managers and other professionals working with projects to assess and/or prioritize the determinants in order to build greater project resilience in their organizations. The literature indicates that the six determinants lead to project resilience and project success, and the data analysis from this thesis corroborates these assertions with significant correlations. Therefore, organizations and project teams are urged to practice the project resilience determinants presented in this study.

In summary, the contribution of this study provides empirical findings that shed new light on the positive links of the integration of all determinants to project resilience, and short- and long-term project success in turbulent times.

5.3 Research Limitations

These conclusions have a number of possible limitations. First, the absence of the 2021 population demographics data impedes a goodness-of-fit test for probability sampling. Therefore, the generalizability of the results cannot be assessed.

Second, the demographics results in Figure 4.3 suggest that the impact of the pandemic on the respondents' organizations (both positive and negative) has not been severe for the most part. It was also the case that most respondents rated their project resilience as high. Nevertheless, it is also possible that external influences particular to Sweden have played a significant role in both lessening the crisis impact and increasing project resilience. However, it is not possible to confidently determine this from the available data. Similarly, since the sample consists of professionals working in project management in Sweden only, the thesis findings and the theoretical model in Figure 5.1 cannot be generalizable to project management practices on a global scale.

Last, since this thesis's questions were added to an already existing survey, it was not possible to have many additional questions, as the questionnaire would have been too long, causing a decrease in response rate. With this respect, the depth of the analysis was restricted. For example, learning was only analyzed by the use of lessons learned, but other sub-determinants of learning could also be studied, such as the use of feedback. This can, of course, be studied in future research.

5.4 Future Research

Notwithstanding the research limitations, the study suggests the following next steps for future research:

A mixed method would have proven to clarify ambiguities that the questionnaire presented by itself. Conducting interviews with a sample of the questionnaire respondents would illuminate how they are actually implementing the determinants in their organizations and what practices they perceive to be the most important or relevant. Additionally, the determinants could be broken down further, for example, analyzing trust as part of empowerment or change management as part of flexibility. This would allow for a deeper analysis of how each of the determinants is actually manifested in practice and where the gaps for improvement lie.

Because Swedish organizations have not been severely affected by the COVID-19 crisis, further studies should be carried out in countries and regions more badly impacted by the pandemic in order to validate the associations among determinants, project resilience and project success.

This study asked respondents to rate the project value generation in their organizations over the last five years, and this question was taken as the measurement for long-term project success. It is not possible yet to assess the long-term project success of projects that have been ongoing during the COVID-19 pandemic. This measure can only be taken in hindsight to determine if the project has added value to the organization and ensured business continuity. Therefore, it would be interesting to compare the numbers from 2021 to 2026 to measure if project resilience levels correlate to long-term project success.

Lastly, upon the analysis of data from other sections of the Swedish Project Review survey (shown in Appendix D), a positive association between long-term project success and the alignment of the project to the organization's strategy was found. Hence, the alignment of project goals to the organizational strategy might be explored as another determinant.

5.5 Conclusion

When a project is endangered by crisis, it can either bend and adapt or dwindle and break. Project resilience is what ensures the former rather than the latter. It is not an independent variable that some organizations simply have, while others simply do not. It is instead parallel to the exercise and application of various factors that serve as building blocks of resilience in project management. Organizations in Sweden and around the world can work to develop the characteristics necessary to strengthen their project resilience. This will allow for smoother operations when emergent risks appear during times of crises.

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Appendix A

Swedish Project Review 2021 Questionnaire

Section 1. Introduction

In 2021, as the COVID-19 pandemic remains, resilience is a necessity for organizations to stay afloat. There are several key aspects essential for an organization to develop resilience; research shows that organizations that practice them effectively are more likely to thrive in times of crisis.

In the Swedish Project Review 2021, we aim to explore the factors behind resilience and change management. How is project resilience correlated with effective project management in times of crisis? What factors seem to have the most significant impacts on project resilience? What could organizations do to increase their growth in this area?

The results from this questionnaire have a double purpose this year:

1. The fifth production of the Swedish Project Review, Sweden's leading temperature meter for projects, which covers industry-specific key figures, trends and describes areas that need to be improved. The report is published annually in collaboration between KPMG and Project Management Institute (PMI) Sweden Chapter.
2. A master's degree thesis project at Lund University School of Economics and Management.

The survey results and analysis will be published on the following platforms:

1. Swedish Project Review 2021 on Project Management Institute Sweden website: <https://www.pmi-se.org/>
2. and on KPMG's website: <https://www.kpmg.se/>
3. LUSEM master's thesis 'Project Resilience in the Face of Crisis: A Case Study from Project Managers in Sweden' in LUP Student Papers: <https://lup.lub.lu.se/student-papers/search>

Note: If you are a consultant, please respond to the survey from your current client's perspective.

Section 2. Respondent categorization

This section focuses on overall facts of your organization.

1. Which of the following best describes the total annual revenue of your organization?

- Up to 2 MSEK
- Between 2 and 100 MSEK
- Between 100 and 500 MSEK
- Between 500 MSEK and 5 BSEK
- More than 5BSEK

2. Which of the following best describes your job role?

- Head of PMO
- Project Manager
- Project Member
- Project Sponsor
- Project Support Function/PMO Staff
- Senior Management/CxO
- Steering Committee Member
- Other (please specify)

3. Please select the term that best describes the primary focus of your organization.

- Aerospace
- Automotive
- Construction
- Consulting
- Energy
- Financial Services
- Food and Beverage
- Government
- Healthcare
- Information Technology
- Legal
- Manufacturing
- Mining
- Pharmaceutical
- Retail/Wholesale
- Telecom
- Training/Education
- Transportation/Logistics/Distribution

Section 3. Governance and strategic alignment

This section focuses on governance of projects and its alignment with the organization's strategy.

4. In your view, how important is it to prioritize the appropriate initiatives/projects to reach your organization's strategic objectives?

- Low
- Medium

High5. How would you characterize the alignment of the projects you manage to the strategy of your organization?

- Low
- Medium
- High

6. In your view, to what degree is senior management actively engaged in high priority projects?

- Low
- Medium
- High

Section 4. Processes and methods

This section focuses on project management processes and methods carried out within your organization.

7. In your view, how important are project-related processes and methods for project success?

- Low
- Medium
- High

8. To what degree does your organization have structured and formalized project-related processes?

- Centralized and well documented with a strong and proven approach
- Centralized and documented
- Non-centralized but documented
- Informal (processes are in place but not formalized or consistent)
- No processes in place
- Other (please specify)

Section 5. Capacity management

This section focuses on managing capacity when planning and executing projects within your organization.

9. In your view, how important is capacity management for project success?

- Low
- Medium
- High

10. For projects in your organization, are competences and resources available and allocated as needed?

- Low
- Medium
- High

Section 6. Benefits and financials

This section focuses on project benefit and financial management within your organization.

11. In your view, how important is benefit and financial management for project success?

- Low
- Medium
- High

12. How would you characterize your organization's project-related benefit and financial management maturity level?

- Low
- Medium
- High

13. What does the application of business cases look like in your organization?

- There is a formal policy and it is always used
- There is a formal policy but it is only used for projects with a certain value or impact on the organization
- There is a formal policy but it is rarely used
- There is no formal policy or formal procedure
- Business cases are never used for projects
- Others (please specify)

Section 7. Organizational change

This section focuses on change management within your organization.

14. In your view, how important is change management for project success?

- Low
- Medium
- High

15. How would you rate the capability to manage and adapt to change within your organization?

- Low
- Medium
- High

16. How high a priority within your organization is creating a culture receptive to organizational change?

- Low
- Medium
- High

17. How important do you consider change management skills for project managers / line managers in your organization?

Project managers:

- Low
- Medium
- High

Line managers:

- Low
- Medium
- High

18. How would you rate the change management skills for project managers / line managers in your organization?

Project managers:

- Low
- Medium

- High

Line managers:

- Low
- Medium
- High

Section 8. Performance and quality

This section focuses on performance and quality management of projects in your organization.

19. In your view, how important is performance and quality management for project success?

- Low
- Medium
- High

20. How would you rate your organization's project related performance and quality management maturity level?

- Low
- Medium
- High

21. For the last 12 months, how many of the projects in your organization do you estimate have delivered on time, within budget and realized benefits of at least 80% ?

- 0-25%
- 26-50%
- 51-75%
- 76-100%

22. In your view, when is quality assurance used?

- Upon completion of milestones
- Upon deliverables
- After completion of each project
- For projects of significant importance
- For projects above a certain size
- When necessary
- Never
- Other (please specify)

Section 9. Risk management

This section focuses on risk management of projects in your organization.

* 23. How would you rate the importance of managing risk for project success?

- Low
- Medium
- High

* 24. How would you characterize your organization's project-related risk management maturity level?

- Low
- Medium
- High

* 25. With what frequency does your organization manage risks within projects?

- Frequently
- At the quality (toll) gates
- At the start and during planning
- At the start
- Not managing risks
- Other (please specify)

Section 10. System & Data

This section focuses on systems and data for projects within your organization.

* 26. In your view, how important is management of project data and reporting for project success?

- Low
- Medium
- High

* 27. In your view, how would you rate the relevance and accuracy of your organization's projects data and reporting?

- Low
- Medium
- High

* 28. In your view, how would you rate your organization's system support and utilization for projects?

- System(s) provide relevant support and are applied across all projects
- System(s) provide relevant support but are applied for projects on ad-hoc basis
- System(s) do not provide relevant support
- No system support available

Section 11. Knowledge and leadership

This section focuses on project related knowledge and leadership within your organization.

* 29. In your view, how important is management of knowledge and leadership for project success?

- Low
- Medium
- High

* 30. How would you rate your organization's project related knowledge and leadership maturity level?

- Low
- Medium
- High

31. Does your organization acknowledge and actively work with leadership and knowledge management (i.e. lessons learned, education and certification, competency requirements, mentorship and coaching)?

- Lessons learned collected and used in new projects and strategies - Low
- Lessons learned collected and used in new projects and strategies - Medium
- Lessons learned collected and used in new projects and strategies - High
- Relevant education and certification - Low
- Relevant education and certification - Medium
- Relevant education and certification - High
- Competency requirements defined - Low
- Competency requirements defined - Medium
- Competency requirements defined - High
- Mentorship and coaching offered - Low
- Mentorship and coaching offered - Medium
- Mentorship and coaching offered - High

Section 12. COVID-19 Pandemic

This section focuses on project resilience during the COVID-19 pandemic in 2020.

32. To what level has your organization been affected by the COVID-19 pandemic?

Positively:

- Low
- Medium
- High

Negatively:

- Low
- Medium

High33. How flexible have your organization's project-related processes been to cope with the emergent risks of the COVID-19 pandemic while maintaining project goals?

- Low
- Medium
- High

34. What has been the level of empowerment of your project team during the COVID-19 pandemic? (Empowerment refers to the authority given to the team members to perform tasks through clear objectives and trust.)

- Low
- Medium
- High

35. How clear has stakeholder communication been in your organization to adjust project scope in response to emergent risks during the COVID-19 pandemic?

- Low
- Medium
- High

36. How would you characterize your organization's budget and schedule contingency preparedness for the emergent risks presented by the COVID-19 pandemic?

- Low
- Medium
- High

37. To what level has your organization been prepared for virtual work?

- Low
- Medium
- High

38. How would you rate your organization's project recovery capability to ensure business continuity in response to the COVID-19 pandemic?

- Low
- Medium
- High

39. How would you rate the long-term value generated by projects in your company in the last 5 years?

- Low
- Medium
- High

40. Do you agree to be contacted for any follow-up questions in regard to the Swedish Project Review report?

- Yes
- No

Thank you for participating

Thank you for responding to our survey and don't forget to click on the Done button below!

Should you have any questions, don't hesitate to contact our survey administrator Javier Lara Cartagena at javier.cartagena@pmi-se.org

Visit www.pmi-se.org and www.kpmg.se for more information and stay tuned for the survey results!

Appendix B

First Newsletter to PMI Sweden Chapter Members

Help us shape a resilient project future!

Take the Swedish Project Review 2021 survey.

Dear PMI Sweden Chapter member,

Sweden's leading temperature meter for projects in 2021 is underway. PMI Sweden Chapter and KPMG, in collaboration with master's students at Lund University, invite you to participate in the Swedish Project Review 2021 by answering the following questionnaire. We would appreciate having your responses by **Sunday, 9 May**.

We look forward to learning how the project economy in Sweden thrived in the past year, as well as what are the most significant challenges and areas for improvement.

This survey is anonymous and takes only 5-8 minutes to complete.

The Swedish Project Review 2021 will be published in June 2021 in:

(1) Project Management Institute (PMI) Sweden Chapter website: <https://www.pmi-se.org/> and on KPMG's website: <https://www.kpmg.se/>

(2) LUSEM master's thesis 'Project Resilience in the Face of Crisis: A Case Study from Project Managers in Sweden' in LUP Student Papers: <https://lup.lub.lu.se/student-papers/search>

If you have any questions, please contact javier.cartagena@pmi-se.org or viorica.doros@pmi-se.org.

Thank you for your collaboration!

SPR 2021 team

Second Newsletter to PMI Sweden Chapter Members

Take 5 minutes to review the project resilience in 2020!

Your input is extremely valuable! Please help us develop the Swedish Project Review 2021 by taking the following survey by Sunday, 9 May.

If you have any questions, please contact javier.cartagena@pmi-se.org or viorica.doros@pmi-se.org.

Thank you for your contribution!

Final Newsletter to PMI Sweden Chapter Members



Help us shape a resilient project future!

**Please take the survey for
Swedish Project Review 2021.**

PMI and KPMG invite you to participate in the upcoming Swedish Project Review, the most extensive project management study in Sweden. This year's study focuses on the success factors behind project resilience.

This survey is anonymous and takes only 5-8 minutes to complete. The deadline has been extended to Friday, the 14th of May.

TAKE THE SURVEY NOW



Thank you for participating!

If you have any questions, please contact javier.cartagena@pmi-se.org or viorica.doros@pmi-se.org.

The SPR 2021 team

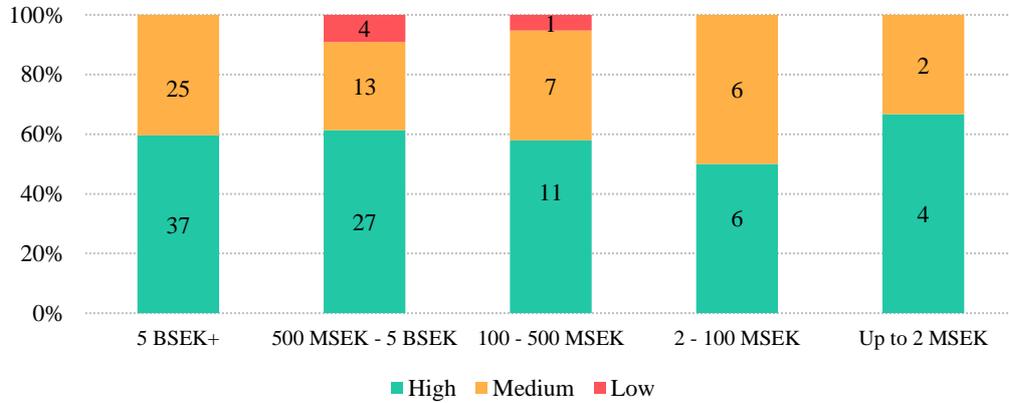
Appendix C

Respondents' industries from 2021 survey

Organization's primary focus	Number
Information Technology	19
Manufacturing	16
Consulting	14
Government	14
Automotive	11
Construction	9
Energy	8
Food and Beverage	8
Telecom	8
Aerospace	5
Transportation/Logistics/Distribution	5
Healthcare	4
Retail/Wholesale	4
Marine	2
Pharmaceutical	2
Training/Education	2
Cityplanning	1
Communication	1
Datacenter	1
Defence	1
Financial Services	1
Insurance	1
Medtech	1
Mining	1
Pulp and Paper	1
Railway	1
Real Estate	1
Security	1
Grand Total	143

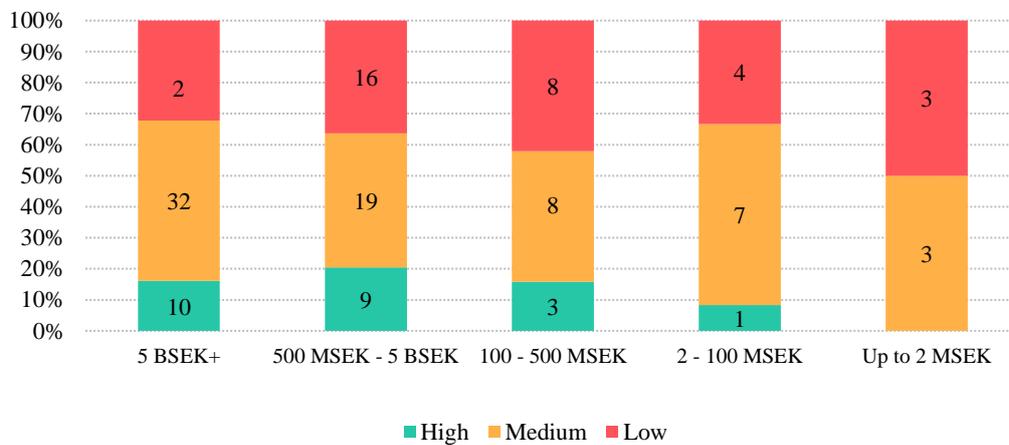
Appendix D

How flexible have your organization's project-related processes been to cope with the emergent risks of the COVID-19 pandemic while maintaining project goals?



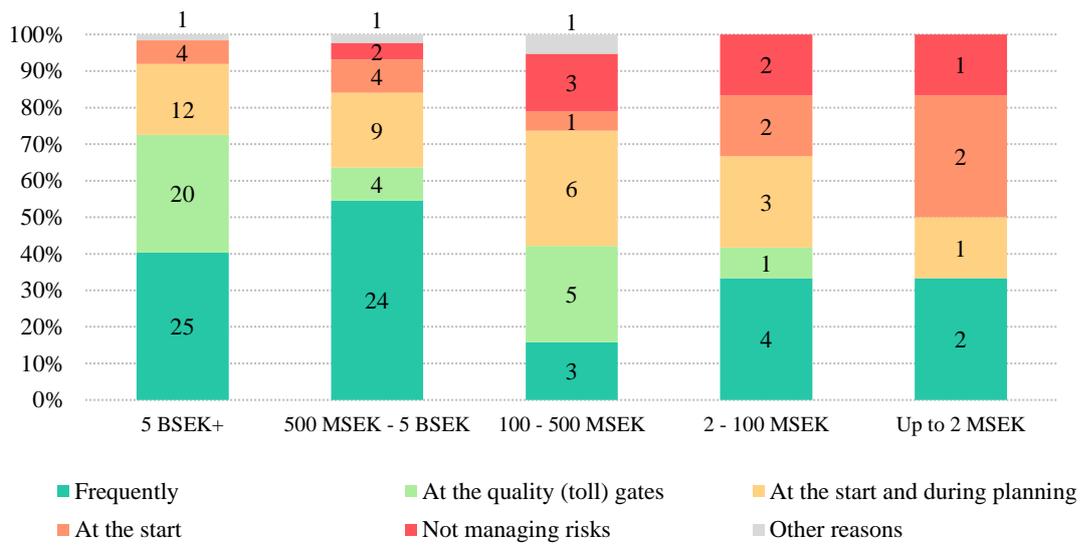
Flexibility by organization's annual revenue in 2020 survey

Does your organization acknowledge and actively work with leadership and knowledge management? [Lessons learned collected and used in new projects and strategies]

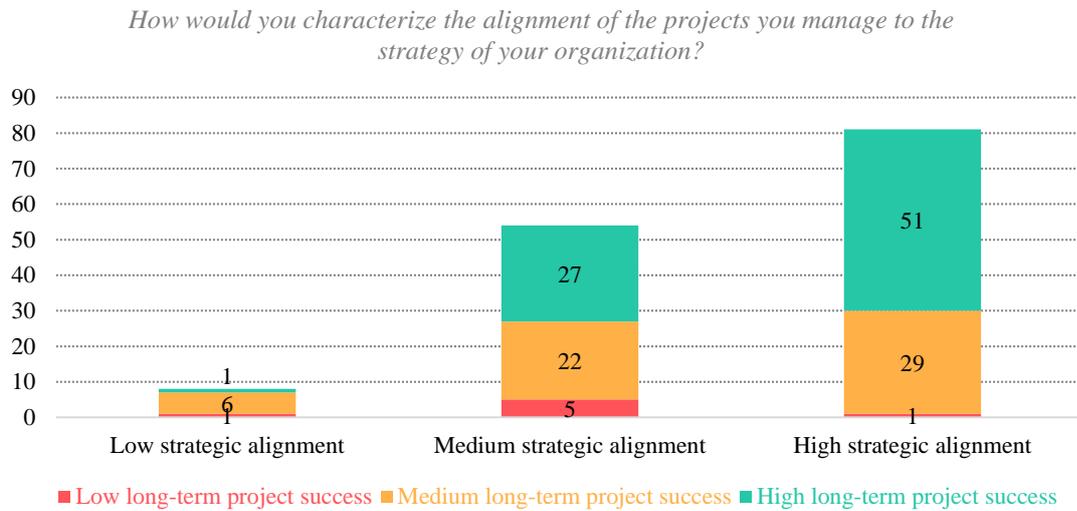


Learning by organization's annual revenue in 2020 survey

With what frequency does your organization manage risks within projects?

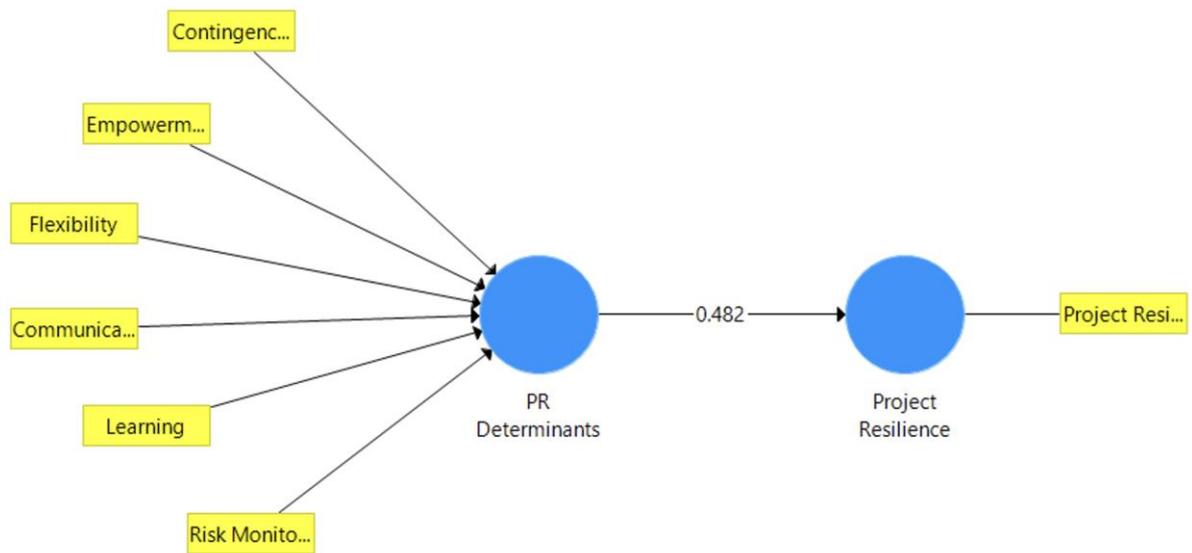


Risk monitoring frequency by organization's annual revenue in 2020 survey

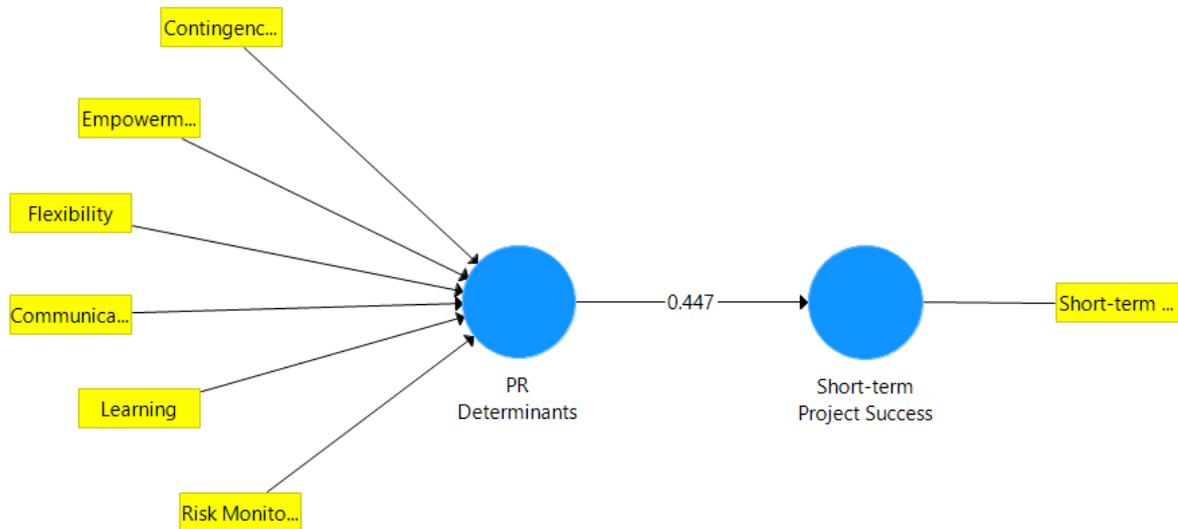


Strategic alignment in relation to long-term project success

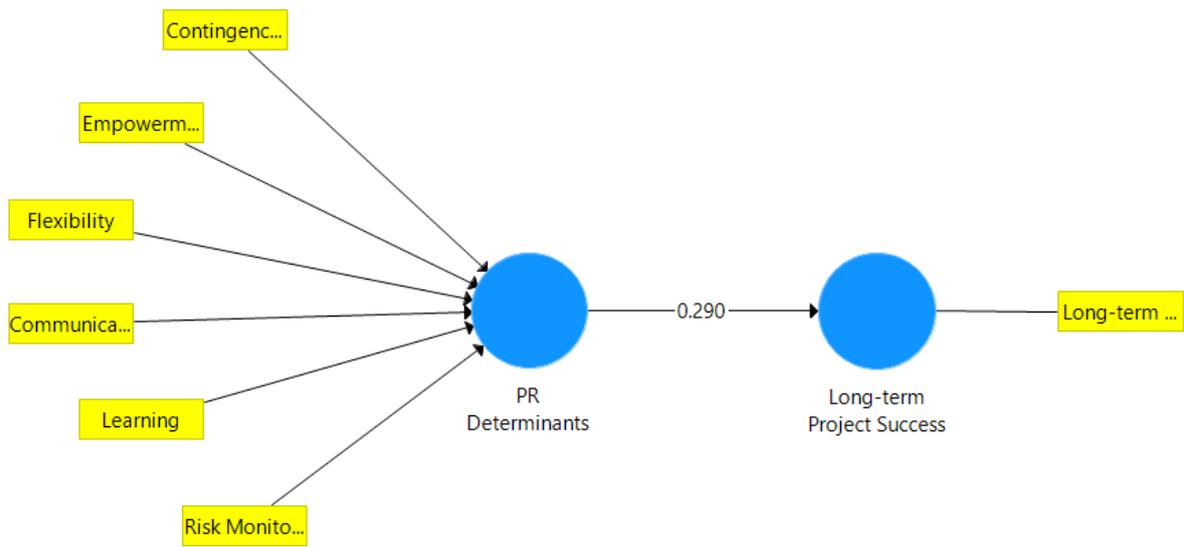
Appendix E



SmartPLS path correlation of integrated project resilience determinants with project resilience



SmartPLS path correlation of integrated project resilience determinants with short-term project success



SmartPLS path correlations of integrated project resilience determinants with long-term project success