A Hybrid Project Management Approach: Bridging Theory and Practice in ERP Implementation Projects

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Sinead Bidgood
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Abstract

The use of efficient information systems and technology has not only become a source of competitive advantage, but also a threshold criterion for organizational survival. In response, many organizations are utilizing Enterprise Resource Planning (ERP) systems (Baykasoglu and Gölcük, 2017, p. 256). ERP systems are software packages that integrate, centralize and automate a company’s information and commercial operations, regardless of the company’s size, diversity or geographical dispersion (Parr & Shanks, 2000, p. 1). This thesis explores the use of hybrid project management approaches in the context of ERP implementation projects.

Hybrid project management approach (PM) involves the blending of traditional and agile project management practices and principles. Although the use of a hybrid PM approach has appeared in research and seems to be utilized in practice, minimal empirical findings have been confirmed due to the infancy of the research topic. Emerging literature emphasizes the importance of context making the point that no single PM approach can be suggested as a “universal best practice” (Highsmith, 2009, p. 23; Leybourne, 2009, p. 524). The ongoing debate between academics and practitioners involves the choice of the PM approach that would lead to maximizing project benefits and achieving project success. Hybrid approaches are becoming increasingly popular as a way of answering the common paradox between flexibility (agile approaches) and structure (traditional approaches). The study was guided by the following research question: **How are traditional and agile project management approaches blended in ERP implementation projects and what are the associated impacts?**

There is very limited research investigating the use of a hybrid project management approach for this type of projects. This study aimed to contribute to the research field, providing new insight to drive future research and useful implications for practitioners. Specifically, this study provides insight on how a hybrid approach is employed in practice, which principles and practices are used throughout the project lifecycle, the critical success factors, benefits, and challenges. Additionally, the factors that should be considered when determining the project management approach for ERP implementation projects are investigated. The findings were supported by the development of a framework and suggestions for future research.

Six in-depth semi-structured interviews with industry experts were conducted to gain insight on their opinions and experience in this specific context. Secondary data was collected, utilizing company documents and websites to support the findings. Following the exploratory purpose of this research and the underlying research question, the qualitative data analysis deployed a combination of a template approach and inspired grounded theory as an analytical tool. The data analysis approach utilized the development of themes *a priori* from the literature review, however the codes were generated directly through analyzing the collected primary data. Answering the research question, the study’s findings were reflected in a model, which also draws conclusions about how the various themes are related. In this framework, the critical success factors, such as the project team, project manager, and project planning, were considered important for using a hybrid project management approach, irrespective if the project management approach is more predominantly traditional, agile or an even combination. An assessment criterion is provided, to determine the best suited project management approach, including client, project manager and team, project specific, and external factors. The most important and used traditional and agile practices were then identified throughout the implementation phases. Finally, the benefits and challenges of using a hybrid PM approach for ERP implementation projects were outlined.

**Keywords:** hybrid project management, project management approach, ERP implementation
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1. Introduction

In today’s dynamic environment, many organizations are utilizing projects to create greater business value, establish competitiveness, and manage the turbulence. Due to globalization, increased innovation, and rapid or unpredictable development in countless markets (Saynisch, 2010, p. 18), many organizations are increasingly turning to project management (PM) to strengthen their competitive advantage (Jugdev & Thomas, 2002, p. 4; Azanha et al., 2017, p. 121). Serrador and Pinto (2015, p. 1040) further support the contemporary proliferation of projects, stating that annual investments in projects equate to trillions of dollars. Although PM is increasing in popularity, projects are also becoming more complex (Saynisch, 2010, p. 19; Špundak, p. 941). For this reason, different approaches to PM have become a key interest in both the research field and practice. The two main approaches of PM are traditional and agile. Commonly these approaches are considered as opposing options (Batra et al., 2017, p. 380; Boehm & Turner, 2004, p. 9; Bredillet, 2013, p. 43; Cobb, 2011, p. 7; Serrador and Pinto, 2015, p. 104; Qumer & Henderson-Sellers, 2008, p. 1899); however recently the prevalence of hybrid PM approaches has been increasingly recognized, blending components of both approaches. Many advocate the use of hybrid PM approach as a means to optimize the benefits of both approaches, while minimizing the associated disadvantages (Batra et al., 2010; Boehm, 2002; Cram & Marabelli, 2017; Vinekar et al., 2006). Although the use of a hybrid PM approach has appeared in research and seems to be utilized in practice, minimal empirical findings have been confirmed due to the infancy of the research topic. Emerging literature also emphasizes the importance of context emphasizing on the fact that no single PM approach can be suggested as a “universal best practice” (Highsmith, 2009, p. 23; Leybourne, 2009, p. 524).

Specifically, the use of hybrid PM in the context of Enterprise Resource Planning (ERP) implementation projects has been widely unexplored and undocumented (Kraljić & Kraljić, 2017). ERP implementation is characterized by high complexity, as it involves both technological and organizational interactions (Moon, 2007, p. 243). Furthermore, ERP implementation projects often constitute substantial risks, budget and time investments. Accordingly, Amid et al (2011, p. 28) report a project failure rate of more than 70% for ERP implementation projects. In response, Nagpal et al. (2015) highlight the selection and utilization of an ERP Implementation Strategy as critical for successful implementation and an ERP methodology as one of the key strategic decisions in the aforementioned process. In order to cope with the industry trends and growing customer demands, the main industry players in ERP systems, SAP, Oracle and Microsoft Dynamics, have been incorporating agile practices in their methodologies to create a hybrid PM approach for implementing ERP (Nagpal et al, 2015). Although there is a tendency of utilizing these methodologies in practice, there is no ground based ERP implementation methodology, widely accepted and tested (Kraljić & Kraljić, 2017).

1.1 Research Question, Aim and Objectives

The research gap for this thesis is constructed using a combination of confusion and neglect spotting (Sandber & Alvesson, 2010, p. 29). An extensive literature review identifies the ongoing dilemma that exists between academics and practitioners alike of whether to use a “pure” PM approach or a combination of both traditional and agile principles and practices leading to confusion spotting. Conventionalists in PM advocate that agile project management
(APM) should be used in a “pure” form and consequently practitioners should decide to use either traditional or APM. On the contrary, many propose that viewing APM and traditional PM methods as bipolar choices can create limitations for project success (Batra et al., 2010, p. 380; Boehm & Turner, 2004, p. 9; Cobb, 2011, p. 7; Serrador and Pinto, 2015, p. 1041; Qumer & Henderson-Sellers, 2008, p. 1899). Serrador and Pinto (2015, p. 1049) recommend future research investigates the prevalence of mixing APM and the traditional approach, to develop a hybrid approach. This research gap is further emphasized by the findings of their research that indicate most of the projects studied were utilizing practices and processes from both approaches. Similarly, Qumer and Henderson-Sellers (2008, p. 1899) declare most organizations are unable to fully adopt APM initially, due to psychological and technical restrictions. Hence, a full transition into pure APM practices requires substantial time and effort. Conforto et al. (2014, p. 31) proclaim the need for research to investigate which APM practices are most important for agility and which could be used in parallel to traditional practices. Furthermore, the research gap is constructed through identifying under-researched areas and areas lacking empirical support (Sandber & Alvesson, 2010, p. 29). There is insufficient empirical research demonstrating the possibility of blending traditional PM and APM. Furthermore, a clear research gap remains regarding which practices of traditional PM and APM could complement one another. As the suitability of adapting certain PM approaches is very much dependent on the context, the use and appropriateness of a hybrid PM approach in the context of ERP implementation projects has been widely under-researched and undocumented (Kraljić & Kraljić, 2017).

Therefore, the research aim is to explore the suitability of using a hybrid PM approach, combining traditional and APM practices and principles in the context of ERP implementation projects. In order to bridge theory with practice, the authors intend to compare the emerging themes and theories from the analysis of the data with existing literature on the topic. Consequently, this thesis will address the following research question:

- How are traditional and agile project management approaches blended in ERP implementation projects and what are the associated impacts?

The research objectives which underpin the main aim and research question are:

- Determine the Critical Success Factors (CSFs) for successful ERP implementation projects using a hybrid approach.
- Explore the main factors that should be considered when choosing an appropriate ERP implementation methodology.
- Examine which traditional and agile practices and principles are used in each phase of an ERP implementation project, consequently which phases are more suitable for an agile and/or traditional approach.
- Investigate the main benefits and challenges of adopting a hybrid approach in ERP implementation projects.

1.2 Structure of the Study

The structure of this thesis will follow a logical order, providing readers with theoretical background on the topic, an explanation of the research methodologies employed, the empirical findings, a discussion, and final conclusions of the research. As the use of a hybrid PM approach for ERP implementation projects remains unexplored in literature, it was
necessary that the researchers assess literature on both topics hybrid PM approaches and ERP implementations. Furthermore, to comprehensively understand the use and establishment of hybrid PM approaches, theoretical background is provided for traditional PM and APM. Theoretical background from current literature is also provided for what is known about the blending of traditional PM and APM, to form a hybrid PM approach. Furthermore, as the context is an important element of this research, a theoretical background is provided based on current literature on ERP implementation projects. A thorough explanation and justification of the research methodology is then outlined, including the research context, philosophy, orientation, and design. A detailed review of literature is included in the research context section, regarding the methodologies used for ERP implementation projects. Following the methodology section, the empirical findings are presented. Based on the empirical findings, a discussion is developed, comparing these findings to the literature. A framework is presented to clearly display the conclusions of the discussion, highlighting the connections between the various themes. Lastly, in the conclusion section, the implications of the research findings and limitations are explained, as well as the final impressions from this research study.
2. Theoretical Background

This section will provide an extensive literature review of the following topics: an introduction to PM, traditional PM approaches, agile PM approaches, comparison between traditional and agile PM, hybrid PM approaches, finishing off with the importance of ERP and its implementation.

2.1 Project Management

In defining the term “project” there are two key components: temporary endeavour and unique product, service or results. Projects as temporary endeavours, indicates that each project has a defined start and finish, represented by the project kick-off and ending with either a project closure or termination. Uniqueness of the project results implies that the project involves non-repetitive processes as each project differs in its uncertainties, circumstances, results, and stakeholders (PMI, 2013, p. 3). Subsequently, PM is the achievement of project requirements through project activities, employing appropriate knowledge, skills, tools, and techniques (PMI, 2013, p. 4). Brinkkemper (1996, p. 275-276) describes PM approach as a specific way of thinking, providing a structured manner of managing projects through the use of rules and guidelines. Gareis et al. (2013, p. 52) expand, stating PM aims to manage project complexity and project-specific relationships. Evidently, PM requires the selection, application, and tailoring of rules, guidelines, tools, and techniques to the specific project situation (Špundak, 2014, p. 940). Given the uniqueness of projects and the environments in which they operate, it is no surprise that many have criticized the use of a one-fits-all approach to PM (Batra et al., 2017, p. 391; Shenhar, 2001, p. 394). There are two main approaches to PM “traditional” also known as structured, and “agile” which is often referred to as adaptive. Traditional PM and APM are frequently considered opposing or bipolar methodologies (Batra et al., 2017, p. 380; Boehm & Turner, 2004, p. 9; Bredillet, 2013, p. 43; Cobb, 2011, p. 7; Serrador and Pinto, 2015, p. 104; Qumer & Henderson-Sellers, 2008, p. 1899). Traditional PM is based on plan-driven methods, with an emphasis on monitoring and control (Augustine et al., 2005, p. 87; Boehm & Turner, 2004, p. 9). In contrast, the agile approach is often described as a means of embracing change and utilizing flexibility (Boehm & Turner, 2004, p. 18; Conforto et al., 2014, p. 1).

PM occurs throughout the entire project lifecycle, as every project requires management from its definitive start to its end. The project lifecycle is commonly segmented into a series of project phases, in both theory and practice. Generally, the project phases are sequential and labelled according to the management and control needs, nature of the project, or deliverables (PMI, 2013, p. 37). There is no normative structure for the project lifecycle phases to be applied to all projects. Furthermore, the project phases may differ within an industry or even organization, as often a different number of phases and labels are deemed appropriate (PMI, 2013, p. 40). The project phases heavily depend on the nature of the project, organizational factors, and the style of the project team (PMI, 2013, p. 41). Although projects widely vary regarding deliverables and work activities, the project lifecycle provides a basic framework for PM. Project lifecycles range from plan-driven to adaptive, depending on the PM approach selected. Albeit, all projects follow a generic project lifecycle structure including the starting of the project, organizing and preparing, conducting project work, and closing of the project (PMI, 2013, p. 37-38). Regarding the execution of project phases, two basic approaches exist: sequential and overlapping. The phase-to-phase relationship may be sequential, in which a phase strictly begins only after the completion of the prior phase. This approach can reduce
risks related to uncertainty; however restrict the ability to compress the project schedule. An overlapping phase-to-phase relationship, allows for phases to begin prior to the completion of the previous phase. This approach allows for schedule compression, however substantial resources may be required to conduct the phases in parallel, rework due to lack of available information, and increased risk can occur (PMI, 2013, p. 41-42). Project managers or project teams may also choose to adopt a mixed approach, utilizing both sequential and overlapping phases throughout the project lifecycle.

2.2 Traditional Project Management

Traditional PM is often referred to as the plan-driven, predictive, or structured approach to PM (Battra et al., 2017, p. 386; Boehm & Turner, 2004, p. 9; PMI, 2013, p. 37). Commonly used traditional PM methods include the waterfall, linear passed-gate, and spiral approach (Confarto et al., 2014, p. 21; Nerur et al., 2005, p. 74).

2.2.1 Traditional Project Management Characteristics

All traditional PM methods involve highly disciplined and deliberate planning early in the project lifecycle, often conducted as a one-off activity (Azanha et al., 2017, p. 128; Confarto et al., 2014, p. 21; Hass, 2007, p. 1). In this approach a rigid and detailed project plan is developed, encompassing an assembly of the defined project deliverables and activities that will drive the project to meet the constraints of time, budget, and scope (Azanha et al., 2017, p. 128; Confarto et al., 2014, p. 21; PMI, 2013, p. 37; Špundak, 2014, p. 941). One of the main assumptions of traditional PM that supports extensive planning is that the systems of the project are fully specifiable and predictable (Azanha et al., 2017, p. 128; Batra et al., 2017, p. 386; Dybå & Dingsøyr, 2008, p. 1042; Špundak, 2014, p. 940). Nerur et al. (2005, p. 74) contribute that traditional PM is grounded on hard systems thinking, which indicates that each problem has an optimal solution that will lead to predictable results. Congruently, traditional PM is appropriate when the project’s deliverables, tools and activities are well understood, and the organization has substantial experience in the specific industry practice (Hass, 2007, p. 1; PMI, 2013, p. 44). Traditional PM is considered predictive, as the approach adopts the mentality that sources of variation in projects are identifiable and can be eradicated through constant measuring and refining of the project processes. In this sense, traditional PM is highly centralized on planning and controlling (Nerur et al., 2005, p. 74). Furthermore, traditional PM approach applies a predictive project lifecycle model (Dybå & Dingsøyr, 2008, p. 1042; PMI, 2013, p. 37). Consequently, the development model of projects utilizing this approach follow a lifecycle model that specifies the activities, tasks, and desired outcomes of each phase (Nerur et al., 2005, p. 75). As the project plan is well-defined early in the project, the distinct project phases can be easily recognized (Hass, 2007, p. 1). Each phase of the project has a distinct focus, such as distinct locations, organizations, related activities or required skills (PMI, 2013, p. 40). These phases are completed in a sequential manner and it is assumed that future revision of completed phases will not be necessary (Hass, 2007, p. 1). Furthermore, each phase requires unique processes and controls to produce its intended deliverable. The end of a phase is indicated by both the hand-off of the phase deliverable to the next phase and formal approval; this is often referred to as a milestone or stage-gate (PMI, 2013, p. 40).

Traditional PM is considered structured, as the approach is process-centric and utilizes a control-and-command management style (Battra et al., 2017, p. 386; Dybå and Dingsøyr,
2008, p. 1042; Nerur et al., 2005, p. 74; Azanha et al., 2017, p. 128). Nerur et al. (2005, p. 74) explain, traditional PM is centralized on identifying and utilizing optimized and repeatable processes. Similarly, Boehm and Turner (2004, p. 9) state that the traditional PM approach values standardized and well-defined processes, that are continuously improved by the organization. To execute a process-centric approach, traditional PM employs a control-and-command or rigid management style. This managerial approach focuses on the initial project plan, identifying and correcting any deviations in order to deliver the defined project requirements (Azanha et al., 2017, p. 128). Boehm & Turner (2004, p. 10) explain that this control is obtained through the use of well-defined work products, verification, and validation. Moreover, PMI (2013, p. 44) proclaim that any changes to the project scope are cautiously managed, through formalized procedures including change requests, analysis, approvals, and re-planning.

Traditional PM is further characterized by its heavy use of documentation, formal communication, limited project customer involvement, and one-off project delivery. Nerur et al. (2005, p. 75) state that the extensive documentation of the traditional PM approach is utilized to both codify processes and manage knowledge. Boehm and Turner (2004, p. 11) expand upon this, stating that the completeness of documentation throughout the entire project lifecycle is necessary for verification and validation procedures. Furthermore, documentation plays a vital role in the formalized communication between project participants (Batra et al., 2017, p. 386; Dybå & Dingsøyr, 2008, p. 1042; Nerur et al., 2005, p. 75). In traditional PM, the project customers maintain an important role in developing the project specifications and requirements, at the beginning of the project lifecycle. However, customer involvement is minimal beyond these initial activities and is considered less critical when compared to other PM approaches (Batra et al., 2017, p. 386; Nerur et al., 2005, p. 75). Lastly, a key characteristic of the traditional PM approach is the one-off project delivery towards the end of the project lifecycle (Boehm, 1988, p. 62).

2.2.2 Traditional Project Management Practices

As aforementioned, traditional PM is heavily focused on defined and well-established processes. This section will focus on the PM processes, tools, and techniques of traditional PM. The Project Management Institute (PMI) is a widely recognized PM organization with the intentions of synthesizing current knowledge in the PM field to educate current and future project managers (Fernandes et al., 2013, p. 7). PMI’s Project Management Book of Knowledge (PMBOK) establishes guidelines for the best practices for PM (PMI, 2013, p. 2). This publication is considered one of the most influential and most widely-used resources in the PM field (Fernandes et al., 2013, p. 7). Consequently, many of the recognized ERP implementation methodologies are strongly established from the guideline outlined in the PMBOK. PMI (2013, p. 46) defines a process as a set of interdependent behaviours and activities utilized to create a predetermined result. Moreover, every process has three general elements: the inputs, tools and techniques applied, and the outputs. PMI (2013, p. 46-47) identifies two major types of processes that are performed by the project team, PM processes and product-oriented processes. PM processes, the focus of this section, embody those processes necessary to achieve effective flow throughout the project lifecycle. In contrast, product-oriented processes are those specific to creating the project deliverable, product, service or result. In traditional PM the project manager in partnership with the project team determine which project processes are necessary given the specific context of the project. Boehm and Turner (2004, p. 13) consider this as verification, in which the project team “do the right things” by using appropriate processes and activities to ensure the project deliveries
meet the specified requirements. PMI (2013, p. 47) further sub-categorize PM processes into five groups: initiating processes, planning processes, executing processes, monitoring and controlling processes, and closing processes. Although the process groups do not constitute the phases of a project cycle, they do tend to maintain importance in a relatively sequential manner. Furthermore, all of these PM processes are supported and conducted through the use of various instruments referred to as PM tools and techniques (Fernandes et al., 2013, p.6). Figure 1 shows the research findings of Fernandes et al. (2013, p. 16). Through their semi-structured interviews and quantitative surveying, these researchers identified the perceived most intrinsic PM practices corresponding to the five process groups and six knowledge areas outlined in the PMBOK.

Figure 1: Top 20 most useful PM practices by group of processes and areas of knowledge. Source: Fernandes (2013).

Initiating processes are those utilized to define a new project or new project phase and obtain official authorization to begin the project or phase. The overall goal of initiating processes is to establish a project vision and align stakeholders’ expectations (PMI, 2013, p. 53). A project charter is considered one of the most valuable tools in this process group and is used to capture the initial project scope and budget, identify the project stakeholders, and assign a project manager (Fernandes et al., 2013, p. 16; PMI, 2013, p. 53). Once the project charter has received formal approval, the project is officially authorized, and the project manager is given authority (PMI, 2013, p. 53). Similarly, a project Statement of Work describes the initial, generic project deliverables, making reference to the business needs and strategic plan of the
project (PMI, 2013, p.67). Additionally, the Kick-off Meeting is a symbolic ritual where the project team initiates the project (Fernandes et al., 2013, p.11).

Planning processes are those necessary for refining the project objectives and scope, while also identifying the required work activities to achieve these. The main target of planning processes is to define a clear strategy and specific actions to successfully deliver the project. This project plan is referenced throughout the remaining project lifecycle to monitor progress and maintain control (PMI, 2013, p. 54). Conforto et al. (2014, p. 27) explain that traditional PM involves a very detailed planning approach with revisions and updating at the end of each project phase. Planning processes include the development of project plans relating to scope, budget, scheduling, communication, risk contingencies, and quality assurance (Fernandes et al., 2013, p. 16; PMI, 2013, p. 54). Conforto et al. (2014, p. 27) and Fernandes et al. (2013, p. 16) both highlight the value of scheduling tools, particularly the Work Breakdown Structure (WBS) and Gantt Charts. White and Fortune (2002, p. 9) contribute that a Cost-Benefits analysis is widely used in practice and considered to be valuable for project planning. Additionally, Boehm and Turner (2004, p. 13) and Fernandes et al. (2013, p. 16) highlight the intrinsic value of risk management, in which risks are identified, assessed, and quantified. From this a Risk Management Plan is derived, outlining how risks can be mitigated to prevent major harm to the project.

Executing processes are utilized to implement the project work according to the project plan and pre-defined project requirements. The main purpose of these processes is to coordinate resources and activities, while managing stakeholders’ expectations (PMI, 2013, p. 55). A Project Issues Log is useful to support the execution of a project, as it identifies complications allowing for systematic development of solutions and may provide useful information for organizational lessons learned (Fernandes et al., 2013, p. 16).

Monitoring and controlling processes are utilized to track, review and evaluate project performance and progress throughout the project lifecycle. The overall goal of monitoring and controlling processes is to identify deviations in the project plan and control changes in the project. Moreover, these processes are important for the identification, approval, and execution of any necessary changes to the project plan. These processes provide insight into the prosperity of the project and can result in an updated PM plan (PMI, 2013, p. 56). To support and conduct the monitoring and controlling processes, progress reports and meetings, as well as formal change requests are used.

Lastly, closing processes are performed to conclude all project activities and officially finish the project; most often terminating contractual obligations. These closing processes are necessary to obtain customer acceptance, conduct a project review, record lessons learned, update organizational asset libraries, archive all project documents, and conduct performance reviews for the project team members (PMI, 2013, p. 56-57). Fernandes et al. (2013, p. 16) identified an established Customer Acceptance Form as a useful tool to support the overall closing process.

2.2.3 Benefits of Traditional Project Management

As traditional PM has been extensively used and researched, the associated benefits and limitations of the approach are broadly recognized. Although traditional PM has been criticized for its intensive front-end planning, it has been recognized that the greatest influence to make changes in a project is during the start of the project lifecycle. Correspondingly, the impact of changes on the project cost and schedule substantially
increase as the project progresses (PMI, 2013, p. 39). This implies that detailed initial planning may reduce the need for costly changes later in the project lifecycle. Boehm and Turner (2004, p. 12) emphasize predictability as one of the major benefits of traditional PM. Predictability is obtained through the heavy planning, repeatability, and defined infrastructure of this approach. Hass (2007, p. 1) contributes to this, stating traditional PM approach maps the steps for development to provide structure and order within a project.

Additionally, traditional PM allows for effective turnover mitigation. This suggests that if project team members need to be supplemented due to unexpected events, the organization can more easily accomplish this. As traditional PM involves extensive documentation, project managers can swiftly move personnel between projects or components of the project. Due to the defined processes and formatting of specific work products, it is assumed that any person with training on the organizational process can estimate and complete common work. This significantly reduces the need for retraining and mitigates the impact of the loss of key personnel amid a project (Boehm & Turner, 2004, p. 12).

Another strength of traditional PM is that it highlights the importance of project requirements (Hass, 2007, p. 1). PMI (2013, p. 120) explains the development of a detailed project scope statement during the project initiation and planning, as critical to project success and for establishing the major deliverables, constraints, and assumptions of the project. Additionally, incorporating the project sponsors and stakeholders in the initial phase of the project helps establish a common definition of project success. Furthermore, stakeholder buy-in is more easily obtained when planning processes are well managed, providing stakeholders with a guide for how the desired project objectives will be obtained. Consequently, this improves acceptance of project deliverables and overall stakeholder satisfaction, while reducing overhead costs associated with ongoing stakeholder involvement (PMI, 2013, p. 54). Finally, as traditional project methods utilize extensive documentation, conformity and transparency are established throughout the project (Boehm & Turner, 2004, p. 149).

2.2.4 Challenges of Traditional Project Management

Traditional PM has been increasingly criticized for being unresponsive to the dynamic environment in which projects operate (Boehm & Turner, 2004, p. 149; Hass, 2007, p. 1; Saynisch, 2010, p. 18; Serrador and Pinto, 2015, p. 1041; Špundak, 2014, p. 940). Špundak (2014, p. 941) proclaims as business environments become increasingly complex, present-day projects encompass a larger number of tasks and complex interdependencies between these tasks. As the traditional PM approach, adopts hierarchical and linear task relationships, it is inept for managing the complexity and dynamism of contemporary projects. Hass (2007, p. 1) expand upon this asserting that projects rarely follow a sequential manner. Furthermore, as traditional PM assumes the project is fully or relatively isolated from its environment, significant challenges are present in practice. In today’s business environment changes to the initial plan are inevitable, implying approaches utilizing heavy front-end planning lack flexibility and may have limited value (Serrador and Pinto, 2015, p. 1041). Frequently during the project execution phases, plans must be updated to address changes in project activity durations, resource availability, project goals, and unexpected risks (PMI, 2013, p. 55; Serrador & Pinto, 2015, p. 1042). When major changes occur, a detailed analysis and choice of appropriate response are required through a formal change request and approval process. This process can be highly time consuming and require excessive rework (Serrador & Pinto, 2015, p. 1041). Correspondingly, it is often highly difficult to define project goals and develop project plans in the initial phases of a project as information is limited (Špundak,
2014, p. 941). Project sponsors and customers often have difficulties communicating all their requirements during the initiating and planning phases of a project (Hass, 2007, p. 1). Moreover, the early development of deliverable specifications can create pressure for the project manager and project team, as future opportunities to add or change functionality are highly limited. This pressure, can lead to “gold plating”, where the project team adds more features than required, most often with added time and budget costs. As project customers’ involvement is limited to the early phases of a project and early rigid definitions of project specifications are developed, traditional PM is associated with higher risks of customer dissatisfaction (Serrador and Pinto, 2015, p. 1041). Lastly, Batra et al. (2017, p. 389) state that traditional PM can lead a project to become overly bureaucratic, as the result of the inherent command and control style. When overly strict plans and processes are applied to projects, innovation is often hindered, resulting in a mechanical mentality. As a result, the project manager and team can become intensely focused on processes, attributing the project deliverables secondary status (Boehm & Turner, 2004, p. 13).

A summary of the benefits and challenges of traditional PM can be found in Table 1 below.

<table>
<thead>
<tr>
<th>Benefits of Traditional PM</th>
<th>Challenges of Traditional PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predictability</td>
<td>Lack of Flexibility</td>
</tr>
<tr>
<td>Structure/Order for Project</td>
<td>Inevitable Changes to Initial Plan</td>
</tr>
<tr>
<td>Effective Turnover Mitigation</td>
<td>Time Consuming Formal Change Process</td>
</tr>
<tr>
<td>Easier Stakeholder Buy-In</td>
<td>Excessive Rework</td>
</tr>
<tr>
<td>Improved Acceptance of Project Deliverables</td>
<td>Difficult to Define Project Goals/ Project Plan in Initial Phase</td>
</tr>
<tr>
<td>Reduced Overhead Costs of Stakeholder</td>
<td>Risk of “Gold Plating”</td>
</tr>
<tr>
<td>Conformity/ Transparency</td>
<td>Higher Risks of Customer Dissatisfaction</td>
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<tr>
<td></td>
<td>Overly Bureaucratic</td>
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<td></td>
<td>Hinders Innovation</td>
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<td></td>
<td>Unresponsive to Dynamic Environment</td>
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</table>

2.3 Agile Project Management (APM)

APM is often referred to as adaptive, as this approach is frequently described as a way to embrace change and apply flexibility (Boehm & Turner, 2004, p. 18; Conforto et al., 2014, p. 1). Commonly used APM methods include Extreme Programming (XP), Scrum, Crystal, and Adaptive Software Development (Batra et al., 2017, p.380; Measey et al., 2015, p. 3).

2.3.1 Evolution of APM

Although iterative methods were known and utilized prior to 2001, the development of the “Manifesto for Agile Software Development” (Beck et al., 2001) is often recognized as the origins of the APM movement (Azanha et al., 2017, p. 122; Cobb, 2011, p. 39; Conforto et al, 2014, p. 22). Prior to the manifesto, rapid prototyping and development were used in software development projects, however were not formally recognized as agile methods (Boehm & Turner, 2004, p. 16). Moreover, methodologies such as the Rolling Wave method can be
considered predecessors of today’s agile methodologies (Serrador & Pinto, 2015, p. 1041). As presumed by its name, the manifesto was developed for the software development industry in response to frustrations of mismatch between traditional PM and highly complex or dynamic projects (Augustine et al., 2005, p. 85; Bredillet, 2013, p. 13). The Agile Manifesto was created by a group of advocates, proposing four core values of APM:

- **Individuals and interactions over processes and tools.**
- **Working software over comprehensive documentation.**
- **Customer collaboration over contract negotiation.**
- **Responding to change over following a plan.**

Beck et al. (2001) further elaborated these values into twelve principles:

1. **Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.**
2. **Welcome changing requirements, even late in development. Agile processes harness change for the customer’s competitive advantage.**
3. **Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.**
4. **Business people and developers must work together daily throughout the project.**
5. **Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.**
6. **The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.**
7. **Working software is the primary measure of progress.**
8. **Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.**
9. **Continuous attention to technical excellence and good design enhances agility.**
10. **Simplicity--the art of maximizing the amount of work not done--is essential.**
11. **The best architectures, requirements, and designs emerge from self-organizing teams.**
12. **At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behaviour accordingly.**

Since 2001, the use of APM has become increasingly popular (Boehm & Turner, 2004, p. 4; Bonassa & Carvalho, 2016, p. 192; Cobb, 2011, p. 39; Conforto & Amaral, 2016, p. 2; Serrador and Pinto, 2015, p. 1041). Although much of the research and practical use of APM still centres on software development, its application has in some cases been transferred to other industries (Batra et al., 2017; Conforto et al., 2014, p. 30; Measey et al., 2015, p. 4). The values and principles developed in the Agile Manifesto are the basis for contemporary APM methods such as XP, Scrum, Crystal, and Adaptive Software Development (Batra et al., 2017, p. 380; Measey et al., 2015, p. 3). The aforementioned principles have been widely used in both practice and research since their publication. Cobb (2011, p. 39) cautions that it is important not to misinterpret these principles and acknowledge their appropriate use. The manifesto signifies a shift in emphasis, implying that the values of the Agile Manifesto merely represent the most critical elements in APM. Albeit, this does not disregard other elements as being unimportant and unnecessary. Boehm & Turner (2004, p. 16) advocate that the Agile Manifesto values are relative statements and do not represent binary choices. This suggests
that the Manifesto should be used as a means of weighing alternatives regarding the various elements rather than rigidly selecting the agile values. Bredillet (2013, p. 13) further emphasizes that the Agile movement is not intended to be anti-methodology, but instead an effort to create balance in PM. Through their quantitative research, Sheffield and Lemétayer (2013, p. 470) revealed that the principles outlined in the Agile Manifesto do not represent theoretically sound conceptualizations. Moreover, it is stated that these principles are not tested instruments. For this reason, although the principles are widely used in research, these statements may not accurately measure APM from an empirical perspective. It is recommended to consider the principles and values of the Agile Manifesto as a philosophy or goal, rather than specific practices (Boehm & Turner, 2004, p. 17; Bredillet, 2013, p. 13; Sheffield & Lemétayer, 2013, p. 470).

2.3.2 APM Characteristics

Conforto et al. (2014, p. 26) proclaim that APM theory remains in the intermediate phase of development. As a result, much of the research on this topic remains exploratory (Edmondson & McManus, 2007, p. 1177). This may in part explain why to date there is no agreed upon, formal definition of APM. Conforto et al. (2016, p. 660) assert that definitions of APM are “inconsistent, incomplete and lack clarity”. Albeit there are recurring themes in the various definitions of APM. Many definitions of APM emphasize the characteristics of flexible scope, evolving project requirements, and increased customer interactions (Boehm & Turner, 2004, p. 12; Conforto et al., 2014, p. 22; PMI, 2013, p. 45; Serrador and Pinto, 2015, p. 1041).

APM incorporates flexible scope as the project requirements are not rigidly defined before the project begins. Customers’ requirements evolve throughout the entire project lifespan using customer prioritization and continual adaptation (Barlow et al., 2011, p. 26; Boehm & Turner, 2004, p. 17; Conforto & Amaral, 2016, p. 2). In this manner, customer interactions are considered a key characteristic of APM, as customer involvement is significantly increased, in comparison to traditional PM. Similarly, many highlight the iterative, incremental and emergent nature of the approach, when defining APM (Batra et al., 2017, p. 380; Conforto & Amaral, 2016, p. 2; PMI, 2013, p. 45; Serrador & Pinto, 2015, p. 1041). APM is considered iterative, as it involves several short development cycles (Boehm & Turner, 2004, p. 17). These iterations are considered the phases of the project lifecycle and involve the intentional repeating of project activities in each iteration, as the project team improves their understanding of the project scope. Iterative methods produce frequent deliveries and incremental changes, as following each iteration a review is conducted, from which the project goals and requirements can be adjusted according to the present circumstances (PMI, 2013, p. 44-45). Moreover, Boehm and Turner (2004, p. 17) explain that APM is incremental as the delivery of project results does not occur once in the project lifespan, accordingly results are presented in parts to allow for adjustments and clarification. APM is emergent in the principles, work structures and processes utilized, as these elements are not predetermined.

Often in literature APM is regarded as a reply to the need for flexibility, embracing uncertainty and rapidly responding to changes (Batra et al., 2017, p. 380; Boehm & Turner, 2004, p. 18). Conforto et al. (2016, p. 671) support this by stating agility is the ability to change. Due to the reduced management effort and empowerment of the project team associated with APM, it is frequently referred to as a “lightweight” management style (Augustine et al., 2005, p. 87; Boehm & Turner, 2004, p. 17; Conforto et al., 2014, p. 22).
Project teams in APM are self-organizing, which provides the project team with the autonomy to decide how the work will be handled (Boehm & Turner, 2004, p. 17).

There are several agile methods, which vary in the specific practices and process used. The most widely used and researched methods are XP and Scrum (Batra et al., 2017, p. 383). Cobb (2011, p. 4) cautions the importance of differentiating agile methods from agility. Conforto et al. (2016, p. 667) defined the agility construct through their quantitative study of 171 projects. Through their research the following definition was developed: “Agility is the project team’s ability to quickly change the project plan as a response to customer or stakeholders needs, market or technology demands in order to achieve better project and product performance in an innovative and dynamic project environment.” In contrast, agile methods are more specific, outlining the precise practices and processes of Scrum or XP for example (Cobb, 2011, p. 4).

### 2.3.3 APM Practices

Due to the intermediate develop of research on APM, there is also a lack of formally recognized APM practices. Each specific APM method has its own practices, rituals and routines, however there is no common set of Agile practices established in research or practice (Conforto et al., 2016, p. 671). Boehm & Turner (2004, p. 18) further state, although agile practices vary based on the specific method employed, all practices are based on the philosophy outlined in the Agile Manifesto. Conforto and Amaral (2016, p. 12) proclaim the importance for research to continue to establish a formalized APM conceptual framework beyond software development, including the critical success factors and management practices.

In their systematic literature review Conforto et al. (2014) critically analysed current research to establish a framework for APM, developing a common set of practices and enablers for APM. The agile practices include the tools, techniques, and behaviours used. Based on their research, six APM management practices were identified (Table 2). The use of product vision was identified as a common APM practice in literature. Product vision often involves the utilization of visual tools to provide a general explanation of the project deliverable. These tools include visual boards, drawings, figures, and prototypes. Furthermore, the development of product vision requires the engagement of key stakeholders and strong collaboration of team members. The product vision reveals what the customer considers as the most important aspects or features of the project deliverable. This is considered as a relatively simple manner of communicating the project plan, in comparison to the extensively detailed descriptions used in traditional PM (Conforto et al. 2014, p. 24). As previously mentioned, APM is iterative in nature and this also applies to the project planning approach. Consequently, planning is conducted on several occasions by the project team, as the project plan is evolving. Self-managed teams in APM create greater dedication, accountability, and involvement of project team members related to the project plan. On this same note, self-managed teams require greater commitment and involvement in monitoring project progress and updating the project plan. Finally, the project plan in APM is updated more frequently than in traditional PM, as this occurs following the completion of every iteration (Conforto et al., 2014, p. 24).
Table 2: APM practices. Source: Conforto et al. (2014)

<table>
<thead>
<tr>
<th>#</th>
<th>APM Management Practices</th>
<th>References (cited in the literature)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Use of the “product vision” concept</td>
<td>Highsmith (2004); Augustine (2005)</td>
</tr>
<tr>
<td>2</td>
<td>Use of simple project plan communication tools and processes</td>
<td>Highsmith (2004); Cohn (2005); Chin (2004)</td>
</tr>
<tr>
<td>3</td>
<td>Use of iterative planning</td>
<td>Eisenhardt &amp; Tabrizi (1988); Boehm &amp; Turner (2004); Highsmith (2004); Schwaber (2004); Augustine (2005); Cohn (2005)</td>
</tr>
<tr>
<td>4</td>
<td>Developing activities using self-managed and self-directed teams in the project plan</td>
<td>Takeuchi &amp; Nonaka (1984); Boehm &amp; Turner (2004); Highsmith (2004); Augustine (2005); Vázquez-Bustillo, Avella, &amp; Fernández (2007)</td>
</tr>
<tr>
<td>5</td>
<td>Use of self-managed and self-directed teams in the project plan monitoring and updating activities</td>
<td>Takeuchi &amp; Nonaka (1984); Boehm &amp; Turner (2004); Highsmith (2004); Vázquez-Bustillo, Avella, &amp; Fernández (2007)</td>
</tr>
<tr>
<td>6</td>
<td>Frequently apply project plan monitoring and updating processes</td>
<td>Eisenhardt &amp; Tabrizi (1995); Andersen (1996); Boehm &amp; Turner (2004); Highsmith (2004); Augustine (2005); Cohn (2005)</td>
</tr>
</tbody>
</table>

Table 3: Management practices related to the agile project management approach.

2.3.4 Benefits of APM

To warrant effective PM and greater project success rates, research regarding the two PM approaches has become crucial. However, although there is a growing body of research on APM, few definitive and transferrable findings have been derived regarding the relationship between APM and project success. To date, the majority of findings supporting the efficacy of APM are anecdotal or based on single cases, specific industries, and small sample sizes (Serrador and Pinto, 2015, p. 1041). In a large-scale quantitative study of 1386 projects across a global context and multiple industries, Serrador and Pinto (2015) investigated the relationship between APM and project success. Based on the findings of previous research, the researchers identified three dimensions of project success. The first dimension was “project efficiency”, considering the project requirements of time, cost, and achievement of scope goals. The dimension of “stakeholder success” encompasses satisfying stakeholder expectations. “Overall project success” was the third dimension, considering end-users’, stakeholders’, the project manager’s, and the project team’s perceptions of overall project success. Through their empirical study, it was concluded that there is a significant positive correlation between the extent of agile approach and all three dimensions of project success. This infers the greater use of APM methodology improves the likelihood of project success. However, this research does not consider the dynamics, context, or complexity of the projects studied. This being said, the study is valuable as it provides empirical evidence to support the use of APM. Serrador and Pinto’s findings regarding APM and project efficiency, contribute to the research of Budzier and Flyvbjerg (2013), who concluded agile methods improve project delivery time. Many theorists also support this notion, stating APM allows for quicker project delivery (Azanha et al., 2017, p. 121; Bredillet, 2013, p. 13).

Batra et al. (2017, p. 387) and Cobb (2011, p. 62) claim APM can be useful to control project costs. It has been suggested when APM methods are successfully applied, there is potential to significantly improve the quality of the project delivery, product or service (Bredillet, 2013, p. 13; Cobb, 2011, p. 62; Dybå, & Dingsøyr, 2008, p. 850; Highsmith, 2009, p. 7). Similarly, many argue that effective use of APM has implications for superior stakeholder satisfaction (Batra et al., 2017, p. 387; Cobb, 2011, p. 60; Dybå, & Dingsøyr, 2008, p. 850). As APM entails greater employee empowerment and engagement, it has been recognized that employee morale can be improved through its use (Augustine et al., 2005, p. 88; Cobb, 2011, p. 60). Finally, although vague, APM is often referred to as an effective approach to manage chaotic and unpredictable projects and environments. Commonly APM is regarded as a response to the shortcomings of traditional PM, specifically the lack of flexibility (Augustine
et al., 2005, p. 87; Bredillet, 2013, p. 13; Serrador & Pinto, 2015, p. 1041). Flexibility in PM can be considered beneficial as it reduces the amount of rework, allowing for adaptation and responsiveness to changes (Serrador & Pinto, 2015, p. 1041). Conforto et al. (2016, p. 660) contribute, stating agility has been widely discussed as a means to obtain competitiveness and develop innovation capabilities.

2.3.5 Challenges of APM

Although APM can potentially provide numerous benefits for the management and success of projects, there are also challenges and limitations of APM methods. Many of the challenges faced using APM are closely related to the critical success factors previously discussed. Cobb (2011, p. 64) proclaims corporate culture comprises one of the major obstacles for successful employment of APM methods. Management and leadership styles can be unaligned with APM, leading to resistance. Additionally, organizational commitment is necessary and often difficult to initially obtain (Cobb, 2011, p. 64). Qumer and Henderson-Sellers (2008, p. 1900) explain it is vital for a shared vision to be established to achieve project success. The absence of this key element is considered one of the main factors impacting project failure in software projects. Conforto et al. (2014, p. 30) identified numerous potential barriers for implementing APM methods. These challenges included distributed project teams, lack of full-time dedicated team members, the need for functional managers as the result of organizational structure, and difficulties ensuring high level of customer interactions. Misra et al. (2009, p. 1879) elaborate stating customer centric issues have a significant relationship with project success, especially related to customer commitment. Consequently, when adopting an APM method, if customer collaboration and commitment is not maintained, the project’s success may be at risk. Boehm & Turner (2004, p. 20) assert that scalability is a challenge in implementing APM methods, as there is tremendous scepticism regarding the use of APM for large projects (Batra et al., 2017, p. 380). Moreover, many have criticized APM methods use of minimal documentation, stating that this can lead to significant issues (Boehm & Turner, 2004, p. 20).

A summary of the benefits and challenges of APM can be found in Table 3 below.

<table>
<thead>
<tr>
<th>Benefits of APM</th>
<th>Challenges of APM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved Project Efficiency (time/cost/scope goals)</td>
<td>Unsupportive Corporate Culture</td>
</tr>
<tr>
<td>Higher Stakeholder Satisfaction</td>
<td>Management/ Leadership Styles</td>
</tr>
<tr>
<td>Improved Perceptions of Overall Project Success</td>
<td>Organizational Commitment can be Difficult to Obtain</td>
</tr>
<tr>
<td>Faster Project Delivery</td>
<td>Establishing a Shared Vision of Project Success</td>
</tr>
<tr>
<td>Useful for Controlling Project Costs</td>
<td>Highly Difficult for Distributed Teams/ Part-Time Dedicated Team Members</td>
</tr>
<tr>
<td>Improved Quality of Project Deliverable</td>
<td>Obtaining Customer Commitment</td>
</tr>
<tr>
<td>Improved Employee Morale</td>
<td>Scalability (use of APM for large projects)</td>
</tr>
<tr>
<td>Flexibility/ Adaptive PM approach</td>
<td>Serious Issues regarding Minimal Documentation</td>
</tr>
<tr>
<td>Reduced Rework</td>
<td></td>
</tr>
<tr>
<td>Means to Obtain Competitiveness/Innovation</td>
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</tbody>
</table>
As aforementioned, Scrum is one of the most widely recognized APM methods and is starting to be used in ERP implementation projects. In this section Scrum is reviewed from a theoretical perspective, as it will be later discussed from a practical point of view. The name Scrum was developed based on the rugby terminology scrummage, implying the restarting of a play after an interruption (Cobb, 2011, p. 3). Moreover, in a scrummage, to achieve the overall goal, collaboration and organization is required by all team members in a way that is self-managed (Cervone, 2011, p. 19). Similarly, the Scrum method requires intense collaboration amongst project team members. Scrum also relies on the use of flexible delivery and project deadlines, established and influenced by customer requirements or market needs. Relevant for flexible delivery, Scrum incorporates frequent revisions, made throughout the project lifecycle to adequately meet customer requirements (Schwaber, 1995, p. 10). Moreover, this method is centralized on timeboxes or iterations, referred to as “sprints” with fixed durations (Batra et al., 2017, p. 383; Schwaber & Sutherland, 2013, p. 7). There are two commonly used and published Scrum artefacts, the Product Backlog and the Sprint Backlog. As Scrum was developed for software development, this method includes a Product Backlog, which is a prioritized list of product requirements (Azanha et al., 2017, p. 130; Cervone, 2011, p. 21; Batra et al., 2017, p. 383). More specifically, a Sprint Backlog is used to prioritize which items from the Product Backlog will be delivered in the current sprint (Azanha et al., 2017, p. 130). The Scrum method involves three imperative roles; these are the Scrum Master, Product Owner, and Scrum Development Team. In this method, the Scrum Master plays a key role, responsible for ensuring compliance with Scrum practices, values, and rules (Azanha et al., 2017, p. 129; Cervone, 2011, p. 20). The Scrum Master is also responsible for protecting the Scrum team from interferences or requirement changes during sprints, facilitating the team in achieving its goal (Batra et al., 2017, p. 383; Bonassa, 2016, p. 192). The Product Owner maintains responsibility for managing the Product Backlog, maximizing product value by acting as the “voice of the customer” (Azanha et al., 2017, p. 129; Bonassa, 2016, p. 192; Cervone, 2011, p. 21). Finally, the Scrum team usually accounts for five to ten cross-functional members, working on the project on a full-time basis (Cervone, 2011, p. 20). The team is self-organized with the authority to decide how to obtain the objectives of each sprint including the planning, scheduling, and distribution of tasks (Azanha et al., 2017, p. 129; Batra et al., 2017, p. 383; Bonassa, 2016, p. 192; Cobb, 2011, p. 3; Schwaber & Sutherland, 2013, p. 4).

There are five main activities of Scrum: the Kick-off, Sprint Planning meeting, Sprint, Daily Scrum meeting, and Sprint Review meeting (Cervone, 2011, p. 20; Schwaber & Sutherland, 2013, p. 7). The Kick-off meeting occurs at the beginning of the project and provides an opportunity for defining the major project goals and highest priority items from the Product Backlog (Cervone, 2011, p. 20). In the Sprint Planning meeting, the Scrum team, Scrum Master and Product Owner collaboratively determine the goals of the upcoming sprint according to the Product Backlog. Additionally, the team develop a plan to achieve these goals. Together the sprint goals and plan, constitute the Sprint Backlog. The sprint begins following the Sprint Planning meeting and spans a maximum length of thirty days. During each sprint the Scrum Master ensures no outside interferences affect the work of the Scrum team, warranting requirements are not changed amid a sprint. Each sprint produces a useable and potentially releasable product, as incremental development is a key characteristic of all APM methods. Within each sprint, the Scrum Master and Scrum team gather for brief regular meetings, called the Daily Scrum. These meetings are intended to track progress, instil

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accountability and commitment (Cervone, 2011, p. 20; Schwaber & Sutherland, 2013, p. 9). Each team member addresses the following three questions at the beginning of every day:

- What did you do since the last Scrum?
- What are you doing until the next Scrum?
- What is stopping you getting on with your work? (Cervone, 2011, p. 20)

Lastly, the Sprint Review meeting concludes each sprint, where the Scrum team conducts a self-evaluation and presents the sprint delivery to the Product Owner. Additionally, the team identifies strengths and weaknesses in their team performance, outlining potential improvements for future sprints (Cervone, 2011, p. 21; Schwaber & Sutherland, 2013, p. 9). Figure 2 provides visual representation of the Scrum method, highlighting the key roles, artefacts, and practices.

![Scrum Method Diagram](Source: Adapted from Schwaber (2004))

**Figure 2:** Scrum method. Source: Azanha et al. (2017, p. 129).

### 2.4 Comparison of Traditional and Agile Project Management

This section compares the characteristics and Critical Success Factors of traditional and APM approaches.

#### 2.4.1 Comparison of Project Management Characteristics

Although there are a number of differences between traditional and APM approaches ranging from their techniques, frameworks, methods and practices, the core difference is found in the different mindset when implementing a particular approach (Dikert et. al, 2016, p. 88). Many differences in the two approaches lay in how the impact of change is perceived. Traditional methods try to minimize change by using rigorous upfront gathering of requirements and
analysis. Agile methods, on the contrary, view change through the project phases as not only unavoidable but also necessary to achieve innovation throughout the process by supporting individual and team initiative (Vinekar et. al, 2006, p. 32). Another important factor that determines the difference is the role of the customer in the project. While more traditional customers communicate their requirements using formal approaches, for successful project execution in APM, it is necessary for customers to possess CRACK characteristics (collaborative, representative, authorized, committed and knowledgeable) (Vinekar et. al, 2006, p. 39). Furthermore, in traditional PM approaches the role of the customer is crucial during the specification of requirements and in the final testing stages of project deliverables, but minimal in other activities. In agile approaches, on the contrary, it is necessary to have customers’ involvement throughout the entire project life-cycle by continuous collaborative decision making (Nerur et al., 2005, p. 75). Regarding the final delivery of the project, in traditional PM there is one big delivery at the end of the project life-cycle in the implementation/deployment phase (Boehm, 1988), while APM allows for frequent project deliveries throughout the entire project life-cycle (PMI, 2013, p. 44-45).

According to Batra et al. (2010, p. 389) the APM approach ensures project progress despite challenges caused by changes in scope, management and user requirements. In this way it eliminates the limitations of traditional approaches which can be very bureaucratic due to their command and control structures. Cram and Marabelli (2017, p. 2) emphasize the approaches being entirely different considering written documentation, changing product requirements, and customer contact and impact. Although this might indicate APM as being an unplanned and undisciplined approach, agile methods, such as Scrum and Extreme Programming, in fact emphasize a fair amount on planning. The difference is that agile methods put more value on the planning process than the resulting documentation, which can make them seem less plan oriented than they are in reality (Boehm, 2002, p. 64). While many researchers criticize APM approaches for lacking discipline, Betra et al. (2010, p. 390) found that the use of the agile method Scrum can, on the contrary, bring discipline into projects depending on the project characteristics and given context. Nerur et al. (2005, p. 75) stress the differences of the two approaches regarding the desired management style, organizational structure and knowledge management. While traditional PM focuses more on a command and control management style, creating explicit knowledge and mechanistic organizational structure with high bureaucracy and formalization; APM requires a collaborative leadership style, develops tacit knowledge and is suited for an organic organizational structure that encourages social and cooperative interactions.

Some of the key differences between agile and traditional PM industry are summarized in Table 4 below.
Table 4: Comparison of traditional and agile PM characteristics.

<table>
<thead>
<tr>
<th></th>
<th>Traditional Project Management</th>
<th>Agile Project Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning</td>
<td>Focus on careful planning, analysis and design</td>
<td>Iterative planning throughout the project life-cycle</td>
</tr>
<tr>
<td>Acceptance of change</td>
<td>Formal cost management and approvals approach to scope and requirements</td>
<td>Acceptance of change – changing user requirements throughout the project</td>
</tr>
<tr>
<td>Teams</td>
<td>Definitive and rigid project management and team roles</td>
<td>Self-managed, collaborative and cooperative teams</td>
</tr>
<tr>
<td>Project delivery</td>
<td>Fully completed product delivered at the end of the project timeline</td>
<td>Continuous and frequent delivery in functional stages</td>
</tr>
<tr>
<td>Customer involvement</td>
<td>At the beginning and end of the project</td>
<td>Throughout the entire project</td>
</tr>
<tr>
<td>Documentation</td>
<td>Formal and rigorous documentation</td>
<td>Minimal documentation</td>
</tr>
<tr>
<td>Communication and management style</td>
<td>Formal command, control and communication</td>
<td>Informal communication</td>
</tr>
<tr>
<td>Knowledge management</td>
<td>Explicit knowledge</td>
<td>Tacit knowledge</td>
</tr>
<tr>
<td>Desired organizational structure</td>
<td>Mechanistic (high formalization)</td>
<td>Organic (flexible and participative)</td>
</tr>
</tbody>
</table>

2.4.2 Critical Success Factors

Critical success factors reflect the internal and external factors that impact the adoption and effectiveness of a given PM approach (Conforto et al., 2014, p. 25).

Traditional Project Management Critical Success Factors

For traditional PM several factors are considered critical for successful project delivery. In his research Cooke-Davis (2002, p. 186) identified critical factors for on-time project delivery, many of which were centred on risk management. These factors included, adequate organizational training on risk management, adequate and up-to-date risk management plan, and mature processes for assigning ownership of risks. Regarding project delivery within budget, a mature scope change control process and maintaining the established performance measurement baseline were considered critical. Stakeholders’ expectations related to the project goals and benefits are widely recognized as necessary to deem a project successful. An established and effective benefits delivery and management process is also critical for this aspect of success. PMI (2013, p. 46) elaborates stating compliance with the defined project requirements and appropriate stakeholder engagement are vital for project success. White and Fortune (2002, p. 10) correspondingly identified clear project goals and objectives as one of the most critical factors for traditional PM to deliver a successful project. The processes and critical factors necessary for project delivery that is on time, within budget, and satisfies stakeholders’ expectations all require extensive documentation to ensure transparency, accurate measurement, and performance evaluation (Cooke-Davis, 2002, p. 188).
Furthermore, it is important that the competing constraints of the project’s schedule, budget, and scope be balanced to meet the specified project delivery (PMI, 2013, p. 46). Many researchers highlight the importance of management support and infrastructure for traditional PM to be effective (Boehm & Turner, 2004, p. 13; White & Fortune, 2002, p. 10). Senior and mid-level management must perceive processes as vital for project delivery and understand that avoiding these processes can lead to substantial budget and schedule risks. Similarly, traditional PM requires practitioners understand the need and importance of common process for both project and organizational success. This understanding is often embedded in the organizational culture (Boehm & Turner, 2004, p. 13). These participants must also actively support the processes, which can be achieved through theoretical and practical training (Boehm & Turner, 2004, p. 16). PMI (2013, p. 46) expand on this advocating that the project team must be able to select appropriate processes to achieve the project objectives. Regarding the necessary infrastructure, it is critical that an organization has adequate structure to support the development and maintenance of project related documents. This includes asset libraries, process training for project team members, an organizational knowledge-sharing system, and support staff whom manage the documentation (Boehm & Turner, 2004, p. 14).

**APM Critical Success Factors**

Conforto et al. (2014) identified 41 APM critical success factors, classifying these factors as organizational, process, project team, or project type and other related enablers (Table 5).

<table>
<thead>
<tr>
<th>Table 5: APM enablers. Source: Conforto et al. (2014).</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organization</strong></td>
</tr>
<tr>
<td>2. Organizational culture</td>
</tr>
<tr>
<td>4. Learning organization</td>
</tr>
<tr>
<td>5. Agile-style work environment</td>
</tr>
<tr>
<td>10. Knowledge management systems</td>
</tr>
<tr>
<td>11. Multidisciplinary teams</td>
</tr>
<tr>
<td>12. Resource competition</td>
</tr>
<tr>
<td>13. Strong executive support</td>
</tr>
<tr>
<td>14. Decentralized decision making</td>
</tr>
</tbody>
</table>

Boehm & Turner (2004, p. 20) suggest five critical successful factors for use of APM. First, maintaining close relationships with the project customer. This relates to the project type enabler of “customer involvement” (Conforto et al. 2014). Correspondingly, Misra et al. (2009, p. 1879) contribute customer collaboration, customer commitment, and customer satisfaction are all significantly related to project success. The second critical factor relates to the need for a highly motivated and knowledgeable project team. Boehm & Turner (2004, p. 20) explain, when using APM, team members must have the ability to retain and utilize tacit knowledge as documentation is kept minimal. This requirement is related to several organization and project team enablers, including “team knowledge about agile”, “team experience/expertise”, and “adequate reward for agile use” (Conforto et al. 2014). Lindvall et al. (2002, p. 203) expands upon this stating beyond knowledge, team members must also possess certain personal characteristics, including a collaborative attitude, willingness to learn, and sense of accountability. The third success factor is cultural acceptance of APM rationale, including managerial and executive commitment (Boehm & Turner, 2004, p. 20;
Špundak, 2014, p. 944). This requirement relates to many of the organization enablers, for example “organizational culture”, “agile-style work environment” and “decentralized decision making” (Conforto et al. 2014). Similarly, Misra et al. (2009, p. 1880) also identified corporate culture as a key success factor of APM. It was found that an environment of supportive management and commitment from all stakeholders was perceived as necessary to implement APM. Lindvall et al. (2002, p. 206) state that for APM to be successfully adopted and used, the organizational culture must support trust, rapid communication, collection of frequent customer feedback, and dynamic project requirement changes. Bossavit (2002, p. 8), further explain it is crucial that the corporate culture portray a willingness to reflect, learn, assess if changes are necessary, and act upon this assessment to ensure essential changes are made. The fourth factor regards project size, proclaiming APM is best suited for smaller projects. This requirement is the source of great debate, as some successful cases of APM use in large projects has been documented (Batra et al., 2017, p. 380; Boehm & Turner, 2004, p. 20). Finally, continuous process and improvement are considered critical for success. This requirement is closely related to process enablers, including “capability of reconfiguration”, “process modularity” and “frequent development milestones” (Conforto et al. 2014).

Misra et al. (2009) contribute two additional success factors. Through their research, they conclude that fast decision making is necessary for APM success in the context of software development projects. It is suggested that this is reinforced through fast and informal communication. In this research, reducing delivery time and time to market through the use of rapid decision making was considered highly important by the majority of survey participants, 84% (Misra et al. 2009, p. 1879). In addition, training and learning are considered key success factors in this research. It was highlighted that continuous, informal learning allows for knowledge sharing and distribution throughout an organization. Moreover, informal training was considered useful for knowledge transfer through discussions (Misra et al. 2009, p. 1881).

**Comparison Summary**

Evidently, there are distinct and common critical success factors for traditional PM and APM. Figure 3 provides a summary of the main distinct and shared critical success factors.
2.5 Hybrid Project Management Approach

The fast-changing technology, competitive business environments, uncertainty and ambiguity have forced the PM field to change in the recent years. The limitations of a rigid, structured PM approach have urged both academics and practitioners of seeking more flexible, innovative and beneficial ways of conducting projects, especially in the field of software development. Since the release of the agile manifesto in 2001, APM has become increasingly popular in its use and research. This has led to the introduction of a number of methods, techniques, tools and practices in the software development industry (Dingsøyr et al., 2012, p. 1213).

Although there are a number of benefits related to adopting an agile approach, the implementation of agile methodologies to large-scale projects and traditional organizations has been facing a number of challenges (Boehm & Turner, 2005; Conforto et al., 2014; Dikert et al., 2016; Nerur et al., 2005). This has resulted in a tendency of emerging hybrid approaches – a combination of both agile and traditional PM methodologies and practices (Boehm & Turner, 2004). In fact, a few industry surveys performed in the software development field indicate the use of both traditional and APM approaches in practice. According to the survey performed by Shine Technologies (2003), even those 96.4% respondents intend to adopt or continue to use agile methods, only 16% believe those methods are suitable for all projects.

As hybrid approaches are a relatively new research field, there have been opposing views of their usage and applicability. The ongoing debate between academics and practitioners alike involves the choice of the PM approach that would lead to maximizing project benefits and achieving project success. While some supporters of agile approaches advocate the universal applicability of its methods (Lindstrom & Jeffries, 2004; Vidgen & Wang, 2009), others believe they are only suitable in particular situations depending on the specific context (Boehm & Turner, 2004).

Hybrid approaches are becoming increasingly popular as a way of answering the common paradox between flexibility (agile approaches) and structure (traditional approaches). In order to respond to contradictory demands in the PM field, academics and practitioners are increasingly adopting a paradox lens (Smith & Lewis, 2011, p. 381). Through ambidexterity, organizations try to both explore and exploit in order to achieve the benefits of both (O’Reilly III & Tushman, 2013, p. 324). In the context of choosing a PM approach, agile principles and practices would qualify in the “explore” knowledge-area, while traditional practices and techniques would be grouped in the “exploit” knowledge-area (Cram & Marabelli, 2017, p. 3). In fact, an increasing number of researchers are adopting ambidexterity lens in the PM field (Cram & Marabelli, 2017; Vinekar et al., 2006). However, there is still a lack of empirical research aimed on understanding the benefits and limitations of combining the two distinct approaches (Conforto & Amaral, 2016, p. 2).

With the emergence of APM, the extensive use of hybrid approaches in practice has opened up a new field of theoretical research. Although there is no clear definition of a hybrid approach due to the scarce literature on the related topic, there can be a couple of explanations drawn from the PM and information systems literature. Cram and Marabelli (2017, p. 2) describe it as simultaneously using the benefits of both traditional and APM approaches, Batra et al. (2010, p. 379) characterize it as a balanced approach that is beneficial for ensuring both control and agility in achieving challenging and dynamic goals, while Vinekar et al. (2006, p. 31) view it as a solution for sustaining and harnessing the benefits of both PM
approaches. What can be drawn from all these explanations is that organizations seek to achieve benefits from both approaches and potentially improve the likelihood of project success. However, simultaneously implementing both agile and structured approaches in the same project, can lead to a wide range of challenges due to different and often contradicting principles and characteristics that are intrinsic to the individual approaches (Batra et al., 2010, p. 380).

2.5.1 Hybrid Project Management Factors/Characteristics

Both traditional and APM approaches have a number of project, organization and client characteristics in which one will work better and the other will experience difficulties in its adoption (Boehm, 2002, p. 64; Vinekar et al., 2006, p. 38). According to Boehm and Turner (2004, p. 55), there are five critical factors used to assess the suitability of the agile or traditional PM approach:

- the size of the project team;
- the consequences of failure (criticality);
- the degree of dynamism or volatility of the environment;
- the competence of personnel and;
- the compatibility with the established culture.

Furthermore, Vinekar et al. (2006, p. 38-40) determine the relevance of these factors across three levels: organizational, project and client organization. The most important factors from an organizational perspective are its culture and personnel that can present specific constraints when determining a PM approach. When looking at the project characteristics, it is important to take into account the size of the project team, criticality and dynamism. Finally, the client culture and ability to communicate their requirements could possibly be the deciding factors on which approach to choose.

While small co-located projects with changing environments are more applicable for agile approaches, large-scale, distributed projects with stable environments are more appropriate for traditional, plan-driven approaches due to more dependencies between projects and teams (Lindvall et al., 2004, p. 30). Additionally, organizational structures and cultures built on innovation may embrace APM approaches easier than those surrounded by bureaucracy and formalization (Nerur et al., 2005, p. 78).

Projects that combine a mix of agile and traditional characteristics could benefit from a hybrid approach which would combine both agile and traditional PM methods depending on the characteristics of the project and the specific context (Boehm, 2002, p. 64). Imani et al. (2017, p. 42) found that hybrid approaches are more scalable than APM approaches and are more applicable in large-scale projects with higher requirement uncertainties. However, contrary to conventional wisdom that as the size of the project increases, there should be more use of a structured approach (Boehm and Turner, 2004, p. 28), Betra et al. (2010, p. 381) found that large projects in specific situations such as time pressure and continuously evolving scope, could rarely be achieved by applying a pure traditional approach. The authors continue by indicating additional characteristics of projects, such as strategic importance, distributed and dynamic user requirements and organizational changes (Betra et al., 2010, p. 379). These characteristics represent distinctive challenges that neither traditional nor APM methods could effectively deal with individually, in other words they contribute towards the decision of choosing hybrid approaches. It is important to understand that depending on the
type and characteristics of a specific project, “agility” will be achieved under different conditions and circumstances. Therefore, Betra et al. (2010, p. 391) propose conceptualizing different types of agility, such as: strategic, design, process, and outsourcing agility.

Conforto et al. (2014, p. 30-31) identify potential barriers in adapting APM approaches in more “traditional” industries and companies, such as: the restriction of assigning full-time dedication project teams; challenge of co-locating all project team members; challenge of involving customers in the project, superficial involvement of the suppliers in the project, and the difficulty in creating large multidisciplinary teams. In conclusion, in these particular contexts, hybrid approaches could be more beneficial than applying a pure APM approach. Additionally, Vinekar et al. (2006, p. 33) stress the importance of organizations striking a balance between the two conflicting interests: agility and stability which again favour adopting a hybrid approach as it is necessary for organizational adaptation and stability is required for organizational optimization.

2.5.2 Hybrid Project Management Benefits

As with APM approaches, adopting hybrid PM approaches can lead to achieving certain benefits from the combined approaches, but at the same time be challenging in their implementation. As research on hybrid approaches is still in its infancy, authors tend to use exploratory in-depth case studies in order to examine their benefits, success rates and challenges. Cram and Marabelli (2017, p. 1) found that by adopting a hybrid approach, the analyzed project was able to continue exploiting traditional PM techniques that were performing well, abandon traditional techniques that were underperforming and integrate agile PM techniques in selected suitable areas. By combining a stage-gate model with agile practices, Conforto and Amaral (2016, p. 12) concluded that the utilization of a hybrid framework contributed in several performance aspects, such as information accuracy, commitment, and leadership. Based on a survey research, Imani et al. (2017, p. 42) found that hybrid approaches can improve project success rates, specifically in terms of cost. However, it is important to emphasize that these findings cannot be generalized on a larger scale due to the study limitations of using case studies but can be helpful for practitioners faced with similar project contexts and dilemmas of choosing the appropriate approach.

2.5.3 Hybrid Project Management Challenges

In practice, when adopting hybrid approaches, dual maxims can often be difficult to achieve which often leads to unavoidable trade-offs between the two approaches (Betra et al., 2010, p. 387). Using both approaches side by side is often viewed as problematical and challenging as it can cause tensions and clashes on all organizational levels (Dikert et al., 2016, p. 98). This is due to opposing assumptions and principles between the two approaches. Often the key issues in migrating to agile methodologies are grouped into: management and organizational, people, processes and technology (tools and techniques) (Nerur et al., 2005, p. 76). Furthermore, these challenges are even more visible when trying to adopt APM in traditional organizations. Boehm and Turner (2005, p. 30) identify development process conflicts, business process conflicts and people conflicts as the main challenges when implementing APM approaches in traditional organizations. Hybrid approaches can therefore also be viewed as transitional PM approaches for easing the adoption of APM methods (Gill et al., 2016, p. 2). However, although hybrid approaches can be viewed as transitional, these approaches are
not free of the prior mentioned challenges outlined by Boehm and Turner (2005, p. 30) and Gill et al. (2016, p. 2).

Table 6 provides a summary of the major benefits and challenges of using a hybrid PM approach.

Table 6: Benefits and challenges of hybrid PM.

<table>
<thead>
<tr>
<th>Benefits of Hybrid PM</th>
<th>Challenges of Hybrid PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of Effective Traditional PM Techniques</td>
<td>Difficult to Achieve</td>
</tr>
<tr>
<td>Abandon Ineffective Traditional PM Techniques</td>
<td>Can Cause Tension on All Organizational Levels</td>
</tr>
<tr>
<td>Integration of Suitable Agile PM Techniques</td>
<td>Blending of Opposing Assumptions/Principles</td>
</tr>
<tr>
<td>Improved Information Accuracy</td>
<td>Development Process Conflicts</td>
</tr>
<tr>
<td>Improved Commitment</td>
<td>Business Process Conflicts</td>
</tr>
<tr>
<td>Improved Leadership</td>
<td>People Conflicts</td>
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<tr>
<td>Higher Project Success Rates</td>
<td></td>
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<tr>
<td>Reduced Project Costs</td>
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</tbody>
</table>

2.5.4 Hybrid PM Approaches in Practice

In practice, the majority of companies tend to use a combination of traditional and APM approaches. The scarce literature on the topic has led academics to recommend and test the performance of certain hybrid frameworks as a way of partially closing the gap between theory and practice. Vinekar et al. (2006, p. 36) suggest adopting an ambidextrous organizational structure through developing independent capabilities in both traditional and APM approaches, but then selecting one pure approach depending on the project, organization, client characteristics, and culture. While the authors propose simultaneously achieving both agile and traditional PM benefits, they fail to address the possibility of combining both approaches in a single project. Betra et al. (2010) and Cram & Marabelli (2017) touch upon companies that simultaneously integrate different PM practices of both traditional and APM approaches within the same project. They conduct this research by an analysis of which agile and which traditional principles and practices are used within the same project.

Boehm (2002, p. 68) suggests balancing agility and discipline through assessing a project’s risk exposure. Conforto & Amaral (2016, p. 4) propose combining a stage-gate model (traditional PM approach) with iterative development (APM approach) in order to balance discipline and flexibility for highly dynamic and innovative project environments. Binder et al. (2014, p. 182) present a cocktail model that balances the structure of traditional PM approaches with the flexibility of APM. The model uses ISO standards with a combination of agility required to adapt to changing requirements and uncertainties. Gill et al. (2016, p. 1) introduce an innovative context-aware hybrid adaptive methodology by using reference architecture elements for a particular situation. This proposed model helps in the tailoring and adoption of an APM approach.

The emergence of APM methodologies has consequently divided the software development community in opposing spectres of “traditionalists” and “agilists” (Nerur et al., 2005, p. 74). A more balanced view is offered by a few who claim that no single methodology can be
universally applied to all projects. Thus, agile and traditional PM approaches need to be tailored and integrated with an attempt of supporting specific project characteristics (Mahanti, 2006, p. 200).

### 2.6 ERP Implementation

Globalization and dynamic environments have led to increasing pressure from customers, shareholders, and suppliers towards contemporary organizations to continuously improve their products and services through quickly and cost-efficiently responding to change (Ranjan et al., 2016, p. 398). Consequently, the use of efficient information systems and technology has not only become a source of competitive advantage, but also a threshold criterion for organizational survival. In response, many organizations are utilizing Enterprise Resource Planning (ERP) systems (Baykasoglu and Gölçük, 2017, p. 256); at the same time vendors are taking advantage of emerging technologies as a way of improving ERP systems with the goal of supporting the end-customer through the challenges of today’s global environment (Ranjan et al., 2016, p. 398).

Therefore, an effective business strategy should focus on an aggressive and efficient use of information technology. This has led to the emergence of ERP systems becoming the core of successful information and business management, as well as being the “enterprise backbone of an organization” (Baykasoglu & Gölçük, 2017, p. 256). ERP systems are software packages that integrate, centralize and automate a company’s information, including its operating processes by providing a means of enhancing competitive advantage, increasing responsiveness towards customers, supporting strategic initiatives and improving decision-making and controlling processes (Baykasoglu & Gölçük, 2017, p. 256; Gargeya & Brady, 2005, p. 502; Sowan & Tahboub, 2015, p. 191). They present software solutions capable of integrating all commercial operations of a company regardless of its size, diversity or geographical dispersion (Parr & Shanks, 2000, p. 1). Depending on the customer’s requirements they can consist of the following modules: Human Resources (HR), Inventory, Sales & Marketing, Purchase, Finance & Accounting, Customer Relationship Management (CRM), Production and Supply Chain Management (SCM) (Ganore, 2013).

ERP systems present major projects demanding considerable amounts of resources, commitment, adjustments and change throughout the organization. As the ERP implementation is a complex and active process, which involves both technological and organizational interactions, it is often the single largest project the organization has ever taken part in (Moon, 2007, p. 243). Therefore, the implementation of an ERP project can be very risky, time consuming and expensive. It is very common for these implementation projects to overrun the budget and timeline, while failing to deliver the expected benefits at the same time (Zare Ravasan & Mansouri, 2016, p. 65). In fact, according to studies there is more than a 70% ERP system failure rate and 35% of ERP implementations end up being cancelled, with the remaining 65% of them resulting in cost and scheduling overruns (Amid et al., 2011, p. 228). Consequently, due to their complexity, high implementation costs, and change management challenges, although they are strategically important for organizations, they also present a high risk. Hence, there is a necessity of selecting ERP software that fits the organizational goals, objectives, and expected benefits of successful implementation (Ranjan et al., 2016, p. 390).

Although the market of ERP software vendors is vast, the market leader in terms of ERP related revenue is SAP, followed by Microsoft Dynamics, Oracle and Infor respectively (Quirk, 2017; SAP, 2017). These providers offer a number of software and software related
solutions such as: ERP, cloud and data platforms, analytics tools, and their respective combinations. The field of ERP is becoming more mature with the integration of emerging technologies, such as social media, mobility, analytics, and cloud (Ranjan et al., 2016, p. 400). These technology advancements have caused leading market providers to offer more innovative and appealing solutions to their customers. The impact of the digital economy has encouraged SAP to launch SAP Hana, Oracle to offer Oracle Database In-Memory, and Microsoft Dynamics to launch Microsoft Dynamics 365. All of these products are aimed at connecting different legacy systems, delivering more business intelligence, and simplifying a company’s IT environment (SAP, 2017; Oracle, 2017; Microsoft Dynamics, 2017).

2.6.1 ERP Critical Success Factors

Due to ERP projects’ complexity and a mixture of technological and organizational interactions, there is typically no single cause responsible for “failed implementation”. Similarly, there is no individual reason attributed for a successful ERP implementation (Gargeya & Brady, 2005, p. 501). Nagpal et al. (2015) stress the importance of recognizing the ERP Implementation Strategy as a critical success factor. One of the key strategic choices when implementing ERP is choosing the appropriate ERP methodology. Typically, the ERP Implementation Strategy should provide the big picture, the goals and objectives of what the ERP system is trying to achieve, while the ERP implementation methodology should complement it, be aligned with the overall ERP strategy (Nagpal et al., 2015).

Fui-Hoon Nah et al. (2001, p. 288) identified 11 factors critical for ERP implementation success, being: project teamwork, change management and culture, top management support, business plan and vision, Business Process Reengineering (BPR) and minimum customization, effective communication, PM, monitoring and evaluation of performance, adequate testing, project champion, and appropriate business and IT legacy systems. These factors are closely related to the ERP methodology used in the project implementation, as well as the organizational culture, mindset, and strategic importance of the respective project. Gergeya and Brady (2005, p. 510) emphasize the importance of the project team, the necessity of being fully dedicated to the project, and having no other responsibilities within the company. Fui-Hoon Nah et al. (2001, p. 289) stress the significance of personnel competence, explaining the importance of employing a cross-functional project team, consisting of the most knowledgeable people in the organization. Reinforcing a “team environment” often becomes a critical factor in the overall success of the ERP implementation (Gergeya & Brady, 2005, p. 511). Change management and culture is tied with dealing with organizational diversity, understanding the differences in organizational culture and ways of doing things (Gergeya & Brady, 2005, p. 512). According to Gergeya and Brady (2005, p. 511) training and internally preparing employees for change are key success factors of an ERP implementation. This is especially true when the project team is unfamiliar with the planned ERP methodology. Furthermore, this closely relates to the attitude of senior managers towards the project. Generally, successful implementation is only achievable when top management is strongly committed to the project (Gergeya & Brady, 2005, p. 510). The attitude of top executives will have an impact on the perception of the project on all organizational levels. Having a clear business plan and vision of the strategic and tangible benefits, resources, costs, risks, and timeline is closely related with clearly specifying and maintaining an organization’s objectives and scope (Gergeya & Brady, 2005, p. 509; Nah et al., p. 291). Good project management regarding defining and maintaining the scope, setting milestones, planning, budgeting, monitoring and evaluating performance are essential for ERP implementation success (Gergeya & Brady, 2005, p. 512; Fui-Hoon Nah et al., p. 292). Finally, adequate
testing, troubleshooting, and fixing the problems in a timely manner are essential factors for ERP implementation success (Gergeya & Brady, 2005, p. 513; Nah et al., p. 294). The importance of the entire team involvement, from the vendors and organizational units to the top management is further emphasized in this stage. It is of crucial importance to assess these factors when establishing a PM approach and ERP methodology for the implementation of an ERP project.

2.6.2 ERP Implementation Challenges

As ERP implementation affects the entire organization, from its processes, people and culture, there are a number of challenges companies can face when implementing ERP systems. Through an extensive literature review, Ranjan et al. (2016, p. 390) grouped the main ERP implementation challenges into four categories: technology selection, change management, knowledge management and emerging technologies. In order to make an organization and ERP system compatible, it is often required for these organizations to make necessary changes. Changing business processes will require people to change as well. In fact, most frequently ERP failures are caused by people rather than technological factors (Ranjan et al., 2016, p. 394). Therefore, it is not surprising that the most common ERP implementation failure factor done on a case study of SAP implementation was reported to be the “readiness for change” (Gargeya & Brady, 2005, p. 511). Organizations are facing challenges of being up-to-date with the newest trends and improvements offered in the ERP industry, but also being aware of the importance of choosing solutions that are in line with their overall organizational strategy, structure, culture, and operations (Ranjan et al., 2016, p. 390-399). Finally, not only are ERP solutions evolving, but there have also been significant changes in the ERP implementation methodologies and models used moving from more traditional towards agile approaches. The main goal of an organization should therefore be to choose an ERP implementation methodology that leads to cumulating higher operational efficiency and effectiveness in order to maintain its competitiveness (Ranjan et al., 2016, p. 400).
3. Methodology

The Methodology section of this report provides a detailed description of the performed research explaining the research context of the study, undertaken research philosophy, followed by an established research orientation and research design.

3.1 Research Context

This section explains the research context of this thesis. While the importance and relevance of ERP and ERP implementation in general was addressed in the theoretical background of the section 2.6 “ERP Implementation”, this section intends to provide a more detailed overview of the researched context – ERP implementation methodologies with a focus on SAP methodologies used when implementing ERP solutions.

3.1.1 ERP Implementation Methodologies

There are no clearly defined guidelines of an ERP implementation strategy or a ground based methodology that has been widely accepted and tested (Kraljić & Kraljić, 2017). The choice of the strategy and its accompanying ERP implementation methodology is usually determined by the specific characteristics, business goals, and objectives of the company (Nagpal et al., 2015). The two most commonly identified ERP implementation approaches are the “big bang” and “phased” approach (Fetouh et al., 2011; Nagpal et al., 2015). The big bang approach implements all ERP modules in one go. In contrast, the phased approach utilizes a number of iterative cycles for this process. As the big bang approach uses distinct phases, it can also be compared to the waterfall approach. In this manner, once a phase is completed there is no possibility of returning back to the previous phases. On the other hand, the phased approach focuses on delivering functionalities during the entire life-cycle of the project through a series of relatively short, iterative cycles. Consequently, this approach could also be compared to the agile or incremental approach (Fetouh et al., 2011, p. 174). The same authors additionally propose using a hybrid approach to eliminate the disadvantages of the two individual approaches by having the incremental characteristics of the agile approach but instead of implementing module by module, the approach should add sub-steps in the form of cycles. Within these cycles, ERP implementation is carried out sequentially generating project deliverables at the end of each cycle according to the big bang approach. However, unlike the big bang approach that delivers the entire project at the end of the project life-cycle, the hybrid approach utilizes characteristics of the phased approach by delivering functionalities throughout the project using cycles (Fetouh et al., 2011, p. 177).

Parr and Shanks (2000, p. 2) categorize ERP implementation approaches depending on the required extent of customization needed, into: “comprehensive”, “middle road” and “vanilla” starting from the most to the least customization required respectively. Nagpal et al. (2015) propose classifying ERP implementation approaches into: custom-made, vendor-specific and consultant-specific. All of these approaches, especially vendor-specific have been embedding APM practices and techniques in their offered methodologies, such as the leading providers of ERP solutions: SAP, Oracle and Microsoft Dynamics (Kraljić & Kraljić, 2017; Nagpal et al., 2015). This paradigm shift in incorporating APM practices and techniques in ERP implementation methodologies shows how APM practices are also being used for projects outside of their primary software development domain. However, there are opposing views in
the ERP industry on whether to incorporate APM principles and practices. Those in favour believe that if ERP implementation projects are carried out entirely using a traditional PM approach, the lengthy testing is carried out at the very end rather than incrementally through the life-cycle of the project, which can lead to a number of detected errors and change requests. This consequently, leads to significant project overruns. Therefore, incorporating agile practices can speed up the ERP implementation process and increase the overall user acceptance and customer satisfaction levels (Kraljić & Kraljić, 2017). As this is still a recent change in the rooted traditional methodologies used in ERP software implementation, many view APM methodologies as “riskier” and as having inadequate control of the total cost. There is a certain perception of APM methods being undisciplined, unplanned and un governable due to decreased documentation requirements (Oberstar, 2016).

When comparing the most widely used vendor-specific methodologies SAP Activate, SAP’s Accelerated (ASAP), Oracle’s Unified Method (OUM) and Microsoft Dynamic’s Sure Step Methodology, it can be concluded that although the methodologies use different names, the number of phases is either similar or the same. Consequently, these methodologies consist of comparable steps and deliverables across the project life-cycle. Nagpal et al. (2015, p. 3) provide a comparison of the key steps and phases of the vendors’ methodologies. In Table 7 it is evident that the phases of the vendor-specific methodologies closely follow the process groups of a project life-cycle as identified in the PMBOK (PMI, 2013, p. 26-27).

Table 7: Comparison of vendor-specific ERP methodology phases. Adapted from Nagpal et al. (2015).

| PMBOK              | SAP Activate | SAP ASAP       | Oracle OUM | Microsoft Dynamics Sure Step |
|--------------------|--------------|                |            |                              |
| Initiating         | Prepare      | Project Preparation | Inception | Diagnostic                    |
| Planning           | Explore      | Business Blueprint | Elaboration| Analysis Design               |
| Execution Monitoring & Controlling | Realize      | Realization    | Construction | Development                   |
| Closure            | Deploy       | Final Preparation Go Live & Support | Transition | Deployment                     |
|                    |              | Run            | Production | Operation                     |
3.1.2 SAP Methodologies

As mentioned in the previous section, although the phases are called differently in various ERP implementation methodologies, they involve similar steps and deliverables. Therefore, the authors decided to focus on one vendor of ERP solutions in order to develop an in-depth understanding of the methodologies used. SAP is the market leader in enterprise application software offering a wide range of software solutions with its business core in ERP and digital solutions. It was founded in Germany in 1972 by five entrepreneurs who had a vision of the business potential of technology. Forty-five years later, SAP provides software solutions to more than 365,000 customers worldwide and it has locations in more than 130 countries (SAP, 2017). With the launch of SAP S/4 HANA, the next generation of enterprise software in 2015, SAP showed it is a pioneer in creating new, innovative solutions that are in line with the fast-moving industry, technology trends, and increasing customer demands. Consequently, this was followed by the release of a new ERP implementation methodology, SAP Activate, which was to gradually replace the widely used SAP ASAP and SAP Launch targeted for cloud deployments. It is important to emphasize that all of these methodologies are aligned with the best practices recommended by the PMI. SAP Activate is more of a framework than a methodology as its main cornerstones are: “Best practices”, “Guided configuration” and “Methodology” (Goncalves, 2017).

The main goal of SAP Activate is to provide customers with “best practice” solutions and agile PM practices and techniques which would significantly accelerate time to value and lower the costs of the implementation process. SAP has already been incorporating APM practices and techniques as part of the ASAP methodology. However, as they were in the form of an optional Agile Add-on, SAP Activate is the first methodology incorporating “Agile built” as one of the key principles of its methodology. In this sense, creating a truly hybrid approach – blending of both traditional PM and APM practices. The methodology focuses on key deliverables in each phase, which are part of the standardized work breakdown structure (WBS). The methodology is composed of four critical project phases with the main activities (Zamfir, 2017) shown in Figure 4:

1) **Prepare**: Initial planning and preparation activities, such as defining the project goals, a high-level scope, developing project governance procedures, establishing and documenting initiation activities in a project charter.

2) **Explore**: Capturing, prioritizing and documenting user requirements and identifying any gaps between the requirements and offered “best practice” solutions in a Backlog document.

3) **Realize**: Involves time-limited and iterative processes (sprints) for incrementally building and testing the complete solution. This information is captured in the Product Backlog. This phase is based on the Scrum APM methodology. It consists of five main activities: Sprint Planning, Sprint Realization, Daily Scrum meetings, Sprint Review and Sprint Retrospective. Although it is suggested to execute this phase using a pure APM, the methodology provides flexibility in case the company and/or context is not suitable for such an approach. In this case, it proposes adapting the phase by adopting a hybrid approach which uses cycles.

4) **Deploy**: Finalizing the solution and its supporting tools and processes for production “go-live” through resolving any open issues, conducting system tests, and proceeding with cutover activities, including data migration.
3.2 Research Philosophy

In order to select an appropriate research design, it is necessary to locate the researched work in a particular research paradigm, in other words to clearly articulate a research philosophy. O’Gorman and Maclntosh (2015, p. 51) propose a structured way of formulating a research philosophy by using the Methods Map which guide the researchers through developing a research paradigm through the branches of ontology and epistemology, followed by rhetoric and axiology. The determined philosophical position will determine what can be regarded as legitimate knowledge and will help in formulating and shaping the research design of the thesis (Williams & May, 1996, p. 69).

3.2.1 Ontology

Ontology is the study of reality or being, in other words it is a philosophical stance which can broadly be divided into two perceptions of reality: objective and subjective (O’Gorman & Maclntosh, 2015, p. 55). While an objective ontological perspective assumes reality being independent of our comprehension of it; a subjective perspective views reality as a mixture of perceptions and interactions of living subjects that shape reality. A subjective ontology focuses on understanding the studied phenomena through considering variables such as behaviours, attitudes, experiences, and interpretations and is therefore largely used in the research of social sciences (O’Gorman & Maclntosh, 2015, p. 56-58).

As the research focuses on exploring and understanding the use of a hybrid approach in a specific context of ERP implementation, the ontological approach that better fits the purpose of this study is the subjective perspective. In order to study the theoretical concepts from the literature review in a practical setting, analyzing the views and perceptions of practitioners on the benefits and limitations, and the applicability of PM practices in certain contexts, the use of a subjective ontology stance is essential. The opinions, perceptions and experiences of “experts” in the field are crucial in providing an answer to the research question and research
objectives. Therefore, their perceptions are essential in shaping reality and understanding the context of this research. In other words, “when?” and “why?” a certain ERP implementation methodology is used greatly depends on the opinions, perceptions, behaviours and interactions of the participants involved in the process.

3.2.2 Epistemology

Epistemology is the study of knowledge; it is a branch of research philosophy that shows the stance of constituting reliable knowledge. There are four main epistemological positions used in the area of social sciences: positivist, critical realist, action research, and interpretivist (O’Gorman & Maclntosh, 2015, p. 58-59). Generally, an objective ontology will typically lead to a positivist epistemological approach to knowledge, while a subjective ontology will tend to be driven by an interpretivist epistemology. While positivism focuses on explaining facts and causalities (Saunders et al., 2009, p. 119), interpretivism seeks to understand what is happening in a given context rather than focusing solely on its measurables (Klein and Myers, 1999, p. 69).

Following a subjective ontological stance, an interpretivist paradigm is aligned with the objectives this research aims to deliver. This is consistent with the research focus of understanding the utilization of a hybrid approach in a specific context. In order to deliver valuable results, the study seeks to understand the perceptions, meanings, interpretations and interactions that occur when implementing a complex project such as an ERP software solution. Valuable practical implications and complementing and/or contradictory results compared to theory could only be achieved through using an interpretivist epistemological paradigm as the research is focused on the perceptions and opinions on how ERP implementations are carried out in practice – the best practice methods. Therefore, in explaining such a complex phenomenon as ERP implementation, subjective experiences, opinions and practical implications of participants should be considered.

3.2.3 Rhetoric

Rhetoric is the study of language, how it can be used effectively and persuasively. Depending on the epistemological stance chosen for the research context, different styles of writing might apply (O’Gorman & Maclntosh, 2015, p. 67). Underpinning an interpretivist philosophical stance towards the research study, the tone of the thesis will emphasize the evolving decision making throughout the entire research process: the literature review, data collection and data analysis. As one of the main purposes of this research is to bridge theory with practice, highlighting the evolution of findings throughout the theoretical section, data collection and analysis, and finally connecting the findings with the theory in the discussion section, will lead the reader towards making his/her own conclusions and insights about the topic.

3.2.4 Axiology

Axiology is the philosophical study of values. In terms of the research methodology, it informs the reader of any potential biases the researchers bring to the research project (O’Gorman & Maclntosh, 2015, p. 69). As this thesis takes an interpretivist epistemological approach when analyzing the social interpretations and perceptions of the used ERP implementation methodology, it is common for certain bias and value-led decisions to occur.
However, the importance of the researchers being as objective and neutral as possible in the analysis and interpretation of the research should be emphasized (O’Gorman & MacIntosh, 2015, p. 66). Therefore, although certain biases exist and will occur during the research process, it is important for the researchers to acknowledge their existence and develop a plan on how to deal with them and minimize them as much as possible. The first bias the authors encountered was in the idea generating and developing stages of the thesis. Based on previous PM knowledge, the authors critically questioned the applicability of APM techniques and practices in certain situations and contexts. Being aware of the limitations of traditional PM methodology, their initial perception was that combining elements of the two approaches could potentially deliver improved project results. Although the findings from an extensive literature review support this view, the authors made sure to incorporate opposing academics’ perceptions of using PM methodologies in order to give the reader a broad and critical overview of the topic. Further on, certain biases were encountered after performing the theoretical background. After reading a large number of articles on the related topic, the authors had a general idea of the main drivers, characteristics, benefits and challenges of using hybrid approaches, compared to “pure” traditional PM or APM approaches. As the nature of the research is exploratory, in order to develop new findings in the context of ERP implementation methodologies, in-depth interviews were performed using open-ended questions. The authors took great caution not to lead the participants in answering a certain way by only offering clarifications and examples, when requested by participants. To mitigate any potential biases and subjectivity in the data analysis, which could consequently influence the findings and conclusion of the research, the authors adopted a rigorous method to ensure maximum transparency. Therefore, the data analysis phase involved extracting and developing “in vivo” codes from the interview transcripts for the concept categorization instead of solely relying on the researchers’ interpretations of the interviews.

3.3 Research Orientation

The Research Orientation section intends to clearly outline how the research philosophical stance of this study aligns with the research design selected. Gephart (2004, p. 457) advocates that consistency between the research paradigm, orientation, and design is vital to produce data and analyses that fulfils the necessities of theory and the intended research goals. In this section the research approach, purpose and strategy are discussed and justified in depth.

3.3.1 Research Approach

There are two broad approaches to research, inductive and deductive. Generally speaking, an inductive approach is most often used for qualitative research and a deductive approach for quantitative research (O’Gorman & MacIntosh, 2015, p. 71; Saunders et al., 2008, p. 124). Moreover, the inductive approach tends to align with an interpretivist epistemology, where deductive aligns with a positivist epistemology, although this is not always the case. An inductive approach to research involves the collection of data and development of theory from the researcher’s data analysis, often referred as “theory building”. Often this research approach is focused on understanding the context in which events or behaviours occur (Saunders et al., 2008, p. 124). The inductive research approach is characterized by greater flexibility that involves the evolution and fine-tuning of the research emphasis throughout the research process. This approach involves the acknowledgement that the researchers are contributors and collaborators in the research process. Finally, inductive research involves understanding participant’s perceptions and the meanings they attach to events or behaviours.
In contrast, a deductive approach is considered well suited for research where hypothesis are developed and rigorously tested. This approach requires the researchers to precisely outline how the concepts, variables, and relationships will be measured (Saunders et al., 2008, p. 124). Moreover, a deductive approach requires a very specific research question, as the research will need to verify or falsify their hypothesis, following data collection and analysis. This is often considered “theory testing” (O’Gorman & MacIntosh, 2015, p. 156). Due to the nature of deductive research a large sample is required to produce meaningful results. In contrast, the use of small samples is considered more appropriate when adopting an inductive research approach. In this sense, inductive research has been recognized as having less concern for the generalization of research findings (Saunders et al., 2008, p. 126-127).

This study adopts an inductive approach to the research. Through the critical review of current literature and analysis of the data, theories about the use of hybrid approaches in the specific context of ERP implementation were developed. Additionally, as this research was concerned with the opinions and perceptions of experts in the specific field, an inductive approach was most appropriate. Similarly, this research intends to develop an understanding of the perceived benefits and limitations of hybrid PM approaches, as well as the company specific characteristics considered when using a hybrid approach in ERP implementation projects. The researchers undertook an active role in the research, co-creating data through semi-structured interviews. Lastly, as this research utilizes an interpretivist epistemology and qualitative research strategy, an inductive approach was justified.

3.3.2 Research Purpose

Research purpose conveys the reason the particular research is relevant and necessary, while emphasizing the overall research vision. Exploratory research is conducted when there is a lack of knowledge and literature. Consequently, this type of research is often used to build theory, through inductive methods to tackle the research gap (O’Gorman & MacIntosh, 2015, p. 82). The overriding purpose of this research was to provide exploratory data that can drive future quantitative research (O’Gorman & MacIntosh, 2015, p. 118). This research was exploratory in nature, as it aimed to develop new insight on how hybrid PM is being applied to ERP implementation projects in practice. As there is a clear research gap regarding the application of hybrid approaches specifically to ERP implementation, this research aimed to generate a better understanding of the topic. Moreover, this research was exploratory, in that it involved the investigation of the phenomena of hybrid PM being used in practice (Robson, 2002, p. 59). The researchers showed openness to change in the research, acknowledging and analyzing new insights arising from the data (Saunders et al., 2008, p. 140).

3.3.3 Research Strategy

There are two general research strategies, qualitative and quantitative. Qualitative research involves the assessment and interpretation of subjective behaviours, attitudes, and opinions (Krishnaswami & Satyaprasad, 2010, p. 7; Walliman, 2005, p. 271). Qualitative research tends to align well with the interpretivist epistemology and an inductive research approach (O’Gorman & MacIntosh, 2015, p. 88; Saunders et al., 2008, p. 126). This research strategy utilizes research methods such as interviews, case studies, or observations (O’Gorman & MacIntosh, 2015, p. 77). In contrast, quantitative research is grounded in statistical knowledge (Gephart, 2004, p. 455) and involves defining variables in operational terms and measuring...
the relationship between variables (Krishnaswami & Satyaprasad, 2010, p. 6). Quantitative research most often aligns with the positivist epistemology and a deductive approach (Saunders et al., 2008, p. 126). This research strategy employs methods like surveys and questionnaires (O’Gormon & MacIntosh, 2015, p. 77).

The qualitative strategy was adopted in this research, as this study was concerned with the context of certain behaviours and decision making (Saunders et al., 2008, p. 126). This research strategy was necessary to depict and understand the behaviours and processes that occur in a real-life organizational context (Gephart, 2004, p. 455). Additionally, qualitative research was most appropriate as the research investigated the subjective opinions or “soft” personal data of experts (Walliman, 2005, p. 271). Moreover, the qualitative research strategy also aligned well with the aforementioned interpretivist epistemology and inductive approach of this study. The researchers took an iterative approach to the research, developing and modifying their emergent research question based on a thorough literature review and collected data (Gephart, 2004, p. 459). Finally, as this research intended to advance the research field and provide meaningful contributions for practice of a rather unexplored topic, the qualitative strategy provided the greatest potential (Gephart, 2004, p. 461).

3.4 Research Design

The main purpose of formulating a research design is to turn the formulated research question into a concrete research project (Robson, 2002). The decision of choosing specific research designs and methods will be influenced by setting a clear research philosophy and orientation in the previous sections including the research approach, research purpose and research strategy (Bryman & Bell, 2008, p. 39). This section will determine the main research choice and methods used for the data collection and analysis, additionally tackling the issues of the ethics of research design and research verification.

3.4.1 Research Methodology

The main choice when determining a research design was the selected research orientation: having an exploratory research purpose, using an inductive research approach and deploying a qualitative research strategy. According to Saunders et al. (2009, p. 145-150) there are three main types of research methodologies suitable when using inductive and qualitative research: case study, ethnography and grounded theory. While ethnography is a research methodology with the main purpose of describing and explaining the social world and involves the immersing of the researcher in that social world, grounded theory is particularly important in predicting and exploring behaviour with an emphasis on “theory building” (Saunders et al., 2009, p. 148-149). A case study is an empirical and in-depth research methodology investigating a contemporary phenomenon within its real-life context while using multiple sources of evidence (Robson, 2002, p. 178; Yin, 2009, p. 18). As the main purpose of the thesis is to gain a rich understanding of the research context of the usage of hybrid methodologies in the ERP implementation context and the specific characteristics and circumstances of their possible applicability, as well as their benefits and potential limitations, the authors found a case study methodology to have the highest value in conducting this research. Additionally, a case study was the most appropriate due to the time constraint of two months the authors encountered for this specific study and the exploratory nature of the study aiming to develop initial results which could be further developed in future research. A case study can generate the answers to the following questions: “Why?” as well as “What? and “How?” (Saunders et al., 2009, p. 146). Therefore, case studies can be used for both
exploratory and explanatory research purposes which fit the determined research purpose of this thesis. Additionally, the case study enabled testing the theoretical contributions of traditional PM, APM, and hybrid PM approaches in a practical context of ERP implementations, while also providing potential areas for future research.

According to Yin (2009, p. 47), there are two dimensions of case studies: single case vs. multiple case and holistic case vs. embedded case. The authors decided to apply a single case study research strategy in order to conduct an in-depth, qualitative data collection of the information required. In the beginning, a multiple-case study strategy on the three market leaders in the ERP industry: SAP, Oracle and Microsoft Dynamics, was considered. However, after a comprehensive literature review and analysis of secondary data, such as websites and internal documents, it was found that all the competitors use similar ERP implementation methodologies. Although the phases of their implementation methodologies’ life-cycles are named differently, they are similar in their content and steps that need to be undertaken in each phase (see section 3.1.1 ERP Implementation Methodologies). Most importantly, all three competitors have been incorporating APM principles and practices into their methodologies creating in a way customizable, hybrid PM methodologies to keep up with the industry trends and increasing customer demands (Nagpal et al., 2015). Considering these methodology similarities, a single case study was undertaken in order to develop an in-depth understanding of the use of a hybrid methodology in practice. Considering the unit of analysis, the research employed a holistic case study approach as the study had a single unit of analysis. The units of the analysis were “SAP ERP implementation methodologies”. Although the main unit of the analysis was the newest established SAP methodology, SAP Activate, which uses elements of both traditional PM and APM practices, other methodologies, such as SAP ASAP was also considered to develop a rich understanding of the applicability of the methodologies in certain contexts and companies. The data for the analysis was therefore gathered from individuals, experienced practitioners, working in the field of SAP ERP implementations.

3.4.2 Data Collection Method

There are a number of research methods that can be used when conducting case studies, such as: documents, archival records, interviews, direct observation, participant observation, physical artefacts, surveys and websites (O’Gorman & Maclntosh, 2015, p. 86). The main method used for data collection in this research was interviews. Initially a critical review of current literature was conducted to establish an understanding of hybrid approaches in PM and the methodologies of ERP implementation. In-depth interviews were than conducted with experts in the field. Additionally, an analysis of company documents was conducted to derive a comprehensive understanding of the SAP Activate methodology and further strengthen the results of this research.

A comprehensive literature review was necessary to develop the research question of the study, interview guideline, and potential themes for data analysis. As mentioned in the research orientation, the research question was developed in an iterative way to reflect the literature and data collected. The interview guideline (see Appendix 1) was directly designed to achieve the research objectives of the study and provide some direction for the interviews. Moreover, the pre-established interview guideline ensured critical points were discussed and increased the reliability and scope for comparability between the interviews. The interview questions themselves, follow a funnelling approach, beginning with general and open questions, gradually becoming more specific as the interviews progressed (O’Gormon &
MacIntosh, 2015, p. 119). Lastly, a literature review was critical for the researchers to develop knowledge on the research topic to effectively conduct semi-structured interviews (Saunders et al., 2009, p. 328).

A convenience sample was utilized for this research due to time and resource limitations. Participants were contacted via networking and those who fit the sample criteria were asked to participate. The sample for this study was professionals with current and/or previous experience working in ERP implementation projects. This consisted of a range of distinct roles within the project team, including project managers and consultants from both the vendor’s and client’s side. The participants were asked their role in relation to ERP implementation, for the purpose of understanding the study sample. Details about the participants can be found in Appendix 2.

Each participant was sent the interview guideline and a research briefing to familiarize themselves on the topic and the demands of the interview, before obtaining informed consent. The research briefing specifically outlined the use of data collected from the interviews, the purpose of the study, and proposed duration. Moreover, as the development of rapport is critical for productive semi-structured interviews (DiCicco-Bloom & Crabtree, 2006, p. 316), informal conversations with interviewees were performed to establish trust and comfort. A pilot interview was also conducted to identify any necessary adjustments to the interview guideline, familiarize the researchers with the interview process, and test the Skype and recording technology (O’Gorman & MacIntosh, 2015, p. 121).

Semi-structured, in-depth interviews were conducted to obtain insights from experts in ERP implementation and develop an understanding about the use of PM approaches in the specific research context. This type of interview was selected to allow for the co-creation of data to appropriately interpret the experiences and opinions of the interviewees (DiCicco-Bloom & Crabtree, 2006, p. 316). Semi-structured interviews were justified for this research for several reasons. Flexibility was necessary in the interview process, as it was important to encourage interviewees to elaborate on their answers and provide specific examples from their experience. Moreover, as this study is exploratory and therefore there is very limited research on the topic, it was important to search for insights, as opposed to confirming hypotheses. For this reason, the interview questions were adapted to ensure appropriateness given the interviewees experience and position in ERP implementation. As these interviews were intended to develop an in-depth understanding of the PM approach being utilized, additional and unique questions emerged during the interview dialogs (DiCicco-Bloom & Crabtree, 2006, p. 315). In this manner, the interview process was a more natural discussion, allowing the interviewees to respond in an informal and relaxed manner (O’Gorman & MacIntosh, 2015, p. 119). Semi-structured interviews are also well aligned with exploratory research purpose and the case study methodology (Saunders et al., 2009, p. 321). Furthermore, concerns of reliability and generalizability associated with semi-structured interviews were not substantial in this study, as the research intended to explore complex and dynamic phenomena (Saunders et al., 2009, p. 328).

The researchers took great care to achieve neutrality of the interview questions and an objective stance during the interview process. Consequently, clarifications about interviewees’ responses were made in the form of questions not statements, to limit interviewer bias and to ensure the interviewees’ response was clearly understood. The interviews were conducted via Skype, as arranging face-to-face interviews was geographically impractical. Albeit, Skype was an appropriate medium as it allowed for the added value of the two-way interaction within the resource constraints of this research. Furthermore,
interviewees could attend the interview with convenience and a neutral environment of their choice (O’Gorman & MacIntosh, 2015, p. 121).

The analysis of company documents was included in this research as it strengthened the researchers’ knowledge about the SAP Activate methodology. Moreover, these documents provided secondary data that complemented the primary data collected via interviews. The researchers maintained confidentiality of these documents as some were internal files provided by participants.

3.4.3 Data Analysis Method

As the main research method undertaken in this thesis was interviews, complemented by secondary data in the form of internal documents and web pages, coding was used to reduce the qualitative data into more manageable “chunks” (O’Gorman & MacItosh, 2015, p. 140). Codes are labels attached to a portion of text relating to a theme in the data the researcher has identified to be of importance (King, p. 257). Coding of data was utilized specifically for categorizing the interview transcripts into themes derived from the literature review, while secondary data was used as supporting material to enrich and back-up the interviewees’ responses. Following the exploratory purpose of this research and the underlying research question of understanding the use of a hybrid PM approach in an ERP implementation context, the qualitative data analysis deployed a combination of a template approach and a grounded theory inspired approach as an analytical tool. On one hand, the data analysis approach utilized the development of themes a priori from the literature review which is a characteristic of a template analysis (Saunders et al., 2008, p. 505). However, the codes were not previously derived from the theoretical background but were rather generated directly through analyzing the collected primary data, which is in line with the characteristics of a grounded theory approach (Charmaz, 2006). Therefore, the data analysis utilizes a combination of an initial deductive approach followed by an inductive approach (Saunders et al., p. 506). Accordingly, the analysis iterates between data and theory.

The reason this research focused on developing themes a priori was to underpin the main objectives of this study which were formed and utilized through performing a comprehensive literature review. The themes developed from the literature were used as guidelines when conducting the interviews and included: Critical Success Factors, Factors/Characteristics, Traditional and Agile PM Practices through different Phases, Benefits and Challenges of adapting a hybrid approach in the context of ERP implementation. The reasons why the researchers decided to develop codes directly from the collected data (a posteriori codes) were: (1) there is no commonly accepted theoretical framework developed for the utilization of a hybrid approach in the ERP implementation context, as there is a lack of empirical research in the area and (2) the researchers wanted to obtain perceptions and opinions of practitioners by avoiding potential biases developed from the literature.

After the main themes were identified from the literature, the coding process from the data consisted of two phases: initial and focused coding (Charmaz, 2006, p. 42). Initial coding involved analyzing words, fragments and practical examples. This phase also allowed for the generation of in vivo codes which enabled the researchers to assign labels to sections of data by using words or phrases directly from that section of data, resulting in interpretations and meanings of the interviews that were as authentic as possible. This was followed by focused coding which involved determining the most useful codes for the study in question. (Charmaz.
This step involved categorizing the codes to their related themes, determining emerging analytical linkages and hierarchy of the codes (Saunders et al., 2008, p. 493).

The main steps of the data analysis process are shown in the Table 8 below:

**Table 8: The seven stages of data analysis. Adapted from O’Gorman and Maclntosh (2015).**

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification of themes</td>
<td><em>A priori</em> themes were identified from the literature review and interview guideline template.</td>
</tr>
<tr>
<td>Transcription</td>
<td>Careful reading of the collected documents and interview transcripts was performed in order to ensure familiarity with the data was conducted.</td>
</tr>
<tr>
<td>Themes and Codes</td>
<td>Codes were generated inductively from the interview transcripts by categorizing words, sentences or sections of the data, their associated meanings and parameters. Consequently, the emerging <em>a posteriori</em> codes were attached to the previously identified themes.</td>
</tr>
<tr>
<td>Producing the initial template</td>
<td>Generated codes categorized in their respective themes were initially displayed by using the SimpleMind Pro tool (see Appendix 3) including the different levels of codes. Sections of the interviewees’ transcripts were displayed for each code in order to determine the relevance and hierarchy of each code in the particular theme. Furthermore, relationships between themes and codes were identified.</td>
</tr>
<tr>
<td>Developing the template</td>
<td>After conducting the initial template, all the interviewee transcripts were revisited in order to include sections for codes that were initially not identified. This step also involved joining or dividing initial codes which the researchers found more suitable.</td>
</tr>
<tr>
<td>Ordering the codes</td>
<td>Once all of the codes and associated comments were reported, the codes were organized based on the number of interviewees whom mention the code, as first priority and the number of times mentioned as the secondary priority.</td>
</tr>
<tr>
<td>Interpreting and writing up</td>
<td>The interpretation of the data and writing of the findings, specifically providing an answer to the aim, research question and objectives was conducted. At this point literature was revisited in order to synthesize the findings realized in the case study (from the conducted interviews).</td>
</tr>
<tr>
<td>Quality checks and reflexivity</td>
<td>In order to limit the researcher’s potential bias, the researchers independently analyzed the interviewee transcripts and generated codes which were further on classified in predetermined themes. After each independent analysis, the researchers would hold a meeting where they would discuss their interpretations of the data and finalizing the developed codes.</td>
</tr>
</tbody>
</table>
A summary of the research philosophy, orientation and design taken can be found below.

Table 9: Methods Map. Adapted from O’Gorman and Macintosh (2015).

<table>
<thead>
<tr>
<th>Research Philosophy, Orientation and Design</th>
<th>Choice</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ontology</td>
<td>Subjective</td>
<td>A subjective perspective views reality as a mixture of perceptions and interactions of living subjects that shape reality.</td>
</tr>
<tr>
<td>Epistemology</td>
<td>Interpretivism</td>
<td>An interpretivist paradigm seeks to understand what is happening in a given context rather than focusing solely on its measurable.</td>
</tr>
<tr>
<td>Research Approach</td>
<td>Inductive</td>
<td>An inductive approach involves data collection and development of theory from the researcher’s data analysis.</td>
</tr>
<tr>
<td>Research Purpose</td>
<td>Exploratory</td>
<td>An exploratory purpose is used when there is a lack of knowledge and literature; it aims to develop new insights on the researched topic/context.</td>
</tr>
<tr>
<td>Research Strategy</td>
<td>Qualitative</td>
<td>Qualitative research involves the assessment and interpretation of subjective behaviours, attitudes, and opinions.</td>
</tr>
<tr>
<td>Methodology</td>
<td>Case study</td>
<td>A case study is an empirical and in-depth research methodology investigating a contemporary phenomenon within its real-life context while using multiple sources of evidence.</td>
</tr>
<tr>
<td>Data Collection Methods</td>
<td>Interviews</td>
<td>An interview involves a conversation between the researcher and the subject with the aim of developing an understanding of central themes and research questions.</td>
</tr>
<tr>
<td>Data Analysis Methods</td>
<td>Combination of template and inspired grounded theory analysis</td>
<td>Qualitative data analysis by developing themes &lt;em&gt;a priori&lt;/em&gt; from the literature review and inductively generating the codes from the interviewees’ transcripts.</td>
</tr>
</tbody>
</table>
3.4.4 Research Verification

The main issue when formulating and conducting a research design is the reliability and quality of the research findings (Saunders et al., 2008, p. 156). The reliability of a quantitative research strategy is associated with the terms validity and reliability (Dul & Hak, 2008, p. 24), while qualitative research strategies are often substituted with phrases such as credibility, transferability, dependability and confirmability (Bryman & Bell, 2008, p. 411). Some researchers, however, argue that the terms validity and reliability can be used in qualitative research as well but have to be adapted using the following phrases: external reliability, internal reliability, internal validity and external validity (Kirk & Miller, 1986, p. 13). Additionally, the main disadvantages of using a case study approach are the limitations when developing generalizable conclusions (O’Gorman & MacIntosh, 2015, p. 91).

The concept of credibility is related to internal validity, meaning whether there is a good match between the conducted research and the following developed theoretical ideas (Bryman & Bell, 2008, p. 411). One of the most common ways of developing credible findings is through the verification method of data triangulation – using at least three sources of evidence in the data collection process (O’Gorman & MacIntosh, 2015, p. 89). According to Scandura and Williams (2000, p. 1248), the process of triangulation presents an important step as it enables the researcher to examine a phenomenon from different viewpoints. This research will deploy both primary and secondary data which are intended to be used as complementary sources. Semi-structured interviews will be used as a primary source, while internal company documents, as well as company websites will be analyzed in order to develop a comprehensive understanding of the utilization of a hybrid PM approach in ERP implementation. Moreover, as two students are conducting this research, triangulation of researchers will limit the potential biases and reinforce credibility and validity of the findings. Finally, when performing the analysis of the data, if there were any uncertainties, the authors followed up with the participants in order to ensure adequate interpretation of the data.

Transferability refers to external validity, in other words the degree to which the findings of the specific case study can be generalized across the research topic in question (Bryman & Bell, 2008, p. 413). O’Gorman and MacIntosh (2015, p. 91) point out that the main disadvantage of using a case study, especially a single case study approach, is the limitations when developing generalizable outcomes. As the purpose of this research was exploratory in its nature, the main objective was not to develop generalizable conclusions but to expand the knowledge area of ERP implementation methodologies through new insights and creating further research questions. Furthermore, case studies present analytical generalizations as previously developed theory is contrasted with the findings of the study (O’Gorman and MacIntosh 2015, p. 91). Therefore, in order to bridge theory with practice, the authors intended to compare the emerging themes and theories from the analysis of the data with existing literature on the topic.

Dependability parallels to the term reliability in quantitative research (Bryman & Bell, 2008, p. 414). In qualitative research it is recommended to use an “auditing approach” as a guide throughout the process of the case study. The authors used a case study protocol which helped support the entire process, especially throughout the data collection process. This included a summary of the research purpose, data collection procedures and interview guidelines, among others. Additional methods were used to ensure results reliability, such as ensuring participants’ honesty through guaranteeing confidentiality and obtaining consent, as well as
providing rich descriptions and understanding on the phenomenon being investigated (O’Gorman and MacIntosh, 2015, p. 89).

Confirmability is related to ensuring as much objectivity as possible when conducting the research (Bryman & Bell, 2008, p. 414). As explained in section 3.2.4 Axiology of this report, certain measures were taken throughout the process of the literature search, data collection and data analysis to ensure as much objectivity as possible.

3.4.5 Ethical Considerations

Denscombe (2009, p. 60) explains that social researchers must utilize an ethical manner when conducting their research. This involves adopting a moral perspective when designing and conducting the research study. In this manner, the researchers act beyond what will produce the best data, to also consider what is morally and legally acceptable regarding the values of society. The researchers of this study took substantial measures to respect their participants, avoid any harm to the participants, and establish transparency.

Ethical issues arise in all research and must be thoroughly addressed and mitigated. Informed consent was collected before each interview and participants were provided with a research briefing outlining the use of data collected in the interviews and the purpose of the study. During this process, the participants were provided sufficient information to decide if they will take part in the study or not (O’Gorman & MacIntosh, 2015, p. 201). Each participant agreed to have the interview recorded for the purpose of future transcribing and analysis. Denscombe (2009, p. 64) emphasizes that the research must avoid causing stress and discomfort for participants; the researchers intentionally developed rapport with the participants through informal conversations and the research briefing carried out prior to each interview. Moreover, to avoid discomfort, participants were provided a guideline of the interview questions to allow them to familiarize themselves and collect any information they felt necessary to answer the questions prior to the interview. During the interviews, if the participants were uncomfortable answering any of the interview questions due to privacy issues, the questions were avoided. The interviews were also conducted in a manner that limited intrusion of the participants (Denscombe, 2009, p. 64). Participants were asked when would be most appropriate to schedule an interview and accommodated the participants’ responses. Moreover, prior to the interview the participants were informed and agreed that the interview would be conducted via Skype and last a duration of approximately thirty minutes. Confidentiality and anonymity were adhered to through the use of coding for participants and their identities were never revealed throughout the research study. Furthermore, the participants’ roles in the company were only used to understand the research sample and were not included in the results. As this research was based on a case study and provides an in-depth analysis of the established methodologies the company employs, the company was identified with the permission of participants. This decision was considered appropriate, as the methodologies are well publicized and have been specifically developed for the purpose of implementing SAP solutions.

The researchers of this study were dedicated to their professional integrity, reporting behaviours, experiences, and attitudes with honesty (Denscombe, 2009, p. 62). Regarding the ethicality of the research findings and conclusions, the researchers of this study have identified any potential biases and limitations of the study, to ensure readers are informed. Moreover, the boundaries of this research are clearly stated in attempt to avoid any misinterpretations of the research findings. In this way the readers are warned not to make
general assumptions beyond the frame of the research. As the research is exploratory, the intentions of the research are to drive future research, not to develop generalizable results.
4. Empirical Findings

The empirical findings are based on the themes identified in the theoretical background: critical success factors, factors/characteristics to be considered, PM practices, major benefits and challenges of using a hybrid PM approach. In order to analyze and display the results of the generated interview transcripts, meta-matrices are used as suggested by Saunders et al. (2012, p. 534). Therefore, the interviewees are listed in columns while the data codes are in rows. The cells marked with an x indicate that the interviewee mentioned the supporting code. The last column indicates the number of times a certain code was mentioned from all of the interviewees in total.

4.1 Critical Success Factors

Table 10 displays the critical success factors specific for the use of a hybrid PM approach in ERP implementation projects.

Table 10: CSFs in ERP Implementation Projects.

<table>
<thead>
<tr>
<th>CSFs</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Times</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Planning/Governance</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>9</td>
</tr>
<tr>
<td>Project team/Project manager</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>18</td>
</tr>
<tr>
<td>Clear Understanding of Project Requirements</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>13</td>
</tr>
<tr>
<td>Change Management</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>9</td>
</tr>
<tr>
<td>Clear Project Boundaries</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>8</td>
</tr>
<tr>
<td>Customer Involvement/Feedback</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>7</td>
</tr>
<tr>
<td>Stakeholder's Support</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>10</td>
</tr>
<tr>
<td>Documentation</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>7</td>
</tr>
<tr>
<td>Project Vision</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>4</td>
</tr>
<tr>
<td>Risk Management</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>2</td>
</tr>
<tr>
<td>Testing</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

Through the analysis of the interview transcripts, 11 codes were developed, describing the factors necessary for the successful delivery of an ERP implementation using a hybrid PM approach. **Project planning and governance** was mentioned by all of the participants as critical for successful project delivery. Project planning and governance covers the preparatory activities and associated documentation, project organization, and alignment with stakeholders’ needs and objectives (PMI, 2013, p. 56). Interviewee 1 proclaims “you need to set up the project teams, the project organization, the hierarchy, you need to set up all the communication plans”. Similarly, Interviewee 4 states that in the Prepare phase “you organize your team, establish project standards, organization starts with risk management and start ordering the software and hardware and everything that is necessary.”. Interviewee 6
advocates that project planning is critical for successful hybrid PM as "it provides you and the team and the entire project more organization in all of it.". Moreover, Interviewee 6 explained the criticality of the project manager to determine what PM approach will be used: "for me I think it is important to have the understanding of how you want to lead the projects, so you can decide to have an ASAP or the Activate or some kind of mix, these things will help you, because if you start writing down the overview for example for the kick-off, where you would explain to the people how the meetings will be done, this will then help you guide". Interviewee 2, highlights the importance of preparatory activities: "the processes should be documented beforehand, as well as the testing scenarios and data migration programs from the existing system".

The project team and project manager were identified as a critical success factor by nearly all of the participants and was the most frequently mentioned factor. Some of the participants spoke generally about having good team members, where others highlighted key roles that are critical for a successful ERP implementation. Interviewee 3 proclaims “basically, it all boils down to the quality of their project team”. Also stating that “more important is the project team on the client side than on the consultant side.”. Correspondingly, Interviewee 6 affirms this commenting "I think its really important to have a good counter-party. I think it is not something you can have an influence on, but I think still when you have a good peer from the customer point of view, either PM or solution architect, I mean that enables you a really good team.". Interviewee 1 contributes also highlighting the importance of a good project manager and solution architect, explaining the need for a “strong, strong solution architect or senior architect, functional one, who knows how to say no to a customer, in the sense PM is kind of keeping the how to say the border, but you have to have a solutions architect who says: “Ah, ok you want to have solution A, you can have it but you have to consider that this is going to take a) much more time and b) much more resources as well, both parts but you also have option B e.g. which could give you a good alternative” so really being the devil's advocate and not to say just like yeah, yeah, we can you know do everything what you want and yeah, you can see that leads to nowhere”. Interviewee 4 also notes critical roles in the project team advocating "if you don't have a good Scrum Master and agile coaches who are leading these parts, you might have problems”. Additionally, this participant highlights “In Activate because things are predefined, a lot of them, the change manager is becoming more important”. Also noted by Interviewee 4 was the criticality of the project manager and frontline staff: “The methodologies are tools that give you "how to do something", but you have to really be people oriented and read people to know how to do things.” and „very often it is good, if for example the front person is someone who has better people skills, because again in the end the solution always works". In conclusion, Interviewee 3 strongly states “if you have a good solution, and a bad project team, forget about it. And if you have a bad solution and an excellent project team you can even do something there".

A clear understanding of the project requirements from both parties, was also frequently mentioned as critical for successful ERP implementation using a hybrid PM approach. Interviewee 5 highlights “understanding the scope for both parties, that is very very important, that both parties have the same understanding.”. Interviewee 6 adds “but if you have a clear person who knows the processes and that can help you get the understanding of it and also be able to present this to the customer, I think this is crucial from my perspective".

Change management was identified as a factor that has become increasingly vital by many participants. Interviewee 5 explains “The crucial thing for me is change management. I think that from the IT side, it can work, but how can you use this in the most optimal way. So
change management is then for me the most crucial part and that is also been proven in the last implementations we did that the tool itself its developed in such a way that it can work with getting the best out of it, and the business also achieves benefits by using it because it is very hard to get them to really work with the system.”. Interviewee 4 states “It is almost never the issue of the solution, its the change, that people need to change the frame of mind and how they are thinking.” This participant elaborates, emphasizing the importance of the roles responsible for managing change: “in the early 2000’s the OCM role, so organizational change manager, became more important and also business change managers, so the person who is in charge of the solution or has industry solution knowledge. In Activate because things are predefined, a lot of them, the change manager is becoming more important because they have to realize what they want, how their business would look like.”.

Relevant to address the challenge of scope creep, clear project boundaries were commonly mentioned in interviews as a critical success factor. Interviewee 4 states “you also have to set the boundaries for the customer where he/she can go”. Interviewee 1 furthers this notion, explaining how project boundaries should be "accepted and signed off by the customer in order for the project team to give us more security, but also to the customer to say “ok this is where we are going to stick, this is the window, we can be a little bit of flexible through the sprints moving away from one part and adding another but not that much because requirements are not finished job.””. Interviewee 6 proclaims that specifically the Activate methodology "gives you some barriers for the customer", when compared to previous methodologies in which "this was the most difficult thing, because you would give this open hand towards the customer where they can do whatever they want and I think its always like that, when you give them too much freedom it takes too long to satisfy every small thing that is being done.”.

Customer involvement and feedback was recognized by four of the participants as critical for successful use of a hybrid approach in the specific context. Interviewee 1 explains the need for ongoing customer involvement: “in the SAP Activate the customer has to be present from the early stage all up to the end because he always has to check his let’s say requirements, in the Explore phase he has to come up with clear thing, clear needs, in the Realize phase he has to sign off all these solution bits and piece. They have clear roles, e.g. we in the Realize phase within these sprints have Daily Scrum meeting, so the customer either PM or sometimes Business expert from their side the Scrum master really needs to be involved on a day to day basis in order to understand and also for us to understand if we are going into the right direction”. Interviewee 5 discusses the necessity of customer involvement to establish clear customer expectations, claiming that with a hybrid approach "by mixing it you interact more with the business and you still have the end product visible, but you already interact with them and they can understand more the product and we can help you in training it and making it more clear”. Interviewee 3 emphasizes the importance of customer feedback: "It’s actually iterative because we show them what we did to the system, then they give some of their objections to the system, then we fix it, make the 2nd, 3rd version".

When asked what the participant considers to be critical for successful use of hybrid PM in an ERP implementation project, Interviewee 4 responded “I would say the support of the stakeholders”. Three participants identified stakeholders’ support as a critical success factor. Interviewee 3 pointed out the importance of the customer sponsor in establishing stakeholders’ support: “Customer sponsor involvement and dedication, very often neglected but extremely important”. This participant elaborates “if you don’t have a sponsor who is higher in the hierarchy than the operational directors it will be very hard to get a quality
performance on the project because they will perceive the project as their last priority and their boss will always tell them: “First deal with your job, your operational activities and then work on the project”.

Documentation was also mentioned by three of the participants as a critical factor. Interviewee 1 explicitly states "coming in to the actual project, the CSFs are default documentation set up" and explains that with the accepted and signed design document "this documentation allowing also the others to read and understand, gives you this chance to kind of rule and manage projects better.". Interviewee 3 recognizes “Well on one hand I do agree that we should strive towards decreasing the documentation, but you cannot do it without documentation.". This participant further explains: “without documentation there is no tracking and project management, I think everything must be documented because the project can involve more people, I there can be 30 to 40 consultants, on the client side there can be thousands of people, after 3 months who knows who said something to whom, or what was agreed upon an internal workshop. Each workshop should be documented and a record is written. So it can later be referred to. “

Three of the participants mentioned the establishment and maintenance of a project vision, outlining the overall goal of the project, as critical for success. Interviewee 3 proclaims "Clarity of vision, what we really want to achieve with this project/implementation " is vital for success. This participant explains "This means that the project vision and project scope or the reason why it is important to go in the project is very important to explain. “ Interviewee 4 highlights the importance of project vision to avoid scope creep, advocating “For someone who doesn't know what they want, than agile may be really, really dangerous. If you don't define at the beginning some prototype or development of what you are doing business process, like what you want to do or what is your goal at the end, than you will have the constant moving target”.

Risk management was mentioned as a critical success factor by two participants, with Interviewee 1 promoting “risk management is very important for every methodology, but for Activate having in mind the idea that you have some predefined packages within that is coming more important for risk management to be there and to communicate. “ Interviewee 6 highlights the importance of starting risk management early in the project lifecycle to pre-develop potential solutions.

Finally, one participant mentioned testing as a critical success factor for using a hybrid PM approach in implementing an ERP solution. Interviewee 1 proclaims “testing, test management is absolutely the most important thing of you know the project because the customer has to of course properly test it because otherwise going live and finding out that you used some errors or bugs that you wouldn't like and so really kind of all kinds of supporting materials.”.

Evidently, there are several factors that are considered critical by practitioners for successful project delivery considering this specific context. Furthermore, there is some agreement about these success factors, as many of the factors were mentioned by numerous participants.

**4.2 Factors/characteristics to be considered**

Table 11 displays the factors/characteristics that need to be considered when adopting a PM approach in the ERP implementation context.
In order to understand the circumstances of adopting a certain PM approach in the ERP implementation context, certain interview questions focused on exploring the factors and characteristics of companies undertaking an ERP implementation project. Through the coding of interviews, 11 factors/characteristics were identified as important when determining the applicability of an ERP implementation methodology to a certain company and/or project. All of the interviewees mentioned the importance of the client’s knowledge/experience with the methodology. As Interviewee 3 summarizes: "you have to consider these people who work on the company side, they are not used to working in a project environment, they are not used to such documentation, they are not familiarized with certain solutions" indicating the challenges of adopting a PM approach in general in a non-project environment. Interviewee 4 more specifically contends: "And then you bring in the agile, which actually the scope, time and sometimes budget can be a little bit in danger with this methodology, if the customer is not aware what does that mean" relating the client’s knowledge and experience with the type of PM approach deployed. Interviewee 6 relates this to people’s habits, regarding how and what they are used to doing: "So I think it is still like the office chair, you still want to adapt it, whether you want to go up or down. It’s still new and I think that is why it is mostly not comfortable for everyone and you still don’t feel good using it completely."

The importance of taking into consideration the country specifics and cultural differences when implementing an ERP project is emphasized by all interviewees. Interviewee 1 states: "when we compare projects like in France, Netherlands, I would say even Sweden, the Nordics, Germany especially, UK and not to speak about the US, they have much more agile projects because the people, the customers are more mature in the sense of knowing what they want. That's the key.". Interviewee 4 emphasizes the importance of taking culture specifics into consideration: "Yes, I think that is very important, that you have a cultural knowledge about how a customer does projects.”. Interviewee 3 indicates the importance of performing an analysis of specific country characteristics (external factors): "and in some countries, it is even a problem in the legislation, so the client would say: “We cannot do it like this””.

Corporate culture was also identified as one of the factors that must be considered, specifically the maturity, adjustability, readiness to change of the organization, in addition to how innovative or traditional the company is. Interviewee 6 summarizes the importance of corporate culture stating "whenever you start planning a project you need to have it in mind,

<table>
<thead>
<tr>
<th>Factors/Characteristics</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Times mentioned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge/Experience with Methodology</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>14</td>
</tr>
<tr>
<td>Culture (Country Specifics)</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>13</td>
</tr>
<tr>
<td>Corporate Culture</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Industry</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Project Manager/Team Style</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Existing Solutions</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Customer Requirements</td>
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<td>x</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Project Type</td>
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<td></td>
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<td>Project Size</td>
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<td>x</td>
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<td></td>
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<td></td>
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<tr>
<td>Organizational Structure</td>
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<td></td>
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<td></td>
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<td></td>
<td>1</td>
</tr>
<tr>
<td>Stakeholder's Support</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>2</td>
</tr>
</tbody>
</table>
that for some of the companies, it cannot be black or white." The industry in which the company operates in was identified specifically considering the differentiation between the public and private sector. The public sector is more likely to undertake a more traditional PM approach, while the private sector could be more suitable for using APM methods. **Project management/team style** was identified as a factor by 4 interviewees. As Interviewee 1 mentions: “If they are old school then you would like to use the SAP Activate still, but really amend it in a way that it has some traditional characters.”. Similarly, Interviewee 4 concludes: “But yes, you should be matching the customer’s style because in the end the implementer always has more responsibility than the customer.”

The choice of methodology also depends on the client’s already **existing solutions** as identified by 4 interviewees, more specifically whether the company has other adjoining systems that require integration. Interviewee 1 emphasizes the importance of taking into consideration the company’s history of software solutions implementation. The code **customer requirements** was reoccurring throughout the conducted interviews and was categorized in different themes. Interviewees 1, 2 and 4 agree that the choice of the implementation methodology highly depends on the customers’ understanding of their business processes, knowing what they want and having clear requirements. The choice of the methodology also depends on the **type of project** deployed. For example, certain ERP modules are more suitable for using SAP Activate such as Finance, Procurement and Sales. In contrast, APM practices are used more for development and innovation projects.

Interviewee 4 identifies the importance of **stakeholder’s support** when implementing a project, specifically the support of high level managers, the middle level and especially the users as they are the ones that feel their jobs are being in danger or replaced. Interviewee 3 emphasizes on the importance of the customer sponsor’s involvement and dedication. Finally, interviewee 4 mentions the need to consider the **project size**: “If you do a project of 12 months with an agile methodology, I will dare to say you will fail. In my opinion you cannot run entire big projects with agile. You can do Activate which gives you the opportunity to combine things, but in my opinion agile would be challenging for let's say more traditional implementations.” and the **organizational structure**.

### 4.3 Project Management Practices

In order to understand the usage of a hybrid PM approach in an ERP implementation context, interviewees were asked questions about which PM practices, tools and techniques they use during the implementation of such a project. In this section, internal documents and websites were used in order to complement and/or confirm the findings of the interviewee transcripts. The empirical findings from the interviewees were especially valuable due to their experience of using the methodologies in a practical context and providing their opinions and insights on which phases could be more adjustable or customizable. As already explained in section 3.1 Research Context, all ERP implementation projects go through four or five different phases depending on the methodology used, following a PMI approach. Each of these phases have specific PM practices used and clear project deliverables. Therefore, the theme PM practices was further divided into the specific ERP implementation phases followed by generating sub-codes for each of these phases. The names of the phases are in line with the SAP Activate methodology as most of the interviewees had experience implementing software solutions with it. However, as all of the interviewees also had experience in using the ASAP methodology and as the ASAP methodology is still widely used in practice, its PM practices
were also considered and grouped in their accompanying phases (see Table 7 for the comparison of ERP implementation methodologies).

Table 12: PM Practices in the Discover Phase.

<table>
<thead>
<tr>
<th>Discover</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Times mentioned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Best Practices/Industry Solutions</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td>x</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>High Level Requirements</td>
<td>x</td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

The **Discover** phase involves pre-sales activities before the actual start of the project as well as determining the ERP implementation strategy (SapJam, 2017). The two main practices in this phase identified by the interviewees are the best practices or industry solutions, which are the main characteristic of SAP Activate, and defining high level requirements. Interviewee 4 explains the idea behind SAP Activate: "The idea of Activate and the future of SAP is that you have predefined business processes, like business process maps, etc. and then especially, the customer is buying some industry solution, so you are already coming with predefined best practices." This is confirmed by interviewee 2, who states "A good prepared Best practice. SAP idea is that SAP partners (the ones implementing SAP solutions) continuously complement the Best practice through their experiences and knowledge." The importance of customers understanding what they are receiving is emphasized in developing the high level requirements. Interviewee 1 states: "before the actual project starts there was tremendous amount of time in pre-sales activities, presentations and showing the solutions, talking about it and everything to get also a feeling of what the customer would like, collect already some, at least some high-level requirements in order for us to be able to understand what the scope would be". Correspondingly, interviewee 4 explains "This is where the project is still in discussions, here we are still selling and discussing. For me it is very important that during that phase the customer understands what they are getting." and interviewee 5: "I mentioned by mobilizing them, asking the business really to go down their business needs, that is the where you have maybe "nice to have's" or "must have's".

Table 13: PM Practices in the Prepare Phase.

<table>
<thead>
<tr>
<th>Prepare</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Times mentioned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Project Planning/Governance</td>
<td>x</td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Kick-Off Meeting</td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Risk Management</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Pre-Workshops</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

The main goal of the **Prepare** phase is to provide the initial planning and preparation of the project (SapJam, 2017). The interviewees emphasized the importance of documentation, as well as project planning and governance in this phase. Interviewee 5 states "The project initiation document is your railway to describe your scope, your planning." Interviewee 1 explains the activities of this phase: "Meaning that you need to set up the project teams, the project organization, the hierarchy, you need to set up all the communication plans.".
Similarly, interviewee 5 proclaims "the phases we have the traditional start off, the initiation phase, doing the start and the analysis. So the requirement documentation, the resourcing, the kick-offs, things like that, it’s more or less always the same." One of the key deliverables in this phase is the Kick-off meeting as mentioned by interviewee 4: “And then let’s say one of the key deliverable is actually the kick-off meeting. The project has begun, from the sense that not only the key user, the key members of the team are involved, but you communicate the project rules, standards, organization to all the project participants. So for me, it is very traditional.” Other practices mentioned in this phase are risk management activities by interviewee 4 and pre-workshops as mentioned by interviewee 6: “but we do have these specific workshops that are even a part of our SAP offering, where we go through the customized processes, even before. So during the Prepare phase. Just to better understand which approach we will choose, whether we have something that can be provided from the best practices perspective.”

Table 14: PM Practices in the Explore Phase.

<table>
<thead>
<tr>
<th>Practice</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Times mentioned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fit-Gap Analysis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Detailed Design Document</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>(Business Blueprint)</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Level Design Document</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>(Backlog)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of Scrum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Training/Workshops</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Risk Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

The main purpose of the **Explore** phase is to perform a Fit-to-Standard analysis to validate the solution’s functionality in the project scope and confirm the business requirements. The identified gaps are then added to the Backlog document for use in the next phase (SapJam, 2017). Unsurprisingly, the Fit-to-Standard, or most often referred to as the Fit-Gap Analysis in practice, was the most frequently mentioned practice performed in this stage by interviewees. Interviewee 2 states: "There is no classical Blueprint phase but a fit-gap analysis is performed. The set-up processes in the system are presented and a gap analysis is performed in comparison with the processes in the company." Depending on whether a more standardized “best practice” solution is considered or a solution that requires additional customization and development, the consultant in collaboration with the client can choose whether to create a detailed design document (Business Blueprint) or a high level design document. The Business Blueprint was a major step in the ASAP methodology and is still sometimes used in the SAP Activate methodology in certain circumstances when the consultant and client require it. Interviewee 2 explains the use of the Business Blueprint: “The phase of Business Blueprint is conducted in the form of a classic interview: “Explain to us what processes do you need, how certain processes are conducted and so on”. The minutes are then converted in the Business Blueprint that provides a detailed description of the processes or a “static Word” when after signing nobody looks at anymore. The majority of clients do not update it during the project, and especially when there are changes after the project is finished. In this phase the SAP system is used to a minimum.” Interviewee 6 confirms the main drawbacks of conducting a detailed Business Blueprint: “what I was seeing before with Business Blueprint alignments, it is a really, really exhausting topic and it is quite
extensive.". Interviewee 1 refers to when they were required to use the Business Blueprint within the Activate methodology: "So we decided not to follow the real Activate but to stick to a firm, more or like business blueprint from the ASAP, still call it a design document terminology wise but work it out in as much possible detail that allows us at that time, meaning business, technical requirements, landscape, technical needs and everything else will be collected during that Explore phase and put it into written and have that accepted and signed off by the customer in order for the project team to give us more security." If using a more standardized “best practice” solution, the extent of documentation can be reduced to a high-level design document as interviewee 1 explains: “This high level design document in the SAP Activate is just like a little bit of a road to see how you are going to steer the whole project”. Although the use of Scrum methodology is emphasized in the Realize phase, interviewees 1 and 6 mentioned that it can start being used already in the Explore phase. Interviewee 1 mentions: "Okay, Realize and basically already in the Explore, you can customize, do you want to start with let’s say sprint 0 to build up the experience and knowledge of the customer". This is confirmed by interviewee 6 claiming "I like to do it before also in the Explore phase, because I think it gets the people into the habit of having them, into getting them a little bit more into this mode of quick discussions, quick alignments, quick information, quick issues.". An emphasis on trainings and workshops was also mentioned in this phase. Interviewee 1 states "Then in the explore phase, this phase consists of workshops, exploring workshops, design related workshops, maybe some showing workshops, demonstrations, and so forth.". Finally, the importance of continuous risk management is mentioned by interviewee 4: "You have to explain the risks to the customer, not to make them afraid, but you have to explain the risks and that you know how to manage the risks and that you will support them. Let's say identify risks together with them, so that they can start managing the risks.”

Table 15: PM Practices in the Realize Phase.

<table>
<thead>
<tr>
<th>Realize</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Times mentioned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of Scrum</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Testing</td>
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<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Iterations</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Training</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

The Realize phase uses a series of iterations in order to incrementally build and test the ERP solution based on the business scenarios and requirements identified in the previous Explore phase (SapJam, 2017). This phase heavily uses Scrum practices. Interviewee 1 mentions the benefits of using sprints, highlighting the earlier implemented customer value: “you showcase what you have built each sprint, so that the customer really gets used to or sees what the solution is going to be about and then coming into the Deploy you have as less as possible surprises.”. Interviewee 1 further explains the customer’s role and involvement when using Scrum: "They have clear roles, e.g. we in the Realize phase within these sprints have Daily Scrum meeting, so the customer either PM or sometimes Business expert from their side the Scrum master really needs to be involved on a day to day basis in order to understand and also for us to understand if we are going into the right direction making these sprints possible and really I would say implementing this solution in that specific sprint so they are into the projects, it is much more intensive from their side." This is confirmed by interviewee 4: “Agile if you actually do it correctly, more or less you have to have meetings every day, the
customer and the implementer have to confirm that everything is okay, you have to agree what you are doing that day/what you want to achieve on that day." Interviewee 6 reflects on the benefits of continuous customer feedback through frequent daily meetings when using this method. Even if Scrum practices are not followed in this phase, the phase still consists of a series of iterations making this the core practice of the Realize phase. Correspondingly, interviewee 3 mentions "then iterations of the system are performed, meaning implementations and testing. It's actually iterative because we show the customer what we did to the system, then they give some of their objections to the system, then we fix it, make the 2nd, 3rd version, etc.". The Scrum methodology provides merely the tools and techniques for undertaking these iteration processes in an agile way. This phase also involves practices such as training and testing. Interviewee 2 explains the main drawbacks of using the ASAP methodology as sometimes the customers are introduced to the system for the first time in this phase: "According to ASAP the customers start working on the system in the testing phase, this phase is full of remarks and comments on the system behaviour, way of performing a specific process, new process requirements emerge that have been probably forgotten in the previous phases, the quality of current information is noticed to be inadequate for the data to migrate to the new system, the trainings last longer than planned and so on." Interviewee 2 contributes that this phase can involve certain adjustments in which the budget and time is in danger: "So here the methodology falls in the second plan, we are negotiating the most key parts, we are changing the orders, we are shortening the processes, decreasing the amount of documentation and so on".

Table 16: PM Practices in the Deploy & Run Phase.

<table>
<thead>
<tr>
<th>Deploy &amp; Run</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Times mentioned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cut-Over Activities</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>&quot;Go-live&quot;</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Final Documentation</td>
<td>x</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Support</td>
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<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

The Deploy phase consists of setting up the production system, confirming the organization readiness, and switching the business processes to the new system. The Run phase consists of activities aiming to further optimize and automate the operability of the solution such as providing support in the execution of business operations (SapJam, 2017). The main activities of the Deploy phase are the cut-over activities, system “go-live”, and final documentation. Interviewee 1 explains "here you have the trainings, the end-user knowledge transfers, really checking that the solution is up and running, transfer from for example the develop system towards the production and support. This kind of very much goes again to the traditional". Accordingly, interviewee 4 describes "Deploy is actually the phase where you have the "go-live" and the system cut over activities, migration...". Interviewee 3 contributes "At the end, you have user acceptance testing, a final test that users have to perform to confirm the solution". Interviewee 4 mentions the final documentation required in this phase: "Deploy is actually the phase where you have the...final administrating. Here I would say it is a traditional approach, as well more or less." Finally, the main activity emphasized in the Run phase is the implementer’s support as mentioned by interviewee 4: "Then you have Run, which means support. So you support the client for either new projects, some changes of the system using or simple support contracts."
4.4 Major Benefits of a Hybrid PM Approach

As demonstrated in Table 17, the data analysis of this study revealed 6 major benefits of using a hybrid PM approach for ERP implementation projects.

Table 17: Major Benefits of a Hybrid PM Approach.

<table>
<thead>
<tr>
<th>Major Benefits</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Times mentioned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexibility/Adaptability</td>
<td>x</td>
<td>x</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>5</td>
</tr>
<tr>
<td>Earlier Implemented Value</td>
<td>x</td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Established Customer Expectations</td>
<td>x</td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Faster Project Delivery</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>7</td>
</tr>
<tr>
<td>Appropriate for all Project Sizes</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Efficiency</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>2</td>
</tr>
</tbody>
</table>

**Flexibility and adaptability** was the benefit mentioned by the largest number of candidates. When describing the Activate methodology, Interviewee 4 proclaims "It's more flexible, it is adjustable". Interviewee 6 contribute to this stating “you are sort of fusing some things from one methodology into another, in order to make it work and to adapt towards the customer”.

**Earlier implemented value** was frequently mentioned as a major benefit of using a hybrid PM approach. Interviewee 6 advocates " I like a lot the Activate because it gives you quick results". Similarly, Interviewee 1 states "showing faster the implemented value. So the value added with the solution, we call it always the "proof of concept" or the "fit validation", so really like a short time for customer to see what has been implemented while in the ASAP, you really see the implemented solution in the end, so that is also a big big benefit.". The use of a hybrid approach was also frequently mentioned as beneficial in establishing clear customer expectations. Interviewee 4 explains "The sooner you show the customer how something will look like, the better they will understand and support you, because they are not capable of imagining how somethings would look like”. Earlier implemented value and established customer expectations were identified as highly related, as delivering value earlier in the project was commonly mentioned as beneficial for establishing realistic customer expectations. Although these codes revealed to be interdependent, the researchers interpreted these as two unique benefits, both derived from the process used in a hybrid PM approach of continuously delivering project value throughout the project lifecycle.

**Faster project delivery** was identified by three participants as a major benefit of utilizing a hybrid approach. Simply put Interviewee 1 states that with Activate there is a "shorter time to go-live". Interviewee 2 confirms this: "The implementation should be faster." Interviewee 1, provides greater detail about the need for faster project delivery in contemporary markets: "that was the whole I would say idea around Activate because of the you know fast markets, customer needed to be competitive and if they cannot not launch solution or something that could help to increase profit or whatever in you know 6 months then it would already be too late, they have time for 2 years because market is changing from you know from today to tomorrow.".
Lastly, it’s **appropriateness for all project sizes** and **efficiency** were recognised as benefits of hybrid PM approaches. Interviewee 4 cautions "If you do a project of 12 months with an agile methodology, I will dare to say you will fail. In my opinion you cannot run entire big projects with agile. You can do Activate which gives you the opportunity to combine things, but in my opinion agile would be challenging for let's say more traditional implementations". In this statement, the participant explains how a pure agile approach may not be appropriate for large projects and how a hybrid PM approach can allow for the use of agile principles for large projects. Interviewee 6 was the only participant to mention efficiency as a major benefit, however this participant highlighted a hybrid approach can lead to more productive meetings, decrease in project team overload, and reduced time spent in meetings to focus on the required project tasks.

### 4.5 Major Challenges of Hybrid PM Approach

As there are benefits to using a hybrid PM approach, Betra et al. (2010, p. 387) and Dikert et al. (2016, p. 98) state every approach also has challenges that must be addressed. Table 18 portrays the 7 major challenges of using a hybrid PM approach mentioned during the interview process.

**Table 18: Major Challenges of a Hybrid PM Approach.**

<table>
<thead>
<tr>
<th>Major Challenges</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Times mentioned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of Customer Experience with Methodology</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Resistance to Change</td>
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<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Resource Constraints (Time/Budget/People)</td>
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<td>x</td>
<td></td>
<td>x</td>
<td></td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Scope Creep</td>
<td>x</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Project Interdependencies</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Commitment to Project</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Miscommunication</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Five of the participants identified **lack of experience** regarding project management methodology from the customer’s side as a major challenge of successfully using a hybrid approach. Interviewee 1 responded that one of the biggest challenges using a hybrid PM approach: "would be the non-experience of the customers itself". Interviewee 2 and 3 both explained how for many customers this is the first time they are implementing a project of this type, scale, and requiring such drastic change within the organization. For this reason, customers often lack knowledge of ERP implementation methodologies.

The researchers recognized during the analysis that the following codes are not explicit challenges of using a hybrid PM approach in the context of ERP implementations, but rather more generic challenges that can occur in a wide variety of projects: resistance to change, resource constraints, scope creep, commitment to the project and miscommunication. Many of the participants mentioned **resistance to change** regarding the project methodology used. Interviewee 6 explains one of the major challenges is: "Breaking the habit of the people to
Similarly, Interviewee 2 explains “people have learned to work the first time that’s how they are working the entire time, they do not adapt at all...So people simply don't think about making the whole process more optimal but they want every single detail to work exactly how they have worked with before, so they are specifically not adjustable.”. Strictly from the customer’s side and as previously mentioned, the implementation of an ERP system requires substantial organizational changes. For this reason, the challenge of resistance to change may be amplified in ERP implementation projects. Interviewee 4 states that “very often you don't have the support from your users and in the beginning because for them it is the biggest change, and very often with people who are working on the projects their jobs are in danger because you are replacing them. So you have to know how to manage them and of course help tell them how to make themselves more important to the company to stay. And that is how you win them over.”. Later declaring, "It is almost never the issue of the solution, its the change, that people need to change the frame of mind and how they are thinking".

Resource constraints has become a common topic of conversation in contemporary PM literature and practice. Organizations are increasingly facing dilemmas regarding fixed budgets, as well as time and resource restrictions (Ranjan et al., 2016, p. 398). Although this is likely the case with many types of project, three of the candidates highlighted resource constraints as a major challenge specifically for PM in ERP implementation projects. Interviewee 1 explains how it can be difficult to introduce a pure agile approach in fixed projects: "Agile methodology on fixed price projects is extremely difficult to manage, because with fixed price projects you have the time, budget and scope which are fixed. And then you bring in the agile, which actually the scope, time and sometimes budget can be a little bit in danger with this methodology". Interviewee 2 discusses time and budget constraints in today’s contemporary markets, explaining “"the process has to be faster because the user world has changed. Before when somebody would ask for SAP then you would talk to them which modules do they need, then you would estimate how many days you need... and then you would get some budget, a million euro or more. Today, people do not have big budgets and they want to have SAP with smaller budgets, so the market, the SAP partners have to adjust with a more agile methodology in order to make the implementation faster.". Finally, Interviewee 3 highlights the challenges of limited human resources stating a major challenge of hybrid PM is the “Strength and availability of the project team”. This participant elaborates "They have their operative day-to-day tasks to perform and then when you introduce a project to them and start asking things from them, they often find it as a problem".

Related to human resource constraints, two of the participants identified commitment to the project as a major challenge. Interviewee 3 explains how commitment to the ERP implementation can be difficult to obtain: "this can be the human factor, meaning that the company did not initially provide resources and did not dedicate sufficient time towards the project”. Also that “it is always challenging for the PM of the client's side to secure the project team, that the project team has a buy-in in the project, that they understand the importance of the project, that they understand the deadlines and that they do not look at it as their last priority: "I can't do it today, I'll do it when I have time”

Scope creep was identified by three of the participants as a major challenge, meaning uncontrolled or excessive changes to the project scope or project requirements (PMI, 2013, p. 163). Interviewee 1 states "the potential never ending project, due to the never ending changing business customer requirements” can be a large challenge using hybrid PM.
Correspondingly, Interviewee 3 explains “if the clients are continuously changing their requests... then the project is prolonged, and the client must pay.”.

Project interdependencies are an explicit challenge of ERP implementation projects and was mentioned by three of the participants. Interviewee 5 explains this interconnection between the various modules of an ERP system: “In ERP implementation you see that everything is more or less interlinked so if you do something in production it interacts maybe with sales and it interacts with finance. So, you need multiple people in this whole end-to-end deliverable, and that makes it quite difficult to do it in an agile way”. Interviewee 6 congruently, expresses “It is crucial to understand to what other systems they connect through interfaces. As this can cause big problems if it is not clearly defined.”

Lastly, miscommunication was mentioned as a challenge by two of the participants. Interviewee 3 explains "It must be clear to everyone, well-communicated and everyone must go in the same direction, because if this is not well communicated, then you lose yourself throughout the project, people start complaining, they lose their motivation, etc.”. Interviewee 4 contributes that this challenge can arise from either party of the ERP implementation, suggesting a major challenge is "miscommunication from both sides".
5. Discussion

This section will discuss the empirical findings in the previous section to the existent literature presented in the theoretical background section, in attempt to bridge theory with practice regarding hybrid PM approaches in ERP implementation projects. Different areas of the relevant literature will be compared with the findings in order to potentially complement the existing theory. Finally, a framework for the use of hybrid PM approach for ERP implementation projects will be presented.

5.1 Critical Success Factors of Hybrid PM Approach

The existence of critical success factors for using a hybrid PM approach were not found in the theoretical background, rather most researchers discuss the factors used to determine how to choose a PM approach. The competence of the project manager and project team was highlighted by nearly all of the participants. This was also the most frequently mentioned critical success factor in the study. As mentioned in the analysis, responses regarding the project team and project manager ranged from broadly explaining the importance of having “good” team members to specifically identifying key roles and skills necessary for the ERP implementation to succeed. Several interviewees proclaimed the need for a good project team. Reliability, accountability, hardworking, and knowledgeable in their specific area were mentioned as important characteristics of project team members. This is aligned with the findings of Fui-Hoon Nah et al. (2001, p. 289) stressing the importance of personnel competence, suggesting that the cross-functional project team employed for an ERP implementation should consist of the most knowledgeable people in the organization. The findings of this study also cohere with Boehm & Turner’s (2004, p.20) claim that a highly motivated and knowledgeable project team is necessary for the successful use of APM. Correspondingly, this is aligned with the project team enablers for APM set out by Conforto et al. (2014), particularly the enablers “team experience/expertise” and “team knowledge about agile”. The findings of Lindvall et al. (2002, p. 203) regarding the criticality for the project team to possess personal characteristics, were in part confirmed in this study. Sense of accountability was recognized as an important trait of project team members when using a hybrid PM approach in ERP implementation projects. The other personal characteristics, collaborative attitude and willingness to learn, highlighted by Lindvall et al. (2002, p. 203) were not explicitly mentioned in this study. Many of the participants highlighted, although it is beyond their control, having a strong counter-part and project team for the client side as extremely important for a successful ERP implementation.

In terms of specific roles, the project manager and solutions architect were portrayed as the most critical roles by several participants. Having a project manager and front-line staff that have strong people skills, emotional intelligence, and a peaceful demeanor were considered critical by some of the participants. Moreover, several participants emphasized the need for a strong solution architect to set boundaries for the customer and deliver a solution that is aligned with the organization’s business and technical needs, as well as timeline and budget. A good Scrum Master, agile coaches, and change manager were also noted as important for the effective use of hybrid PM in ERP implementation projects. Although it was mentioned more as a challenge than a critical success factor by participants in this study, the project team’s commitment to the project was considered in literature as vital for a successful ERP implementation. Gergeya and Brady (2005, p. 510) emphasize the importance of the project...
team, particularly the need for project team members to be fully dedicated to the project, and be freed of other responsibilities within the company during the project duration.

Project planning and governance was mentioned by all participants of this study, as critical for the successful use of hybrid PM in ERP implementation projects. As prior mentioned, PMI (PMI, 2013, p. 56) explains project planning and governance consists of the preparatory activities and associated documentation, project organization, and alignment with stakeholders’ needs and objectives. Participants describe how conducting project planning and establishing the project governance, allows for greater organization and structure of the project throughout the project lifecycle and can act as a guide for the project. As mentioned in the theoretical background section, project planning is an essential element for both traditional PM and APM, although it is commonly associated more with traditional PM approaches. Gergeya and Brady (2005, p. 512) and Fui-Hoon Nah et al. (2001, p. 292) both recognized that effective project management regarding defining the scope, setting milestones, and planning are all crucial for the successful delivery of an ERP implementation project. Risk management was classified as a separate critical success factor, although sometimes is considered as part of project planning in literature. In fact, one participant highlighted the importance of initiating risk management early in the project lifecycle to pre-develop potential solutions. The use of risk management is commonly associated with traditional PM, although it is also important for APM. Cooke-Davis (2002, p.186) identified critical factors for on-time project delivery, many of which were based on risk management, including adequate organizational training on risk management, adequate and up-to-date risk management plan. Accordingly, one of the participants suggested that risk management is important for every methodology and therefore considers it a critical success factor for the use of a hybrid PM approach in ERP implementation projects.

Similarly, project vision, outlining the overall goal of the project, was highlighted in this study by three of the participants as critical for success. Participants explain that both parties must have a shared understanding of what is to be achieved through this ERP implementation or in other words the overall purpose of carrying out the project. One participant warns that it is necessary to define the client’s wants and needs at the beginning of the project to avoid enormous issues, like scope creep. It is further explained that using more agile practices with a client who does not know what they want or need can doom project success. Conforto et al. (2014, p. 24) identified the use of project vision as an APM practice. Nagpal et al. (2015) refer to this as ERP Implementation Strategy, which provides the big picture, the goals and objectives of what the ERP system is trying to achieve. They consider this to be critical for the successful implementation of an ERP system. Correspondingly, Gergeya and Brady (2005, p. 509) and Fui-Hoon Nah et al. (2001, p. 291) propose that it is critical to have a clear plan and vision of the strategic and tangible benefits, resources, costs, risks and timeline for the ERP system that is closely related to the organization’s objectives and scope. More specific, a clear understanding of the project requirements from both parties, was acknowledged in this study as critical for successful ERP implementation using a hybrid PM approach. Almost all of the participants mentioned this factor, highlighting the importance for both parties to maintain the same understanding. Evidently this requires effective communication between the parties and a shared understanding of the overarching project goals. Vinekar et al. (2006, p. 38-40) identifies the ability of the customer to communicate their requirements as a critical success factor for the project management approach used in ERP implementation projects. Moreover, this finding also adheres to White & Fortune (2002, p.10) claim that clear project objectives are one of the most critical factors for traditional PM
to deliver a successful project. Similarly, this aligns with PMI’s (2013, p.46) statement that compliance with the defined project requirements is vital for project success.

Establishing clear project boundaries was a new finding from this study, which was not recognized in literature relating to PM approach or ERP implementations. This critical success factor was mentioned by four of the participants, considered as vital for change management and for avoiding scope creep. Project boundaries provide a guide for the customer to understand what can and cannot be changed as the project progresses. One of the participants, suggested that project boundaries should be accepted and signed off by the customer to provide the project manager and project team security, while also producing a definitive reference for the customer. As ERP implementation projects suffer a high risk of overrunning the budget and schedule, clear project boundaries were acknowledged as a tool for managing the project within these constraints. Finally, one participant cautions, if the customer is given too much freedom to make changes throughout the project, the ERP implementation will likely be considered a project failure due to delivery over budget and/or schedule, or in some cases no final project delivery.

Correspondingly, change management was identified by several participants in this study as a critical success factor for hybrid PM in ERP implementation projects. Change management or control in terms of the project requirement is evidently critical for the project to be delivered within the triple constraints and to satisfy stakeholders’ expectations. Cooke-Davis (2002, p.186) identified a mature scope change control process and an established performance measurement baseline as critical for successful project delivery using traditional PM. Although an established control process was not mentioned by the participants nearly all agreed change management regarding project requirements is important for project success. Moreover, change management was recognized as becoming increasingly important given the modern business environment. One participant in particular highlighted the recent gain in importance of the organizational change manager and business change managers. Organizational change is necessary for the client to use the ERP system in the most optimal way and achieve the project goals and objectives. Interviewee 4 explains that most often difficulties arise in ERP implementations because of people resisting change, as opposed to issues with the solution itself. This confirms the findings of Ranjan et al. (2016, p. 394) that most ERP implementation failures are caused by people factors rather than issues of the solution itself. Moreover, the findings are aligned with that of Gargeya and Brady (2005, p. 511) concluding that the organization must be ready for change, as this is the most common factor related to ERP implementation failure in their case study. Change managers ensure that the necessary changes are communicated, undertaken, and committed to. In literature change management is often mentioned in relation to corporate culture, which was not specifically found in the analysis of this study. Fui-Hoon Nah et al. (2001, p. 288) identified change management and culture as critical for ERP implementation success. Similarly, Gergeya and Brady (2005, p. 512) explain that change management and culture are linked with understanding and managing the differences in culture and ways of doing things. They further suggest that internal preparation and training of employees is necessary for successful ERP implementation. Although these activities were not independently recognized as critical success factors, many participants did mention the importance of client support during the Deploy and Run phase to ensure the organization is ready for the “go-live” and can use the system.

In order for the necessary organizational changes to be made and the ERP to be successfully implemented, stakeholder support was recognized as critical in this study and literature. One participant highlights the importance of the project sponsor in establishing stakeholders’
support, stating that although the support from this role is extremely important, it is often neglected. Generally, it was recognized in this study that support from members higher in the hierarchy than the operational directors is necessary to obtain commitment and prioritization of the project. This is aligned with the findings of Fui-Hoon Nah et al. (2001, p. 288) and Gergeya & Brady (2005, p. 510) that top management attitude, support and commitment towards the project is critical for ERP implementation success. Management support and commitment was also considered a shared critical success factor of traditional PM and APM in the theoretical background of this study. Support from senior and mid-level management was reported as critical for traditional PM to be effective by Boehm & Turner (2004, p.13) and White & Fortune (2002, p.10). Regarding APM, managerial support was reported as a critical success factor by Boehm & Turner (2004, p.20) and Špundak (2014, p.944). The responses from participants in this study, adheres the research of Misra et al. (2009, p.1880) that supportive management and commitment from all stakeholders is necessary to implement APM.

Customer involvement and feedback was recognized by four of the participants as critical for successful use of a hybrid approach in the specific context. In literature intensive customer involvement and frequent customer feedback are considered to be critical for project success using APM (Boehm & Turner, 2004, p.20; Conforto et al., 2014, p. 24; Misra et al., 2009, p.1879). Participants of this study confirm this in further detail, advocating the need for the customer to be continuously involved providing feedback, clarifications, and approvals of project deliverables. Moreover, when using aspects of the Scrum methodology, it is important that the customer or a representative for the customer is present at the Daily Scrum meetings. Ongoing customer involvement and feedback was also recognized by one of the participants as a necessary component of the hybrid PM approach that contributes to establishing clear customer expectations.

Documentation was also mentioned by three of the participants as a critical factor and considered important for a variety of reasons. Some participants highlight that documentation provides proof of agreements and accountability, providing both the customer and project team with greater security. It was also suggested that by signing off on documentation, the project manager is able to better manage the project. Another participant explains that it is important to ensure documentation is not excessive and overly time consuming, however that project management without documentation is impossible. Furthermore, as ERP implementation projects commonly involve a large amount of people working on the project, the use of documentation in a hybrid PM approach allows for the recording of information to allow for easy recall. Documentation was acknowledged as a critical success factor of traditional PM, explained by Cooke-Davis (2002, p.188) that to achieve project delivery that satisfies stakeholders’ expectations and remains within the project constraints, extensive documentation is required. This documentation also facilitates transparency, accurate measurements and performance evaluation. Evidently, documentation is critical for the successful use of a hybrid PM in an ERP implementation project, however the extent of documentation remains unspecified.

Finally, testing was considered as a critical factor by one participant. This participant explains that testing before the Deploy and Run phase is vital to ensure that necessary changes are made before the “go-live”. This notion confirms the research of Gergeya & Brady (2005, p. 513) and Fui-Hoon Nah et al. (2001, p. 294) that adequate testing, troubleshooting and fixing the problems in a timely manner are critical factors for ERP implementation success.
The shared critical success factors of established benefits delivery and management process, as well as training of the project manager and project team recognized for traditional PM and APM in the theoretical background were not confirmed in this study. This does not justify the conclusion that these factors are not important for a hybrid PM approach, but rather that it was not mentioned by any of the participants interviewed in this study. The findings of this study relating to the critical success factors address the first research objective: determine the Critical Success Factors (CSFs) for successful ERP implementation projects using a hybrid approach.

5.2 Factors/Characteristics to be considered

Depending on specific project and organization characteristics and factors, a certain PM approach, whether it is traditional or agile might work better in a specific context, while the other might experience certain difficulties (Boehm, 2002, p. 64). Conforto et al. (2014) classified these factors into four categories: organization, process, project team and project type and others, while Vinekar determined three different levels: organizational, project and client organization. The identified factors in the Empirical Findings section indicated that a differentiation between them was possible, creating the following four categories: client (organization) characteristics, project manager/project team characteristics, project characteristics and external factors. The codes were, therefore, grouped in the identified categories in the following way:

Table 19: Assessment Criteria of PM Practices.

<table>
<thead>
<tr>
<th>Client (Organization)</th>
<th>Project manager/team</th>
<th>Project</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corporate Culture</td>
<td>Knowledge/Experience with Methodology</td>
<td>Project Type</td>
<td>Culture (Country Specifics)</td>
</tr>
<tr>
<td>Existing Solutions</td>
<td>Project Manager/Team Style</td>
<td>Project Size</td>
<td>Industry</td>
</tr>
<tr>
<td>Stakeholder's Support</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organizational Structure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customer Requirements</td>
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<td></td>
<td></td>
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</tbody>
</table>

In summary, the main factors/characteristics of adopting a certain PM approach identified in the literature review were: size of the project team, strategic importance of the project, the degree of dynamism or volatility of the environment, the competence of personnel, the compatibility with the established company structure, user requirements, organizational structure, strong executive support and project complexity among others (Betra et al., 2010; Boehm, 2002; Conforto et al., 2014). Although the empirical results indicate many similarities, there are some additional factors that were identified related to the specifics of the ERP implementation context.

Examining the client characteristics, in the ERP implementation context it is important to understand the history of the company, meaning its already existing software solutions. This will determine the number of project interdependencies, complexity, as well as interlinking it with the customer knowledge/experience of using certain software solutions. Stakeholder’s support is related to the support of the customer sponsor (executive support) but the findings additionally identified the importance of the support of the solution’s users, the main
customers of the product. The findings of the factors corporate culture and organizational structure are aligned with the literature review. Therefore, more flexible, adjustable and open-minded companies built on innovation are more suitable for adapting an APM approach, compared to companies surrounded by bureaucracy and formalization (Nerur et al, 2005). From a consultant’s side, the ability of customers to clearly communicate their requirements and a good understanding of their business processes is crucial when determining the PM methodology used. This result supports Imani et al. (2017) findings that hybrid approaches are more applicable for high customer uncertainties compared to pure APM approaches. Although in literature APM approaches are characterised by evolving customer requirements and changes, (Vinekat et al., 2006), the findings of this research indicate that adopting a completely agile approach could potentially put the project in danger if the customer perceives “agility” as an unplanned and undisciplined approach.

When examining the project management/team characteristics, the factor knowledge and experience with the PM methodology is closely related to the factor identified in the literature review: competence of personnel. This was confirmed by interviewee 3 who mentioned the difficulties of introducing agile practices to the customers if they had no previous experience with the approach. The client’s knowledge/experience of the methodology used in implementing previous projects can therefore significantly influence the combination of agile and traditional PM practices used for implementing the specific project. If the PM and project team style is collaborative it could lead to incorporating more agile practices, while an “old school” command and control style could lead to more traditional practices throughout the project life-cycle.

The characteristics of the specific ERP implementation project are also important to take into account. Therefore, the same PM approach is not appropriate if a specific module or multiple modules of the ERP are being implemented. Similarly, the approach is different if the solution is being implemented in one or more countries simultaneously. Once again, it is different if it is mostly a standardized solution or if significant customization and development is required, and so on. The findings suggest that an agile approach is more applicable for less complex projects with a smaller scope, for project teams that are geographically co-located and for projects that require software development opposed to pure implementation of standardized solutions. These findings confirm and complement the existing literature (Boehm, 2002, p. 64; Lindvall et al., 2004, p. 30). Consequently, factors such as project type and its complexity, as well as project size and its overall planned duration can determine the direction the project management and team decide to take in terms of the PM methodology. It was found that undertaking a completely agile approach could potentially lead to project failure due to the complexity, project interdependencies and size of ERP implementations, as these projects can involve numerous users from the customer’s and consultant’s side. Therefore, adopting a hybrid PM approach would be more beneficial.

One of the main contributions of this thesis is this identification of external factors that can impact the choice of an ERP implementation methodology. While the literature identifies the degree of dynamism or volatility of the environment (Boehm, 2002) which can potentially be classified as an industry factor, this thesis complements the literature by identifying the importance of culture from a country or regional perspective, specifically the country the company is operating in. The volatility of the environment is emphasized in the empirical findings through the importance of differentiating between a public and private sector company. A public company is not accustomed to experiencing a lot of changes and therefore it can be challenging to adopt an agile approach. In contrast, private companies are more familiar with changes and the dynamic business environment which may lead them to be
more open minded to adopting a different and new approach when implementing software solutions. The culture of the country the company operates in and country specific characteristics were factors mentioned in great extent by all interviewees. The country may have certain legal restrictions or barriers that may limit the company in taking a certain approach. For example, the legal requirements may necessitate a more bureaucratic, formalized process that could be heavy in the use of documentation. As all of the interviewees have undertaken at least one project in Croatia and/or its accompanying region, they have all stressed the differences in implementing ERP solutions in different countries due to the country’s history, culture, mentality and ways of doing business and/or projects. The importance of having cultural knowledge regarding how projects are performed in certain countries is highlighted. Interviewee 5 gave a positive example of when cultural specifics were taken into account in the appropriate way by employing people on a specific project with not only ERP implementation knowledge but also a cultural understanding of the country the project was being performed in. These cultural factors present key empirical findings as they are not outlined and emphasized in the literature review.

All these factors can serve as a base when deciding on the combination and/or extent of traditional and agile PM practices, techniques and tools. Therefore, they can be used as assessment criteria when determining the blend of agile and traditional PM practices and techniques for ERP implementation projects. These findings partially offer the answer to the first part of the research question: “How are traditional and agile project management approaches blended in ERP implementation projects?” and contribute towards the second objective of this research.

5.3 Project Management Practices

The empirical findings of the section PM Practices explored the most common used PM practices, activities, tools and techniques when implementing ERP projects. This section will group these identified practices into traditional PM and APM practices by comparing the extensive literature on PM practices. Although in some cases a PM practice could have been classified as both traditional and agile, in the end it was classified in only one category depending which characteristics or activities were more similar to a specific PM approach with an exception of the practice “testing” which was grouped in both. Furthermore, it was found that the term “agility” presented different interpretations and possible misconceptions regarding the definition of the concept. This is not surprising as to date there is still no agreed upon, formal definition of APM among academics. The confusion can be spotted in the quotes by interviewee 2: "If by agility you mean the speed we react and adjust our behaviours depending on current needs/challenges then the agile approach is present in the Realize phase.", interviewee 5: “That goes back again to what do you consider agile. Agile for me is sometimes a bit of a buzzword. But, it’s how you see it. So for me it is hard to say.” and interviewee 4: "And then you bring in the agile, which actually the scope, time and sometimes budget can be a little bit in danger with this methodology, if the customer is not aware what does that mean.” Interviewee 2’s perception of “agility” is similar to the one defined in the literature by Conforto et al. (2016, p. 667) as “the project team’s ability to quickly change the project plan as a response to customer or stakeholders needs, market or technology demands in order to achieve better project and product performance in an innovative and dynamic project environment.” However, as indicated in the literature, it is important to differentiate between agile methods and agility (Cobb, 2011, p. 4). Correspondingly, it was found in this study that when differentiating between these concepts, there is a strong misconception and confusion among practitioners in ERP implementation projects. Again, this is not surprising
as APM methods have just recently been introduced into ERP implementation methodologies in a more formalized way.

When analyzing the overall ERP implementation methodology, it is clear that it consists of several sequential phases, each focusing on a set of key deliverables and milestones which are part of the standardized WBS. Therefore, the overall methodology has the characteristics of a traditional PM as the phases are assumed to be completed in a sequential manner and future revision of completed phases is assumed not to be necessary (Hass, 2017, p. 1). The use of scheduling tools such as the WBS is considered to be a traditional PM tool (Conforto et al., 2014, p. 27; Fernandes, et al., 2013, p. 16).

Table 20: Traditional and Agile PM Practices.

<table>
<thead>
<tr>
<th>PM Practices/Phases</th>
<th>Prepare</th>
<th>Explore</th>
<th>Realize</th>
<th>Deploy &amp; Run</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Traditional PM practices</strong></td>
<td>Documentation</td>
<td>Detailed Design Document (Business Blueprint)</td>
<td>Testing</td>
<td>Cut-Over Activities</td>
</tr>
<tr>
<td>Project Planning/Governance</td>
<td>Training</td>
<td>Training</td>
<td></td>
<td>&quot;Go-live&quot;</td>
</tr>
<tr>
<td>Kick-Off Meeting</td>
<td>Risk Management</td>
<td></td>
<td>Final Documentation</td>
<td>Support</td>
</tr>
<tr>
<td>Risk Management Pre-Workshops</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Agile PM practices</strong></td>
<td></td>
<td>Fit-Gap Analysis</td>
<td>Use of Scrum</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High Level Design Document (Backlog)</td>
<td></td>
<td>Iterations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Use of Scrum</td>
<td></td>
<td>Testing</td>
<td></td>
</tr>
</tbody>
</table>

The Discover phase was not included in the discussion as it involves activities before the actual start of the project. Therefore, these activities are more connected to the pre-sales and negotiation rather than the PM practices. The Prepare phase is a combination of the Initiation and Planning process groups established by the PMI (2013). It more or less follows the traditional practices, tools and techniques such as extensive documentation, detailed project planning and governance, kick-off meeting, risk management and workshops. The project planning and governance consist of setting up the project teams, the project organization, the hierarchy, establishing the project standards and communication plans. These practices can be compared to the traditional PM practices such as the Responsibility Assignment Matrix and communication plans (Fernandes et al., 2013, p. 6). Furthermore, this phase is considered to be a standardized phase with clear templates and activities that need to be followed through. Therefore, it resembles a waterfall approach with the key deliverable being the project kick-off, a symbolic ritual where the project team initiates the project which is aligned with the literature on traditional PM practices (Fernandes et al., 2013, p. 11).

The Explore phase combines both traditional PM and APM practices and can be related to the Planning process group established by PMI (2013). The main differences that can occur are in the extent of documentation comparing the detailed design document (Business Blueprint)
with the high level design document (Backlog). The detailed design document (Business Blueprint) can be compared to a Detailed Requirement Analysis, Project Scope Statement and WBS (Fernandes et al., 2013, p. 6). On the other hand, the high-level design document (Backlog) can be compared to the Product Backlog which is a Scrum artefact. The Product Backlog is a prioritized list of product requirements (Azanha et al., 2017, p. 130; Cervone, 2011, p. 21; Batra et al., 2017, p. 383) which are delivered through the sprints in the next phases. The Fit-Gap Analysis or Fit-to-Standard analysis according to the SAP terminology is a practice or activity specific for ERP and other software implementations. The Scrum methodology was created with software development projects specifically in mind, while the Fit-Gap Analysis is used when more standardized, “best-practice” solutions are introduced to the customer, requiring minimal customization and development. This practice is also not mentioned in traditional practices. According to interviewee 4, the fit-gap analysis is really about offering the customer a predetermined solution and then identifying the gaps between what SAP is offering and what the customer really wants and needs. The reasons why the researchers decided to classify this practice as an APM practice are the following: (1) it shows the agility of the implementer/provider by coping and adapting to the dynamic industry trends, increasing customer demands and providing solutions to customers with a fixed budget and limited time and (2) the benefits this approach generates can be related to the benefits of APM practices, such as faster and continuous project delivery and earlier implemented value. This is confirmed by interviewee 1, stating that the fast changing markets and increased competition have led to the necessity of implementing solutions in a shorter time. Moreover, this phase also includes more traditional practices such as trainings and risk management or contingency planning. It can also be more adaptable in the sense of already using Scrum practices, such as the Daily Scrum meetings.

The Realize phase is heavy in the usage of APM practices, through a series of iterations and specifically the use of Scrum practices. It can be compared to the Execution process group, as well as partially the Monitoring and Control established by PMI (2013). The main activities of Scrum consist of: Sprint Planning, Sprint Realization, Daily Scrum meetings, Sprint Review and Sprint Retrospective which are slightly adapted to the activities suggested by Cervone (2011, p. 20), and Schwaber and Sutherland (2013, p. 7). The project team roles are also consistent with the ones suggested by the Scrum methodology: Scrum Master, Product Owner and Scrum Development team. The more traditional practices in this phase are continuous trainings and testing of the solution. The testing activity can be traditional, agile or even hybrid depending on how it is performed. If the testing results in project deliveries at the end of each sprint it is done in a more agile way. However, if testing is done throughout the process but results in only one project delivery at the end of the phase it is performed in more of a traditional manner. This phase can also be flexible and adjustable by introducing cycles within the phase as suggested by Fetouh et al. (2011, p. 177). SAP Activate also offers the possibility of adopting a hybrid approach in this phase.

The Deploy & Run phase can be compared to the Closing and partially the Monitor and Control process groups established by PMI (2013). As with the Prepare phase, this phase mostly consists of traditional practices, such as cut-over activities that include data migration, system “go-live”, final administration and documentation, and supporting “post-live” activities. The final deliverable of this phase is the system “go-live” and sign-off phase deliverables from the implementer’s and client’s side. This activity can be compared to the traditional PM tool of Client Acceptance Form of the Closing process group (Fernandes et al., 2013, p. 6). However, this phase can be shorter and have a smaller scale if an APM approach was deployed in the previous phases. As interviewee 1 states, this would lead to confirming
the solution by the customer already in the Realize phase and entering the Deploy phase with only minor adjustments that still need to be performed.

The findings show different PM practices and activities used in ERP implementation projects. While the phases Prepare and Deploy & Run are mostly traditional, the phases Explore and Realize can be flexible and adjustable when determining which traditional and/or agile practices to utilize. However, although the first and last phases are more traditional, they can still be adapted to an extent. For example, by introducing Scrum practices already in the Prepare phase so the project team familiarizes with them. Additionally, the Deploy & Run phase can be compressed by having a clear mutual understanding of the solution and its deliverables from the implementer’s and client’s side. These findings partially offer the answer to the first part of the research question: “How are traditional and agile project management approaches blended in ERP implementation projects?” and contribute towards the third objective of this research.

5.4 Major Benefits of Hybrid PM Approach

Many of the benefits outlined in the analysis of this study were present in the literature. As prior mentioned hybrid PM approaches have received limited attention in the research field, information regarding the associated benefits is highly limited. Albeit, the results of this study did confirm some of the identified benefits of using a hybrid project management approach. Efficiency was mentioned as a benefit of using a hybrid PM approach in ERP implementation projects by one of the participants. Although this was not explicitly mentioned by the interviewee, it was implied that by employing the effective traditional PM techniques and abandoning the ineffective traditional PM techniques, project management can be more efficient. Additionally, the integration of agile practices in the hybrid PM approach, contributes to this improved efficiency. This finding was consistent with the research of Cram and Marabelli, (2017, p. 1). The participant who mentioned this major benefit, discussed in detail the use of daily meetings, consistent with the Scrum methodology, as a major source of greater efficiency and reduced time spent in unproductive meetings, to allow for the project team to focus on required project tasks. The performance benefits of information accuracy, commitment and leadership found in the research of Conforto and Amaral (2016, p. 12), were not confirmed in this study. Although several participants mentioned their fondness of the Activate and other hybrid approaches, improved project success rates and cost reduction were not explicitly identified as benefits of this PM approach, as was reported by Imani et al. (2017, p. 42).

Flexibility and adaptability was identified as a major benefit of using a hybrid PM approach by the greatest number participants in this study. In literature, this is highlighted as one of the most significant benefits of agile PM, and a major challenge of traditional PM (Augustine et al., 2005, p. 87; Bredillet, 2013, p. 13; Serrador & Pinto, 2015, p. 1041). In their research Serrador and Pinto (2015, p. 1041) concluded that flexibility in PM can reduce the amount of rework and allow for responsiveness to changes. The reduction of rework was noted in this study, categorized as the benefit of efficiency; where responsiveness to change was included in the benefit of flexibility and adaptability.

As mentioned in the analysis section, the benefits of earlier implemented value and established customer expectations appear to be interconnected, as delivering value earlier in the project was considered important for establishing realistic customer expectations. Both of these benefits are mainly derived by the agile practice of continual project delivery throughout
the project lifecycle. Although these specific benefits were not found in the literature, they are likely very closely related to the APM benefits of higher stakeholder satisfaction and improved perceptions of overall project success. Establishing realistic customer expectations that are aligned with a set of agreed upon project requirements, limits any element of surprise when the final project delivery occurs. Stakeholders’ expectations were recognized as a critical success factor for both traditional PM and APM (Cooke-Davis, 2002, p.186). PMI (2013, p. 53) explain involving project stakeholders can help establish a common definition of project success, improving stakeholder buy-in and ultimately the acceptance of project deliverables and overall stakeholder satisfaction. The ability of APM to achieve superior stakeholder satisfaction was described as a major benefit of the approach by Batra et al. (2017, p. 387), Cobb (2011, p. 60), and Dybå, and Dingsøyr (2008, p. 850). As described by many of the participants in this study, establishing customer involvement throughout the entire project lifecycle, transparency, and effective communication are important for the delivery of a successful ERP project. The blending of traditional and agile PM practices and principles, results in earlier implemented value for the project customer to understand the deliverable, therefore establishing clear customer expectations throughout the project lifecycle, likely resulting in improved acceptance of the project deliverable and stakeholder satisfaction.

Faster project delivery was identified as a major benefit of using a hybrid PM approach for ERP implementations in this study. This was found as a benefit of APM in the research of Serrador and Pinto (2015), Budzier and Flyvbjerg (2013), Azanha et al. (2017, p. 121), and Bredillet (2013, p.13). Interviewee 1 of the study, emphasized the need for faster project delivery in contemporary markets for the client to remain competitive. This emphasized the significance associated with the benefit of faster project delivery, as contemporary markets are constantly recognized as dynamic and rapidly changing across literature and practice.

Finally, the appropriateness of hybrid PM for all project sizes was recognised as a significant benefit of the approach. There is substantial debate regarding the application of APM to large projects, with both advocates and sceptics (Batra et al., 2017, p. 380; Boehm & Turner, 2004, p. 20). Lindvall et al. (2004, p. 30) asserts APM is best suited for small co-located projects with changing environments, where traditional PM is more appropriate for large-scale, distributed projects with stable environments. In this sense, blending traditional and agile PM practices and principles, can address and overcome the potential challenge of scalability. Interviewee 4 of this study advised that agile methodology on large scale and lengthy projects can be highly problematic and lead to project failure. Consequently this participant explained that by blending methodologies using Activate, agile practices can successfully be employed for large projects. Hybrid project managements were considered by two of the participants in this research as applicable for all project sizes, as the project manager can adjust the PM approach to incorporate more traditional or agile practices based on the characteristics of the specific project. This finding is consistent with the research of Imani et al. (2017) who concluded that hybrid approaches are more scalable than APM approaches, and also more applicable in large-scale projects with higher requirement uncertainties.

These findings answer the second part of the research question of this study: what are the associated impacts? Moreover, the final research objective in part was addressed regarding the main benefits and challenges of adopting a hybrid PM approach for ERP implementation projects.
5.5 Major Challenges of Hybrid PM Approach

Ranjan et al. (2016, p. 400) suggest the main goal of an organization involved in an ERP implementation should be to select an ERP implementation methodology that leads to cumulating higher operational efficiency and effectiveness, to ultimately achieve competitiveness. Albeit, this is a challenge that is significant and specific for ERP implementations. As ERP solutions have evolved, so have the ERP implementation methodologies and models used to conduct this type of project. ERP methodologies, much like PM, are moving from more traditional towards agile project approaches. Many of the participants in this study identified lack of customer’s experience regarding PM methodology as a major challenge for successfully using a hybrid approach. Two participants specifically explained how for many customers this is the first time they are implementing a project of this type, scale, and requiring such drastic change within the organization. For this reason, customers often lack knowledge of ERP implementation methodologies. Other participants explained how customers with existing SAP solutions, were familiar with previous methodologies, but unaware of new methodologies, like Activate. This unawareness was identified as challenging, because it requires the project manager to take the time and effort to explain the new methodology and manage resistance. It was highlighted in the interviews that many organizations find it difficult to transition from a methodology they are comfortable with to a new methodology, irrespective of the benefits of a new methodology. In this manner, whether the company is entirely new to ERP implementation or has existing software solutions, lack of knowledge about current methodologies can be a substantial challenge for the use of hybrid PM in ERP implementation projects.

Correspondingly, resistance to change was highlighted as a major challenge by most of the participants in this study and is a recurring theme in literature. As mentioned in the analysis, resistance to change is not limited to the use of hybrid PM approach in ERP implementation projects but rather a more generic challenge faced in a wide variety of projects. In the analysis it became obvious that resistance to change was viewed on two distinct levels. Some participants discussed resistance to change regarding the use of methodologies used to implement the ERP system. These participants explained how it can be difficult to break the habits of people whom are comfortable with a different methodology to adopt and utilize a new methodology. In their research Dikert et al. (2016, p. 98) specifically discuss the challenges of utilizing a hybrid PM approach. It was concluded that the use of a hybrid approach in which two approaches are employed simultaneously, can cause tension and disagreement on all organizational levels. This is consistent with the research of Nerur et al. (2005) who concluded that management, organizational, people, and processes issues often occur when migrating towards APM. This is also aligned with the findings of Boehm and Turner (2005, p. 30) who identified business process and people conflicts as main challenge when implementing APM approaches in traditional organizations. Cobb (2011, p.64) outlines corporate culture as a major obstacle for successful employment of APM methods, explaining how management and leadership styles can be unaligned with APM, leading to resistance towards the new methodology. This is similar for the use of hybrid as it requires people to work in a different way than they have previously. Moreover, this finding poses challenges for the success factor of project team dedication to the approach, that was mentioned in literature for both traditional PM (Boehm & Turner, 2004, p.16) and APM (Misra et al., 2009, p. 1880).

From a broader and client-based perspective, the implementation of an ERP system requires substantial organizational changes. As ERP implementation affects the entire organization,
from its processes, people and culture, organizational resistance to change may be amplified in this type of project. Organizational change is most often required to ensure that the ERP system and business processes are compatible. Any changes to the business processes directly impacts the people using these processes and frequently requires a change of attitude and the way they work. Consequently, most ERP failures are the result of people factors rather than issues with the solution itself (Ranjan et al., 2016, p. 394). Gargeya & Brady (2005, p. 511) conclude that the most common factor related to ERP implementation failure in their case study was “readiness for change”. This notion was strongly confirmed in this study, as resistance to change was mentioned by most of the participants on numerous occasions. Moreover, stakeholders support, in particular support from end-users was highlighted by participants as often difficult to obtain but critical for successful implementation of an ERP system. Effective communication can help overcome the challenge of resistance to change, as it is important for the project manager to establish this across all stakeholders. Although miscommunication was not identified in the literature as a major challenge of hybrid PM, it was mentioned by two participants in this study. Likewise, developing a communication plan was mentioned as an important part of project planning and governance, which was considered critical for the successful delivery of an ERP implementation project. Furthermore, in the research of Fui-Hoon Nah et al. (2001, p. 288), effective communication was recognized as a critical success factor for ERP implementations.

Resource constraints has become a common topic of conversation in contemporary PM literature and practice. Organizations are increasingly facing dilemmas regarding fixed budgets, as well as time and resource restrictions. As ERP implementation projects often comprise of the largest projects an organization has taken part in, considerable amounts of resources and commitment are required. ERP implementation projects consist of a complex and active process, involving both technological and organizational interactions (Moon, 2007, p. 243). Consequently, this specific type of project has a tendency to overrun the budget and timeline, while also failing to deliver the expected benefits (Zare Ravasan and Mansouri, 2016, p. 65). Correspondingly, three of the participants identified resource constraints as a major challenge specifically for PM in ERP implementation projects. Although resource constraints are a shared challenge for most projects, as ERP implementations are most often large and demanding projects, this challenge is amplified. Specifically, regarding the use of hybrid PM in this type of project has its challenges. One of the participants emphasized that using agile practices with a project characterized by a fixed budget, schedule, and scope can be extremely difficult. Another participant explains how with agile methodology the scope, time, and budget can be in danger. Other participants confirmed the literature, detailing how in today’s markets customers are demanding faster ERP implementations within more limited budgets. Some participants suggest that the methodology used in ERP implementation projects must reflect this change in the markets, by using more agile practices to speed up the process.

Human resources pose another major constraint for the use of hybrid PM in ERP implementation projects. One participant in particular highlighted the major challenge of employing a project team with both strength and availability. The project team and project manager were identified as a top critical success factor, however to employ the right people and establish their commitment to the project can be a major challenge. Two of the participants proclaimed commitment to the project as a significant challenge. Participants explained the difficulties of having a project team whom is not fully dedicated to the project and therefore required to undertake project tasks, in addition to their operative day-to-day activities. This is aligned with the findings of Conforto et al. (2014, p. 30), whom deemed distributed project teams and the lack of full-time dedicated team members as a major
challenge of APM. Furthermore, as ERP implementation projects require substantial changes from end-users and potentially deem some positions obsolete, project team commitment and buy-in to the ERP implementation can be extremely difficult to obtain and must be handled with sensitivity. These insights from the analysis of this study are consistent with the challenges of APM reported in the research of Cobb (2011, p.64) in relation to challenges of corporate culture and Misra et al. (2009, p.1879) in relation to customer commitment.

Three of the participants in this study mentioned scope creep as a major challenge of using hybrid PM in ERP implementation projects. As mentioned in the analysis, this represents uncontrolled or excessive changes to the project scope or project requirements. Scope creep often causes projects to overrun the budget, schedule, and scope (PMI, 2013, p. 163). Interviewee 1 refers to this challenge as "the potential never ending project, due to the never ending changing business customer requirements". This challenge is closely related to the critical success factors of clear understanding of project requirements and clear project boundaries. Participants highlighted the importance of setting boundaries for the customers, to manage changes to the project requirements. If this is not well established and the customer is given too much freedom to make changes throughout the entire project lifecycle, the project will be delivered over budget and schedule. Considering the limited budgets and need for fast project deliveries to meet the needs of organizations competing in dynamic markets, scope creep can be a challenge with substantial implications. In contrast, “gold plating” was described in literature as a major challenge of traditional PM. Gold plating occurs when the project team adds more feature than required, most often with associated increases in time and budget. As customers and project sponsors are only involved in the initial phase when using traditional PM, often it is very difficult for the customer to communicate all of their requirements (Hass, 2007, p. 1) and for the project team to develop a detailed scope statement, based on the limited information (Špundak, 2014, p.941). In this sense the risk of gold plating is higher and will most likely lead to customer dissatisfaction (Serrador and Pinto, 2015, p.1041). Using a hybrid PM approach may reduce the risk of gold plating as the customer is involved throughout the entire project lifecycle. For this reason, scope creep is a more prominent challenge when using a hybrid PM approach.

Project interdependencies pose a specific challenge for ERP implementation projects. As the ERP systems consist of several modules and impacts numerous departments, project interdependencies can pose substantial barriers in this type of project. Participants of this study acknowledge this challenge, cautioning that even small changes have widespread implications across the ERP system and organization. In this sense, the importance of analysing and testing changes was highlighted. Moreover, one participant also emphasizes the criticality of understanding the interfaces between the implemented ERP system and existing solutions to ensure customer benefits are actually achieved. This confirms the notion outlined by Hass (2007, p.1) that projects rarely follow the assumption of traditional PM that projects are fully or relatively isolated from their environment. Therefore, it is important to understand the interdependencies within and between software solutions to achieve optimal and aligned processes.

These findings are also a response to the latter part of the research question regarding the associated impacts of using a hybrid PM approach for ERP implementation projects. As with the major benefits outlined in the previous sub-section, these findings achieve the fourth research objective.
5.6 Hybrid PM ERP Implementation Framework

Through the analysis and discussion sections, it became clear that the various themes were highly related. For this reason and to derive a tool for practical implications, a framework demonstrating these relationships was developed and can be seen in Figure 5.

The critical success factors for using a hybrid PM approach for an ERP implementation project remain important regardless of the project specifics. Conforto et al. (2014, p. 25) define critical success factors as internal and external factors that impact both the adoption and effectiveness of a PM approach. In this framework the critical success factors are considered important for using a hybrid PM approach, irrespective if the PM approach is more predominantly traditional, agile or an even combination. These factors were considered vital by the participants of this study and most were also supported by theory as being important for either traditional PM, APM, hybrid PM, or ERP implementation projects in general. The theme “factors/characteristics to be considered” used in the analysis, comprises the assessment criteria of this framework. This assessment criteria indicates to the project manager if the PM approach should utilize more traditional or agile practices. Consequently, this allows the manager to capitalize on the flexibility of hybrid PM approaches to find the best combination given the client, project manager and team, project specifics, and environment in which the project operates. Based on the assessment criteria the project
manager and project team can decide to plan and execute the project using the most beneficial approach. As mentioned the Prepare and Deploy & Run phases will predominantly utilize traditional PM practices, tools and techniques, regardless of the factors and characteristics that are considered. However, when it comes to the Explore and Realize phases, the assessment criteria can be referred to for determining the extent and selection of traditional and agile practices to be employed. As a result of blending both traditional and agile tools, techniques, and practices to form a hybrid PM approach, certain benefits are achieved. For example, the use of Scrum methodology in the Realize phase requires frequent project deliveries contributes to the benefit of earlier implemented value, realistic customer expectations, and efficiency. In contrast, the use of a hybrid approach across the phases of an ERP implementation project can lead to significant challenges. In this sense, an example could be that the project manager decides to use a more predominantly agile approach for a company that should have been assessed as requiring a more traditional approach. This unalignment may lead the project team to heavily use agile practices in the Explore and Realize phase. As a result, resistance to change and a lack of commitment to the project could occur. Evidently, the themes of this research are highly interrelated. The hopes of this study is to provide a framework to drive future research on the critical success factors, an established assessment criteria, and the major benefits and challenges of using a hybrid approach for software implementation projects. Moreover, it is intended that this framework be a tool for practitioners to improve the success rates of ERP implementation projects. Finally, this framework collectively addresses the research question and all of the research objectives in a simplified, visual model.
6. Conclusion

This section starts with an overview of the key findings generated from the study by highlighting the answers to the research question and objectives. It continues with an outline of the managerial and theoretical implications, and concludes with outlying the study limitations and suggestions for future research.

The literature recognizes the lack of empirical research on the possibility of blending traditional PM and APM and which practices could potentially complement each other through creating a hybrid PM approach. As the suitability of a PM approach highly depends on the context (Highsmith, 2009, p. 23; Leybourne, 2009, p. 524), it was found that the use and fittingness of a hybrid PM approach in ERP implementation projects is widely under-researched and unexplored (Kraljić & Kraljić, 2017). As ERP implementation projects are characterized by high complexity which constitute of substantial risk, budget and time investments, it is clear that a single, “universal” PM approach cannot be applied to all projects. With the increasing popularity and research on APM practices, techniques and tools and the shift in ERP implementation methodologies, the ERP implementation context was found to be an excellent ground for studying the applicability of a hybrid PM approach. The study is exploratory in nature as it aims to explore how traditional PM and agile PM approaches are blended in ERP implementation projects and their associated impacts. Specifically, it examines the CSFs of a successful ERP implementation using a hybrid PM approach and explores the main factors that should be considered when choosing an appropriate ERP implementation methodology. Furthermore, it examines which traditional and agile PM practices are used in each phase of an ERP implementation project and investigates the associated benefits and challenges of adopting a hybrid PM approach. The study focuses on a case study of implementing ERP projects using SAP implementation methodologies. As the theory of APM is in an intermediate stage of development (Edmondson & McManus, 2007), while hybrid PM is still in its infancy, further exploration is required and qualitative research methods were used. Semi-structured interviews conducted via Skype were used to collect the data and a combination of template analysis and inspired grounded theory to analyze the data. Additional sources were utilized such as internal documents and the company’s websites to complement and confirm the data findings. The themes of the analysis were developed through an extensive literature review of traditional, agile, hybrid and ERP implementation approaches and included: critical success factors (CSFs), factors/characteristics to be considered when implementing an ERP project, PM practices used in ERP implementation, and benefits and challenges of adopting a hybrid PM approach in the ERP implementation context.

The findings identified 11 CSFs for a successful ERP implementation project. These are factors that are considered to be critical regardless of the PM approach deployed and combination of agile and traditional PM practices. Project managers need to consider these factors before and throughout all of the implementation phases in order to deliver successful ERP projects. The 11 CSFs identified are similar to the CSFs for ERP implementations identified by Fui-Hoon Nah et al. (2001) and Gergeya and Brady (2005). Some of the CSFs were found to have elements of CSFs of traditional and/or APM approaches which is consistent with the exploration of a hybrid PM approach. The CSFs personnel competence of the project manager and project team, project vision, customer involvement and feedback are mostly associated with APM approaches, while project planning and governance, risk management, documentation, clear understanding of project requirements are usually related to traditional PM practices. Change management and stakeholder’s support can be associated
with the CSFs for both traditional and APM approaches, while testing is a specific CSF related to ERP implementation projects. Finally, establishing clear project boundaries was found to be a CSF not previously identified in the literature but being vital for change management and avoiding scope creep.

Moreover, the empirical findings identified 11 factors/characteristics that should be considered when determining the combination of traditional and agile PM practices in a hybrid PM approach. The factors were classified in the following four categories: client (organization) characteristics, project manager/team factors, project characteristics and external factors. The first three categories are similar to the factors identified in the literature (Betra et al., 2010; Boehm, 2002; Conforto et al., 2014) except for the factor of the company’s existing solutions which is specific for the ERP implementation projects. The impact of external factors, specifically the importance of culture and country specifics when considering a certain PM approach, has not previously been emphasized in theory. These factors can be used as assessment criteria when determining the combination of agile and traditional PM practices, tools and techniques for a specific ERP implementation project. The study identified traditional and agile PM practices, tools and techniques used in ERP implementation projects in different project phases. It was found that ERP implementation projects usually consist of 4-5 phases, specifically for SAP Activate these phases are: Discover, Prepare, Explore, Realize, Deploy & Run. The findings showed that the phases Prepare and Deploy & Run are more traditional with most of the practices being standardized and heavy on the use of traditional PM practices such as: extensive documentation, project planning/governance, cut-over activities and so on. The middle and longest part of the project life-cycle, the phases Explore and Realize were found to be more adaptable, customizable and suitable for adopting a combination of traditional and agile PM practice, tools and techniques. Specifically, for the SAP Activate methodology, a formalized way of adopting an agile PM approach is utilized in the form of Scrum practices. These are the phases where the assessment criteria can be utilized in order to combine traditional and agile PM practices depending on the company and context of the ERP implementation.

By utilizing a hybrid PM approach in practice, practitioners have to be aware of the benefits but also the challenges this approach may cause. The major benefits of using such an approach identified in the findings of this study were: flexibility/adaptability, earlier implemented value, established customer expectation, faster project delivery, suitability for all project sizes and efficiency. As the SAP Activate approach introduces elements of an agile PM methodology, most of the benefits derived are the benefits of an APM approach as identified in the literature (Augustine et al., 2005, p. 87; Bredillet, 2013, p. 13; Cram and Marabelli, 2017, p. 1; Serrador and Pinto, 2015). The finding appropriateness for all project sizes is consistent with the research of Imani et al. (2017) who concluded that hybrid approaches are more scalable than APM approaches, and also more applicable in large-scale projects with higher requirement uncertainties. The major challenges that can arise in adopting a hybrid PM approach or in ERP implementation projects in general are: lack of customer experience with the methodology, resistance to change, resource constraints, scope creep, project interdependencies, commitment to project and miscommunication. Some of the ways of overcoming these challenges are tied to the identified CSFs of the findings. As there were clear connections between the themes and how they impact each other, the final output of this study was the development of an Hybrid PM ERP Implementation Framework providing an answer to the research question initially posed in a simplified and visual way.
6.1 Research Contribution

As the main purpose of this research was the bridging of theory and practice in the context of ERP implementation projects, the results are aimed towards academics and practitioners alike. The findings of the thesis provide recommendations and practical implications primarily for practitioners in the ERP implementation field. The main output of the research provides a preliminary framework practitioners can use when determining the combination of agile and traditional PM practices used for a hybrid PM methodology. This framework, consisting of the critical success factors (CSFs), assessment criteria to be considered when determining the combination of agile and traditional PM practices in different ERP implementation phases, as well as the resulting benefits and challenges, can be a starting point for practitioners when choosing and developing a suitable PM approach. Although the research was performed in the context of ERP implementation projects, the framework could also be considered with certain adaptations for other software implementation projects. However, caution is advised due to the limitations of a case study methodology deployed, accompanied with analytical generalization. Moreover, empirical research on how the two PM approaches can be blended and under what circumstances, could be exploited by organizations to improve their project success rates and adapt to the dynamic industry trends and increasing customer requirements.

Theoretically, the research findings contribute to the field of hybrid PM approaches as well as the field of ERP implementation methodologies. By using qualitative research methods, the research contributes towards a more comprehensive understanding of the compatibility of traditional and APM practices in a specific context. As the study is exploratory in nature, comparing the empirical findings with the existing literature, areas that were not identified in the literature were found, such as defining clear project boundaries as a CSF and cultural factors as assessment criteria. Finally, the development of a preliminary framework opens further research areas on the need for empirical testing and possible improvement of the framework both within and beyond the context of ERP implementation projects.

6.2 Limitations and future research suggestions

The main limitations of this study are related to the research methodology, methods and research strategy deployed. Using a single case study and a qualitative research strategy, may have led to certain biases despite using recommended mechanisms of minimizing them. Furthermore, the main disadvantage of conducting a single case study is the limitation of developing generalizable conclusions. Therefore, future quantitative research is advised in order to generate more objective findings and reach a wider mass. Surveys as a quantitative research method can be employed in order to produce more statistically generalizable results through a large random sample. Quantitative methods, such as correlation analysis could be used to explain the explanatory aspects of the assessment criteria and project management practices, as well as classifying the importance of a certain CSF in a quantitative way which was done using qualitative methods in this study. Using quantitative methods could also help in developing certain scales and weights of the identified assessment criteria for determining the combination of agile and traditional PM practices. Finally, they can be used to assess to what extent hybrid PM approaches lead to project success compared to other approaches, in other words do the benefits outweigh the challenges of the undertaken PM approach.

Furthermore, future qualitative research on the topic could also be improved in order to overcome the limitations of this research. Although multiple sources of data were used in this research, due to time limitations and a convenience sample, six in-depth interviews via Skype
were performed. The preliminary developed framework is suggested to be empirically tested through face-to-face interviews in order to avoid any possible misunderstandings and through conducting observations during ERP implementations in order to limit the potential bias of the interviewees. Conducting observations is especially encouraged as the findings show there are different perceptions of the meaning of “agility” and APM practices among practitioners which could consequently increase the credibility of the findings.

Moreover, the findings identified the importance of cultural factors when implementing ERP projects. Therefore, suggestions for future research can include performing a cross-country analysis of the differences in conducting ERP implementation projects regarding traditional PM and APM practices, techniques and tools. A study on the differences in conducting ERP projects in different countries could potentially present a valuable research contribution in this field. This could potentially lead to a modification and adaptation of assessment criteria for determining a combination of traditional PM and APM practices depending on the country the project is being implemented in. Finally, due to the research boundaries of this study focused on ERP implementation projects, future studies can focus on different contexts by adapting and modifying the framework as necessary.
7. Reference List


Appendices

Appendix 1: Interview Guideline

Introduction

Dear Participant,

Thank you for dedicating your time to our research study. This is a study organized within the context of academic research and all information or data obtained from this interview will be used ensuring the highest degree of confidentiality. Furthermore, we would like to inform you that the interview will be recorded and transcribed for our data analysis. Attached to this e-mail you can find the interview questions so you can familiarize with them beforehand. This interview intends to last approx. 30 minutes. In case you do not have time to participate in the interview, we would highly appreciate if you could fill out the questions and send them back to us, it would still represent valuable input in our research study.

The focus of our research is to understand the utilization of a hybrid methodology (in this case SAP Activate methodology) when implementing ERP projects. Our objectives are to understand the benefits and disadvantages of the methodology, in what way can the methodology be customized depending on specific customer characteristics, and what traditional and agile project management practices are used in certain phases of the project life-cycle.

Once again thank you for your time and best regards,

Andrea & Sinead

Interview Questions Guideline

1) What is your specific role in ERP implementations (e.g. Project Manager, Consultant...)? How long have you worked in ERP implementation?

2) How many ERP implementation projects have you taken part in using the SAP Activate Methodology approx.? How many projects have you taken part in using the previous SAP ASAP methodology approx.?

3) What would you say are the main differences comparing the two methodologies (SAP ASAP vs. SAP Activate)?

4) Comparing the two methodologies (SAP ASAP and Activate) what would you say are the main benefits/advantages of using the SAP Activate methodology?

5) Comparing the two methodologies (SAP ASAP and Activate) what would you say are the main disadvantages/challenges of using the SAP Activate methodology?

If you did not work with the previous methodology, what are the main benefits and challenges of the current methodology in your opinion?

6) When implementing ERP for a specific customer what are the main factors/characteristics (e.g. industry sector, organizational culture...) you consider?
7) Depending on these customer specific factors/characteristics do you customize the implementation methodology and in what way?

8) Let us discuss the 4 main stages of the project implementation life-cycle: Prepare, Explore, Realize and Deploy. Which stage in your opinion are the most traditional and which one are the most agile (when considering the traditional PMI and agile practices)?

9) Which traditional and/or agile practices are commonly used in the stage: Prepare?

10) Which traditional and/or agile practices are commonly used in the stage: Explore?

11) Which traditional and/or agile practices are commonly used in the stage: Realize?

12) Which traditional and/or agile practices are commonly used in the stage: Deploy and Run?

13) In your opinion, are there any stages that are more standardized (irrespective of specific company characteristics)?

14) In your opinion, are there any stages that are more customizable (related to specific company characteristics)?

15) Can you give us an example of a project when you focused more on the traditional practices (within the Activate?) when implementing the ERP system? What were the characteristics of the company?

16) Can you give us an example of a project when you focused more on the agile practices when implementing the ERP system? What were the characteristics of the company?
### Appendix 2: Sample Table

<table>
<thead>
<tr>
<th>Respondent</th>
<th>Role</th>
<th>Experience</th>
<th>Countries of Implemented Projects</th>
<th>Interview Date</th>
<th>Interview Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interviewee 1</td>
<td>Project Manager</td>
<td>3 years</td>
<td>Croatia</td>
<td>11/21/2017</td>
<td>46:19</td>
</tr>
<tr>
<td>Interviewee 2</td>
<td>Project Manager (previously consultant)</td>
<td>12 years (PM)/ 9 years (consultant)</td>
<td>Croatia, Serbia, Slovenia…</td>
<td>11/26/2017</td>
<td>19:02</td>
</tr>
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<td>Interviewee 3</td>
<td>Project Manager (previously Consultant from client/consultant side)</td>
<td>14 years (PM)/ 20 years (consultant)</td>
<td>Croatia, Serbia, Slovenia…</td>
<td>11/29/2017</td>
<td>43:46</td>
</tr>
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<td>Interviewee 4</td>
<td>Project Manager (previously consultant)</td>
<td>12 years (PM)/5 years (consultant)</td>
<td>Croatia, Germany, France, UK, Netherlands, Denmark…</td>
<td>11/30/2017</td>
<td>55:46</td>
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<td>Interviewee 5</td>
<td>Project Manager (IT) (previously consultant)</td>
<td>6 years (PM)</td>
<td>Croatia, Netherlands…</td>
<td>12/7/2017</td>
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<td>Interviewee 6</td>
<td>Project Manager/Organizational change manager</td>
<td>7 years</td>
<td>Croatia, Slovenia, Serbia</td>
<td>12/8/2017</td>
<td>29:30</td>
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