ABSTRACT

For the past few years, Agile methodologies have been hailed as the silver bullet which will successfully address the high project failure rate. Many organisations have been using a traditional project management methodology for years and are now either considering or in the progress of introducing a more agile approach as a substitute for the more rigid, inflexible and control oriented traditional methodologies. Potential benefits include, but are not limited to, faster return on investment, better products/services, and higher customer satisfaction. Often however, this leads to a painful introduction because employees are uncomfortable with the drastic changes Agile methods impose or because there is internal resistance to change, and in many cases the expected increase in project efficiency does not occur.

The purpose of this thesis was to determine the perceived challenges related to organisational adaptation to agile project management and to develop a conceptual model of best practices to help guide agile adaptation. Research and data collection was performed through a review of relevant literature within both traditional and agile methods, principles and techniques, along with papers on organisational transformation and case studies and in parallel, interviews with experts and practitioners in the field. Data analysis was performed in two phases: the literature review helped us find data in relevant project management fields and through a subset of the Burke-Litwin organisational change model extract challenges and questions, and in the second phase the outcome of interviews based on these questions was fed back through the change model, analysed and compared with the original data.

Some of the main findings of this thesis are:

- Adaptation to an environment with less structure and control is often a hard challenge, but it can be overcome with proper guidance and the support of a high-level internal sponsor who champions the agile vision top down.

- The change in management style from the traditional ‘command and control’ to self-regulation is a challenge for former project managers, who must evolve into project facilitators.

- For agile adaptation to be successful, it should be implemented company-wide, and not in for instance a single department.

KEYWORDS: Organisational Transformation, Project management, Methodologies, Agile, PRINCE2, SCRUM.
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Rami Hansen and Allan Hibner
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1 Introduction

Project management as a discipline underpins much economic activity. Projects drive businesses in industries as diverse as ICT, pharmaceuticals, construction and aerospace. Most organisations use projects as a way to turn strategies into actions and realize their objectives. Choosing the right project management methodology is therefore an essential component of any business strategy. Different project management methodologies put different demands on the organisational structure, market strategy, processes, management expectation, as well as the team member roles and competencies. More traditional methodologies emphasize rigid planning and tight command and control, whereas an agile approach focuses more on flexibility, leadership and team collaboration. Traditional methods put a lot of emphasis on analysis and planning in early phases of the project, making estimations and assumptions of time and cost before all the factors are known. These assumptions often build on models and templates, combined with previous experience. In contrast, agile methodologies focus on adapting to the situation, making it harder to develop an initial estimate of time consumption and cost. As a result, they are more capable of dealing with changing requirements, but they are also more prone to scope creep, thus increasing the risk of budget overruns.

1.1 Background

Traditional project management is defined by the Project Management Body of Knowledge (PMBoK) as "a set of techniques and tools that can be applied to an activity that seeks an end product, outcomes, or a service". Traditional project management methodologies are usually divided into phases or steps that must be finished in order to drive the project forward. Requirements are gathered, analysed and documented in an ordered fashion. There is a strong emphasis on control, a strict decision hierarchy, and a well-defined process surrounding the steps, as well as a number of formal "deliverables" for each step. Examples of traditional methodologies include PRINCE2 ("PRojects IN Controlled Environments") the PMBoK and many others.

Agile development methodologies such as SCRUM and Feature-Driven Development (FDD) are based on a more lightweight, iterative project organisation, where requirements may evolve during the project life cycle and where collaboration is achieved through extensive customer involvement and more empowered, self-organizing and cross-functional teams. In contrast to traditional “heavyweight” methodologies, Agile methods deal flexibly with scope changes, put much less emphasis on documentation and formal procedures and encourage simplicity in design. As such, these methodologies aim at a faster time-to-market and increased customer satisfaction.

1.2 Discussion of the Problem

According to a survey of the Standish Group, $80 -145 billion per year is spent on failed and cancelled projects. Forrester Research indicates a 66% project failure, costing U.S. businesses at least $30 billion every year. According to the Meta Group, 60% - 80% of project failures can be attributed directly to poor requirements gathering, analysis, and management. Improving these performance records is essential for any organisation. However, if traditional project management is ineffective, it is necessary to research other methods of managing and delivering projects. This is where Agile methods come into play.

For the past few years, Agile methodologies have been hailed as the silver bullet which will successfully address the high project failure rate. Many organisations have been using a prescriptive traditional project management methodology for years and are now either considering or in the progress of introducing a more agile approach to take advantage of the numerous benefits that they offer to an organisation. Those benefits include, but are not limited to, quicker return on investment, better quality products and services, and higher customer satisfaction. To date, however, there is no
structured process (at least that is published in the public domain) that guides organisations in adopting Agile practices [62]. Also, while Agile methodologies promise numerous advantages over traditional methodologies, they are not without limitations and pitfalls and in many cases the expected increase in project efficiency does not occur. This might be because the agile approach is not implemented correctly or is unsuitable for the types of projects the organisation undertakes.

In spite of a growing need for agile project management, little is known about how an organisation should approach the implementation of such a radically different methodology, while mitigating the challenges in terms of human resource structure, processes, client interaction, etc. Research shows that organisations find it difficult to adopt and implement agile approaches psychologically or technically [51]. While research has been done on specific aspects of Agile adoption (such as the introduction of self-organising teams, agile risk management, etc.), what is lacking is a holistic model of best practices to guide overall Agile adoption at an organisational level.

1.3 Problem formulation and purpose

The purpose of this thesis is to determine the perceived challenges related to organisational adaptation to agile project management and to develop a conceptual model of best practices to help guide agile adaptation.

In short, our problem formulation is the following:

How can Agile project management methodologies be introduced in a traditional organisation, in such a way as to avoid the pitfalls and manage the related challenges?

Concretely, our research objectives are:

- To examine organisational change theory and select or derive a conceptual change model to apply to the context of agile adoption
- To understand the main characteristics of/differences between traditional and agile project management
- To analyse the impact of agile project management adoption on organizational factors
- To define a set of recommended best practices to help overcome the related challenges when transitioning from a traditional to an agile methodology

1.4 Limitations and delimitations

The focus of this thesis is on the challenges/best-practices related to the actual project management aspects and not on supporting tooling or implementation specifics as sometimes proposed by methodologies. It is also not within scope to define an entirely new methodology or in-depth change process, but rather to formulate a set of best practices for application within the context of introducing an Agile approach in a Traditional organisation.

In order to develop a conceptual framework, we start out with an analysis of two of the most widely used methodologies in Europe: the traditional PRINCE2 and the agile SCRUM. These will act as concrete prototypes for their respective methodology types. We have opted to research specific methodologies instead of basing ourselves on a purely high level methodology stream comparison, in order to identify very concrete problems and challenges.

We have opted for PRINCE2 as the prototype traditional project management methodology, as it is by far the most popular and widely adopted methodology in Western Europe [25]. In addition, many of the custom in-house methodologies used by companies in Europe are variations of PRINCE2. This choice therefore allowed us to more easily find experienced subjects to participate in interviews in order to gather qualitative data on this methodology. In the US, the PMI is the most widely adopted
methodology and therefore, we will also reference the PMBoK in areas where this methodology deviates from or elaborates on PRINCE2. In general however, both PRINCE2 and the PMBoK share a similar enough approach that they can be easily adapted to complement each other, as described on the official PRINCE2 website [63].

Our choice for SCRUM to represent agile project management was also driven by the fact that according to latest surveys [52], SCRUM is the most popular agile project management methodology in IT development. As of late, Scrum is used almost interchangeably with agile (while Scrum is in fact just one project management method beneath the umbrella of Agile methods). It is clear that Scrum has become the most popular exponent of agile over the past few years [60].

While the results of this thesis are founded by a literature review, analysis as well as concrete experience captured through interviews, the actual benefits of the suggested best practices cannot be quantified as this would require several extensive case studies of organisations integrating our suggestions into their approach. This could be an area of further research.

1.5 Thesis structure

The research in this thesis is performed according to the structure outlined in Figure 1-1.

![Figure 1-1: Thesis structure](image)

**Chapter 1** provides an introduction and delineates the problem this thesis researches. It also defines a set of research questions which served as input and guidelines for two parallel research tracks.

**Chapter 2** elaborates on the theories and references which were used to conduct our research. It provides an overview of the theory on organisational transformation and an overview of both traditional and agile project management frameworks.

**Chapter 3** describes the methods we have applied in the course of our research. On the one hand a review of relevant literature was performed, in which we gain further insight into the main differences between both traditional and agile methodologies, the related organisational challenges in migrating from one methodology to another and the possible ways in which these challenges may be overcome. Literature streams consist of both the reference literature provided by the respective founding organisations, papers on organisational transformation and methodology adoption, as well as concrete
case studies relating to the effects of introducing a new methodology into an organisation. This provided use with the context to formulate specific research questions on the basis of which interviews with experts and practitioners in the field were performed, which then served as qualitative data. In parallel, we have analysed documented case studies which were relevant to our research questions.

Chapter 4 documents the data collection results following the interview process and case study review. This served as the raw data which was analysed as described in the subsequent chapter.

Chapter 5 details the actual analysis and evaluation performed on the data gathered. The objective of this chapter is to derive a conceptual model of best practices for Agile project management adoption, supported by both the researched theory as well as the insights of the interviewed field experts.

Chapter 6 summarizes our conclusions and documents the implications. Our goal was to list a set of recommended best practices in the context of an organisational change model in order to help guide an Agile transformation.
2 Theory

In this chapter we summarize the theoretical foundations for our research, as gathered through a literature review which provides the basis of our subsequent analysis. As will become clear, the introduction of an Agile methodology impacts many organisational factors, therefore the chapter starts out with an overview of Organisational Change theory, along with some well-known change models. From these models, we have derived our own model, which has served to analyse and categorize data gathered through interviews in chapter 5.

Next, the theory continues with a high-level comparison of the traditional versus the agile approach in each project management field, in order to clarify the differences between them (and consequently the challenges in transitioning from one method to another). The model used to compare methodologies is based on the 9 Project Management Fields of Practice as described in the Project Management Body of Knowledge [50].

This is followed by a theoretical overview of PRINCE2 and SCRUM, respectively the leading traditional and agile project management methodologies in use in Europe. Note that these are subordinate to the theoretical foundations of the thesis and are intended to understand the processes, concepts and techniques discussed by practitioners during the interviews, as well as to gain an understanding of the main practical differences between these two concrete methodologies. The theory on these methodologies is broken down into the same project management fields described above, in order to allow a structured comparison.

As this topic is closely related to actual practice, there are some practitioner journals, conference papers and articles included in the reviewed literature. The major development of this literature review, however, is built on academic sources. The practitioners’ literatures and publications serve as a means to inspire ideas and to enable us to gain insight into the concrete implementation of Agile methods in practice.
2.1 Organisational Change

2.1.1 Introduction

The adoption of Agile methodologies is usually a gradual process with a significant impact on many organisational factors, such as its processes, human resource structure, client interactions and involvement, revenue model, etc. As such, it requires a transformation at organisational level. Therefore, we provide the reader with an overview of the concepts of Organisational Development and Organisational Transformation in this chapter, as these will be the theoretical basis for our Agile Adoption model.

2.1.2 Organisational Development

Organisational Transformation theory finds its roots in the concept of Organisational Development (OD). Organisational Development is a long range conceptual effort at organisational level to improve the effectiveness and viability of the organisation and more specifically its problem solving and renewal processes, particularly through more effective and collaborative management of organisational culture, often with the assistance of a change agent or catalyst and the use of the theory and technology of applied behavioural science [11]. Warren Bennis calls it a response to a changing environment and can be seen as a complex educational change strategy to alter the beliefs, attitudes, values and structure of an organisation to such an extent that it is better able to adapt to new technologies, markets or challenges [6]. While behavioural science has provided the basic foundation for the study and practice of organisational development, new and emerging fields of study have such as systems thinking, leadership studies, organisational leadership, and organisational learning have emerged as Organisational Development catalysts. Organisational Development emphasis is on process, its models are linear, and focuses on incremental and continuous change.

Kurt Lewin (1898–1947) is considered to be the founding father of Organisational Development, although the concept only became more popular in the 1950’s. Lewin launched the ideas of group dynamics and action research which underpin the Organisational Development process. Lewin described a three step change model, known as the Unfreeze-Change-Refreeze model [39] (Figure 2-1).

![Figure 2-1: Lewin's Organisational Change Model][39]

Douglas McGregor and Richard Beckhard actually introduced the term organisational development to describe an innovative bottoms-up change effort that fit no traditional consulting categories [73].
Lippitt, Watson and Westley’s model of planned change \[11\] expands Lewin's three-step model to five phases:

- Need
- Establish a change relation (client-agent)
- Clarification and diagnosis of problem
- Evaluate Alternatives
- Transformation of intentions into actual change efforts
- Generalization and stabilization of change (refreezing)
- Terminate relation

### 2.1.3 Organisational Transformation

Organisational Transformation can be seen as a further evolution of Organisational Development. It is a process that radically alters the organisation’s strategic direction, including fundamental changes in structures, processes, and behaviours. Munro \[42\] states that transformational change is frequently identified as the need for companies to change as the environment changes. Agility and rapid response are important to meet customer’s demands, but not all organisations are able to make successful transformations. Blumenthal and Haspeslagh \[7\] indicate that in order to qualify as transformational change, the majority of individuals within an organisation must change their behaviour. This is usually achieved through a long running process which promotes paradigmatic change and helps the organisation to better fit or create desirable future environments. For organisational transformation to operate, change is required in strategy and structure. Tushman and O'Reilly state, \[71\] "long-term success is marked by increasing alignment among strategy, structure, people and culture."

Successful organisations are those that regularly refresh their strategies, structures and skills with the environment. Tushman and O'Reilly \[71\] state that older, larger, successful organisations develop "structural inertia" and/or "cultural inertia". Structural inertia is resistance to change, which has roots in the organisation's structures, systems, procedures and processes that are tied to organisational size, complexity and interdependency. Cultural inertia is developed as lessons from success of the past become embedded in the shared expectations, stories, values and norms of the way things are to be done in the organisation. Haveman \[28\] states that the more institutionalized the culture, the more complacent an organisation becomes. Managing company culture is an important aspect of managing change, because bureaucratic companies are subject to excessive rigidity in the application of rules and regulations and severely constrain their ability to transform in answer to environmental shifts.

### 2.1.1 Organisational Change Models

Organisational change models as described in organisational change theory serve as a basis for understanding the interrelationships of different variables and how they may respond to change. They are therefore ideally suited for structuring and contextualizing the agile adoption challenges and best practices resulting from our analysis. In this section we will briefly describe some prominent models and the Method chapter will describe how we leverage such a model for our analysis.

There are multiple well founded organisational change models in existence which assist in formulating specifically tailored change processes in different contexts. Generally, these can be categorized in two main streams. A first stream, consists of procedural models which describe the different phases or steps in which change can be effectively introduced into an organisation. The most influential contributor in change theories of this type was Kurt Lewin and his previously mentioned, Unfreeze-Change-Refreeze model \[39\]. Other models in this category include Kotter’s eight-step model \[34\] for managers to follow to ensure success of a change initiative.
A second category of organisational change models focuses more on the key organisational factors which affect (or are affected by) the introduction of change in an organisation, as well as the relationships between these factors. One of the earliest models in this category is Leavitt’s Diamond model [37] which highlights the interdependencies between an organisation’s structure, technology, people and tasks.

Many other classical models such as Weisbord’s Six-Box Model [72], McKinsey’s 7S model and Burke-Litwin’s 12-factor change model [12] have extended Leavitt’s basic model. The Six-box model is a framework inspired by techniques and assumptions in the field of organisational development and was originally developed by the American analyst Marvin Weisbord to assess the functioning of organisations and the impact of change. It pays attention to factors such as planning, incentives and rewards, the role of support functions, internal competition among organisational units, remuneration, partnerships, hierarchies and the delegation of authority, organisational control, accountability and performance assessment.
Another well-known model for evaluating and guiding organisational change is McKinsey’s 7s model, developed by Pascale and Athos[^48^]. It details 7 organisational focus areas and their interrelationships. Of these factors strategy, structure and systems are considered ‘hard’ and skills, staff, style and shared values are considered soft factors. Strategy refers to the vision as set by top management. Structure encompasses the organisational hierarchy as well as command and control structure. Systems include the collection of supporting processes, both formal and informal. Skills include the competencies required to execute tasks. Staff includes all HR processes such as recruitment, training and career guidance. Style reflects the leadership and management styles in an organisation. Shared values reflect the organisational culture and set of beliefs. The model also describes the effect each of these variables can have on other variables when change is introduced in an organisation.

![Figure 2-5: McKinsey’s 7S model[^48^]](image)

The Burke-Litwin Causal Change Model[^12^] has been developed to assist with the analysis and adoption of organisational change and performance. This model strives to introduce change in the performance of a team or an organisation by establishing links between performance and the internal and external factors which affect performance. This model is based on assessing the organisational as well as environmental factors which can be tweaked so as to ensure a successful change. The Burke-Litwin change model begins with outlining a framework of the affecting factors which can be manipulated to guarantee a smoother transition from one phase of the change process to another. Of these factors, the external environment is considered to be the most powerful driver. This in turn leads to significant changes in an organisation’s mission and strategy, its organisational culture and its leadership. In a next phase, these lead to changes to structure, systems and management practices. These are more operational factors and changes in them may or may not have an organisation-wide impact. Subsequently, these changes affect motivation, which in turn impacts on individual and organisational performance. Each of the variables interacts with the others and a change in any one of them can eventually impact the others. This is useful in explaining not only how organisations perform, but also how they can be changed.
2.2 Derivation of an Agile Adoption Change Model

As previously mentioned, the adoption of Agile methodologies requires a transformation at organisational level, as it affects many organisational factors, including its processes, human resource structure, client interactions, revenue model, etc. In order to perform a structured analysis of the main organisational challenges and agile adoption best practices, we therefore decided to structure our research according to a well-founded organisational change model.

In chapter 2.1.1 we described the difference between process and factor based change models. Since this study intends to identify the main challenges and best practices to overcome these challenges in each of the affected organisational areas rather than develop an actual change process, we will focus specifically on the second set of models which help identify the change factors and their relationships. We can however use a process model to illustrate the specific phases our research will concentrate on. Specifically, we target the actual adoption phase and presume top management’s decision to implement an Agile method has already been taken and this vision has been communicated throughout the company. In other words, we will mainly focus on the implementation challenges during steps 5, 6 and 7 of Kotter’s 8 step model \[34\] (see Figure 2-7)

Of the described factor based change models, the Burke-Litwin model \[12\] is the most elaborate and includes the variables identified in the other models as well. As such, we have decided to use this model as the basic framework for framing and categorizing the challenges and best practices identified during our research. Since we are addressing the actual implementation phase and wish to limit the
scope of our research to the specific problem areas of Agile adoption (according to our literature review), we have selected a subset of the factors in the model, as illustrated in Figure 2-8.

![Figure 2-8: Research focus areas in the Burke-Litwin model](image)

In the table below, we provide a description of each of the factors in the model, along with our reasoning for selecting or deselecting a particular dimension for our actual analysis.

<table>
<thead>
<tr>
<th>Dimension of Model</th>
<th>Description</th>
<th>Reason to in/out scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>External environment</td>
<td>Concerns the key external drivers (e.g. markets, legislation, competition and the economy) and their impact on the organisation</td>
<td>The reasons for adopting Agile methods may have been driven by external factors, however for our analysis, we assume the decision has already been made (during the first 2 steps of Kotter’s 8 step model) and we focus on the actual introduction of Agile methods within the organisation. Therefore we will not analyse challenges for this dimension.</td>
</tr>
<tr>
<td>Mission and Strategy</td>
<td>Describes the overall vision and mission statement as laid out by top management, along with the employee’s perception of these</td>
<td>Similarly, we assume that a buy-in for the implementation of agile methods from top management has already been attained (during steps 3 and 4 of Kotter’s 8 step model) and incorporated in the corporate strategy.</td>
</tr>
<tr>
<td>Leadership</td>
<td>This considers the attitudes and leadership style of senior personnel and how these behaviours are perceived by/affect the organisation</td>
<td>Successful Agile project management requires a significant shift in leadership style, so this is an important dimension to include in</td>
</tr>
</tbody>
</table>
### Organisational Culture
Encompasses overt and covert rules, values, customs and principles that guide organisational behaviour[^12]. Research has identified organizational culture as a factor that potentially affects the deployment of agile methods[^29]. Therefore, we include this dimension.

### Structure
Describes the arrangement of functions and people in specific areas, their level of responsibility and the key decision-making, communication and control relationships[^12]. Agile teams are composed differently than traditional ones and responsibilities also differ radically[^5], so this dimension is in scope.

### Systems
Deals with an organisation’s policies and procedures, including systems for reward and performance appraisal, management information, HR and resource planning[^12]. Our analysis will not take into account the specific infrastructure or supporting HR processes to assist with Agile adoption (see limitations in chapter 1.4), so this dimension is not included in the analysis.

### Management Practices
Concerns the way management uses human and material resources, their relationship with subordinates and general management style[^12]. Since this thesis specifically focuses on project management aspects, the shift in management practices is an indispensable dimension of our analysis.

### Work Unit Climate
Concerns the overall feelings, impressions and expectations of employees, as well as the relationships between teams and individuals[^12]. Communication, relationships and expectations between team members differ radically in Agile environments[^5], so this dimension cannot be ignored.

### Tasks and Individual Skills
Encompasses the individual skills, abilities and knowledge required to effectively execute tasks[^12]. Agile methods do not require drastically new skill sets as chapter 2.5 will show, so we leave this dimension out of scope.

### Individual Needs and Values
Describes the psychological factors which could increase job satisfaction and enrichment[^12]. While we do focus on challenges in team dynamics (work unit climate) we will not bring individual psychological factors into scope for this analysis as these are difficult to assess through our selected research methodology (see chapter 3).

### Motivation
Considers the significance of individual and organisational goals and the extent to which these are in line[^12]. One of the major objectives of Agile methods is improving employee motivation and participation (it is even one of the 12 statements of the Agile Manifesto[^15]), so this is not an area in which we expect major challenges. As such, we leave this area out of scope for our analysis.

### Individual and Organisational Performance
Handles factors such as productivity, efficiency, quality and customer satisfaction[^12]. As will be described in chapter 2.3 and onwards, Agile methods deal very differently with quality management, planning and performance in general, therefore this dimension will also be included in our analysis.

| Table 1: Derivation of agile adoption research model |  |  |
Applying the scope defined above, we can derive our research model as illustrated in Figure 2-9, which is a subset of the overall Burke-Litwin model. This will be our reference framework for the categorization and contextualization of the main agile adoption challenges and associated best practices we derive during our analysis.

![Derived agile adoption research model](image)

*Figure 2-9 : Derived agile adoption research model*
## 2.3 Comparison of Traditional and Agile Project Management

The theory so far has provided us with a model to analyse the impact of a change in project management methodology on the different organisational factors. In order to apply this model to our concrete case of Agile adoption, the next chapters provide more insight into the main characteristics and the main differences between Traditional and Agile project management methodologies.

Table 2 summarizes the key high-level differences between Traditional and Agile project management.

<table>
<thead>
<tr>
<th>Principles and Context</th>
<th>Traditional Project Management</th>
<th>Agile Project Management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project scope</strong></td>
<td>Project scope is known in advance and will not change significantly[^20]</td>
<td>Complete project scope is not known at start and will evolve during the project[^49]</td>
</tr>
<tr>
<td><strong>Events affecting the project</strong></td>
<td>Events affecting the project are predictable</td>
<td>Unpredictable events may affect the project</td>
</tr>
<tr>
<td><strong>Processes</strong></td>
<td>Processes must be well defined, repeatable and their execution rigidly controlled</td>
<td>Processes must be lightweight and easily adaptable to the project context</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Process based approach</strong></td>
<td></td>
<td>Iterative approach</td>
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</tbody>
</table>

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<tbody>
<tr>
<td><strong>Quality</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cost/Earned value</strong></td>
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<td></td>
</tr>
<tr>
<td><strong>Planning/timing</strong></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Key characteristics</th>
<th>Full in-depth upfront planning</th>
<th>Incremental refinement and re-planning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Continuous command and control</strong></td>
<td></td>
<td>Self-organizing expert teams</td>
</tr>
<tr>
<td><strong>Management by Exception</strong></td>
<td></td>
<td>Flat hierarchy</td>
</tr>
<tr>
<td><strong>Formal hierarchy</strong></td>
<td></td>
<td>Active client participation</td>
</tr>
<tr>
<td><strong>Disciplined adherence to processes</strong></td>
<td></td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Key strengths</th>
<th>Controls scope creep through rigid control over requirements[^50]</th>
<th>Thrives in dynamic environments with strong client participation[^20]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strongly emphasizes and controls the quality of deliverables</strong></td>
<td>Strongly emphasizes and controls the quality of deliverables</td>
<td>Strong team involvement and collaboration</td>
</tr>
<tr>
<td><strong>Deviations in terms of cost or planning are detected in an early stage</strong></td>
<td>Deviations in terms of cost or planning are detected in an early stage</td>
<td>Improved customer satisfaction and team motivation[^35]</td>
</tr>
<tr>
<td><strong>Easily teachable and repeatable</strong></td>
<td>Easily teachable and repeatable</td>
<td>Quick and easy to learn</td>
</tr>
<tr>
<td><strong>Efficient monitoring and resource control through incremental project lifecycle</strong></td>
<td>Efficient monitoring and resource control through incremental project lifecycle</td>
<td>Low start-up time</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Key weaknesses</th>
<th>Poorly suited to dynamic and uncertain project environments[^20]</th>
<th>Susceptible to scope creep as clients have the luxury of changing requirements on an on-going basis[^35]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Any changes in the later project stages may have a significant impact on the overall project</strong></td>
<td>Any changes in the later project stages may have a significant impact on the overall project</td>
<td>Overall cost and planning cannot be determined upfront</td>
</tr>
<tr>
<td><strong>Initial plan often falls quickly out of touch with reality and requires constant revision</strong></td>
<td>Initial plan often falls quickly out of touch with reality and requires constant revision</td>
<td>Less efficient for large teams due to daily stand-ups</td>
</tr>
<tr>
<td><strong>Inappropriate for small projects due to overhead of formal deliverables</strong></td>
<td>Inappropriate for small projects due to overhead of formal deliverables</td>
<td>Not usable for fixed price projects</td>
</tr>
<tr>
<td><strong>Less frequent interaction with stakeholders</strong></td>
<td>Less frequent interaction with stakeholders</td>
<td></td>
</tr>
</tbody>
</table>

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 2: Comparison of Traditional and Agile project management</td>
<td>14</td>
</tr>
</tbody>
</table>
The individual characteristics described above will be clarified in the next chapters by comparing 2 concrete methodologies, PRINCE2 and SCRUM. These will act as concrete prototypes for their respective methodology types. We have opted to research specific methodologies instead of basing ourselves on a purely high level methodology stream comparison, in order to identify very concrete problems and challenges. They also provide context for the processes, tools and techniques described by practitioners during the interviews in chapter 4.1.

2.4 Traditional Project Management and PRINCE2

The objective of this chapter is to provide a high level summary of PRINCE2 as a prototype of traditional project management methodologies. It is not our objective to offer an in-depth, comprehensive overview of this methodology, as this is amply performed in other literature. It is merely intended to provide the reader with enough context for the analysis which follows in later chapters. While this chapter gives a general overview, chapter 2.6 and onwards will focus closer on the PRINCE2 vision, tools and techniques in the context of each of the main project management areas.

2.4.1 History

PRINCE stands for ‘PRojects IN Controlled Environments’ and is a structured method for effective project management, first established in 1989 by the British Office of Government Commerce \(^{25}\). It is a further evolution of PROMPTII, a project management method created in 1975 by Simpact Systems Ltd. In 1996, an updated version, PRINCE2, was launched, which provided improved guidance on projects of all types. Currently, PRINCE2 is the de facto standard used extensively by the UK government and is widely recognized and used in the private sector worldwide.

As determined by a recent study and illustrated in Figure 2-10, PRINCE2 is by far the most popular traditional project management methodology in Europe and Australia. In the USA, the PMBoK remains the dominant traditional project management methodology, however steps have been taken by both the founding organisations and the private sector to align and integrate both methodologies. This
is possible as both methodologies share a similar process model and the PMBoK offers a high level, largely prescriptive, guiding framework, whereas PRINCE offers a lower level descriptive and directly applicable model. With some alignment of concepts and processes, they can therefore be made to reinforce each other [26].

2.4.2 Principles

The PRINCE2 methodology is founded upon seven basic core principles. First and foremost, a project must have a Continued Business Justification. Not only must there be a justifiable reason to start a project (as detailed in a Business Case), but this reason must remain valid throughout the life of a project and must be formally documented and periodically re-evaluated and approved – especially when project tolerances are exceeded at any point during the project lifecycle. PRINCE2 project teams are also expected to learn from experience. Experiences are documented during the project lifecycle in a Lessons Log and every project ends with a review in order to describe the lessons learned for incorporation into any subsequent project. Projects have well defined and agreed-upon roles and responsibilities that engage all aspects of the involved internal or external organisations: business, user and supplier. All stakeholder interests must be represented in the project management team. PRINCE2 projects are Managed by Stages. Multiple control points are set throughout the project, which allows projects to be planned, monitored and controlled on a stage-by-stage basis. Per stage, tolerances are set, which allows Management by Exception. When tolerances are exceeded, these issues are escalated to the next level of management in order to decide how to proceed. PRINCE2 is Product Focused method and all work is planned around agreed-upon output products which should meet well defined quality criteria. Finally, PRINCE2 was modelled to allow tailoring to suit the project environment. All essential processes must be present, but their concrete implementation can be adapted, according to a project’s size, complexity, importance, environment and risks.

2.4.3 Processes

PRINCE2 is a process-driven method, which contrasts with adaptive methods such as SCRUM. It defines eight main processes (illustrated in Figure 2-13), which are further subdivided in over 40 activities, each of which is characterized by key inputs, role assignments and deliverables. The processes are described in chapter 2.6.1.

2.4.4 Components

PRINCE2 describes eight components which are required in order to successfully run a project. A Business Case provides the justification of a project. Organisation outlines the roles and responsibilities of all project members. Plans describe the products to be described, how work should be executed and by whom. Controls define how the project manager and project board will exercise control over the project. Risk Management describes how the project should mitigate any risks which may occur during the project lifecycle. Quality Management defines how the project will assure that all deliverables will meet the quality requirements. Configuration Management dictates how deliverables are identified and tracked. Finally, Change Control specifies how to manage changes in scope or specifications.

2.4.5 Techniques

PRINCE2 provides three techniques in order to support the above mentioned processes. Product Based Planning defines the project in terms of outputs (rather than activities). Change Control defines how to report, assess the impact and escalate changes and issues. Quality Reviews provide a structured technique for assessing whether a product meets the business requirements.
2.4.6 Roles

PRINCE2 uses a Four Layer Management Model (as illustrated in Figure 2-20) which can scale according to different project environments and sizes. To achieve this, each layer is defined as a set of roles, each of which can be allocated to one person, shared by several people or combined according to the specific needs of a project. The different roles and their interrelations are described further in chapter 2.4.6.

2.5 Agile Project Management and SCRUM

The objective of this chapter is to provide the reader with a high level overview of Scrum as a representative of modern agile project management and development methodologies.

2.5.1 History

Scrum is originally a Rugby-term, describing the position in which a game is restarted after an infringement \(^{69}\). It was first used (in modern context) in the now famous analogy by Hirotaka Takeuchi and Ikujiro Nonaka. Their article “The New New Product Development Game” compared management of product development to the game of Rugby \(^{70}\) and highlighted some traits which are now very much at the centre of modern agile methodologies.

The Scrum process was then formalized and introduced into software development by Sutherland and Schwaber \(^{59}\), culminating in the *Scrum Methodology*.

2.5.2 Principles

Scrum is built on the same principles that make up the Agile Manifesto\(^{15}\), namely:

**Individuals and interactions over processes and tools**

Scrum does not say that processes and tools are not important, but rather that individuals and interactions are more so. Processes and tools are there to support them, but it’s the right people, talking to each other, working as a team that makes things happen.

**Working software over comprehensive documentation**

“Software” here can stand for any product (outcome) from the project. Documentation in a project is important for several reasons. In a large project or projects that span over a long time, people working on the project come and go. In order for knowledge to survive and be retrievable later, documentation is clearly needed. However, the primary objective of the project is to have an acceptable product as outcome, and this should be prioritized. The best is to find a good balance between getting it done and writing it down.

**Customer collaboration over contract negotiation**

A contract is an agreement between you and the customer/client over what (and sometimes how) something will be done, how much it will cost etc. The contract is typically signed in the beginning, before all details are clear. Scrum recognizes the problems this causes, and focuses on solving problems and making the customer happy, rather than fighting over what was initially agreed.

**Responding to change over following a plan**

Planning is essential to knowing what to do next, but to follow the initial plan blindly when requirements and needs change makes no sense. In Scrum planning is done in iterations, as more and more information is known.
2.5.3 Process

Traditional project management methodologies like PRINCE2 are mostly process driven, and approach process control in a “defined” way, e.g. they try to define the exact input and output for each process from the start, and hold on to this. The process outcome can be evaluated at times, and if needed, the process will be re-defined, setting new inputs and outputs.

Scrum instead utilizes empirical process control \cite{66}. Here the process itself is monitored constantly, and if found lacking is adjusted as soon as possible. The iterative, short time frame approach of Scrum (e.g. deliver working prototype every x weeks) makes it possible to adjust the process while the project is on-going, and base these process adjustments on what has actually been done.

Below is a figure depicting the Scrum process (the iteration time is just a suggestion; it can be longer but preferably shorter than 30 days). Each iteration is called a *Sprint*.

![Figure 2-11 : The Core Scrum Process\cite{43}](image)

2.5.4 Components

Figure 2-11 above shows the main components of Scrum. The *Product Backlog* is a list of items (business requirements, functionality and features) that lives during the project. The priority of the items is decided by the Product Owner. The *Sprint Backlog* is the list of items to be implemented in the current iteration (Sprint). The items are divided up into tasks, and in theory anyone can choose any of the tasks, providing their skill level is adequate. The *Daily Scrum* meeting is re-occurring during the whole Sprint, and is a good process control point. There is also a *Sprint Burndown Chart*, which can be a simple diagram and shows how much work remains to be done.

Except for the Daily Scrum, the following Scrum meetings are also an integral part of the Scrum process: Sprint Planning Meeting, Sprint Review Meeting and Sprint Retrospective.

2.5.5 Roles

In Scrum there are 3 main roles. The *Product Owner* defines and prioritizes the items for the Product Backlog and has the power to accept or reject the outcome. Through this, he is responsible for the business result of the project. The *Scrum Master* has a team lead role, and is responsible for helping
and supporting the team, rather than controlling what they do. Finally, the Team are the people who make things happen. The team is small, cross functional and self-organizing. There are also other roles which might have some involvement in the project, but which are not formally part of the Scrum process. A deeper description of the roles can be found in chapter 2.6.6
2.6 Methodology Comparison per Project Management Area

This chapter provides a more in-depth comparison of Traditional and Agile methodologies, in order to identify the potential pitfalls when migrating from one to another and to provide a basis for understanding the processes and techniques discussed by practitioners during the interviews in chapter 4.1.

A Guide to the Project Management Body of Knowledge (PMBoK Guide) is a book which presents a set of standard terminology and guidelines for project management across all types of projects. While the PMBoK details its own project management processes, it also defines nine main knowledge areas which are typical of all projects, irrespective of the project management methodology used. As such, we will use these knowledge areas as a guide for comparing how the PRINCE2 and SCRUM methodologies approach each of these areas and what the organisational impact of agile adoption is in the context of these areas.

![Figure 2-12: The core Project Management Areas as defined by the PMBoK](image)

The 9 Project Management Fields of Practice which comprise project management, as described in the PMBoK are:

- Integration management
- Scope Management
- Time Management (planning, forecasting and estimation)
- Cost Management (budgeting)
- Quality Management
- Human Resource Management (leadership and people management)
- Communications Management
- Risk Management
- Procurement Management
2.6.1 Integration Management

Definition

Integration management is an element of project management that coordinates all aspects of a project. Project integration, when properly performed, ensures that all processes in a project run smoothly. In the following sections, we will contrast the PRINCE2 and SCRUM project integration models.

PRINCE2

PRINCE2 is a process-driven method, which contrasts with reactive/adaptive methods such as SCRUM. It defines eight main processes (illustrated in Figure 2-13), which are further subdivided in over 40 activities, each of which is characterized by key inputs, role assignments and deliverables.

![Figure 2-13: The high level PRINCE2 Process Model](image)

Starting up a project
During this initial process, the project team resources are appointed and the Project Brief is prepared, which outlines the project goals and business justification. The overall approach is determined and the next phase is planned.

Initiating a project
The Project Brief is elaborated upon to form a complete Business Case. Project controls and quality requirements are set, potential risks are identified and a project plan is composed, all of which are included in the Project Initiation Document.

Directing a project
The process represents the controlling aspects executed by the Project Board. Every stage is authorized by the board and in addition, the board provides ad-hoc direction and will ultimately confirm the project closure.

Controlling a stage
Projects may be executed iteratively in multiple stages. Each of these stages formally defines the work package scope and deliverables, the reporting requirements and timelines, as well as the method by which issues should be escalated.
Managing stage boundaries
This process defines what should be performed towards the end of each stage. This includes planning the next stage upfront and amending the project plan, risk log and business case as required. The process also determines how to deal with stages that exceed their tolerance levels in terms of timing, budget or quality.

Managing product delivery
This process controls the links between the Project Manager and the Team Managers and focuses on formal requirements definition and acceptance, tolerance setting and follow-up, as well as reporting.

Closing a project
At the end of a project, a formal decommissioning is performed, resources are de-allocated, follow-up actions are defined and the project is formally evaluated in order to detail best practices to incorporate in future projects.

While each of the individual processes relatively simple, the overall process model including all activities, inputs, deliverables and interdependencies becomes quite complex, as illustrated in Figure 2-14.

![Figure 2-14: The complete PRINCE2 Process Model](image)

**SCRUM**

PmBOK[^50] defines the following sections as making up the area of Project Integration Management:

Develop Project Charter
This activity is not really a part of Scrum, rather it is something that must be done in order for the Scrum project to start. Signing a contract, allocating resources etc. could be seen as prerequisites. The Scrum roles (Product Owner, Scrum Master and Team) will be defined.

Develop Preliminary Project Scope Statement
In Scrum, the Product Backlog represents the preliminary project scope. It will contain all the known requirements at project start.

**Develop Project Management Plan**
During the first Sprint Planning Meeting, the items in the Product Backlog will be roughly sorted and assigned to a target Sprint iteration, and a rough time estimate will be done. Hence, the Product Backlog can be seen as the overall project plan.

**Direct and Manage Project Execution**
As the Product Backlog items are prioritized by the customer, it will be the main project steering document. The Planning meeting at the beginning of each Sprint will serve to refine the task descriptions for the coming iteration. Each Sprint can be seen as a sub-project, and is the container within the actual work is performed. The Daily Stand-up meeting serves as a point of control.

**Monitor and Control Project Work**
Each Sprint has its own Sprint Backlog, which together with the Sprint Burndown Chart (that shows remaining work to be done within the Sprint) and then Daily Stand-up makes sure that we have continuous monitoring of how the project is progressing, and problems can be discovered early on. The Sprint Review and Retrospective meetings serves a feed-back loop for controlling quality of the project implementation.

**Integrated Change Control**
Change Control is built into the Scrum process. New requirements/items can at any time be added into the Product Backlog, and can be dealt with in following Sprints. If a major change needs to an ongoing item within a Sprint are discovered, that item can be lifted out if the current Sprint and put in the Product Backlog.

**Close Project**
The last Sprint Review in the Project will be the final point at which the Product Owner can accept/reject the output of the whole project, and will serve as the formal acceptance. The Sprint Retrospective will deal with lessons learned and preserve the knowledge from the project so that it can reused at a later time.

The image below show the overview of the full Scrum process:

![Image of Scrum Process Overview](image-url)
2.6.2 Scope Management

Definition

The PMBoK\textsuperscript{[50]} defines Project Scope Management as the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully. These processes include scope planning, scope definition, scope verification, and scope control. Without proper scope control, “scope creep” may occur, as requirements continue to change in response to customer business needs, changes in the industry and changes in technology. Traditional and Agile methodologies have a very different philosophy with regards to managing scope. Plan-driven approaches work hard to prevent changes in scope, whereas agile approaches expect and embrace scope change.

PRINCE2

Within traditional project management, the scope is defined upfront and any changes to the initial scope are considered exceptions, which are dealt with through a formal change management process. PRINCE2 performs scope definition as part of the Product-based Planning technique, which is described further in Chapter 2.6.3. This includes creating a Product Breakdown structure, which decomposes work packages into smaller, more manageable products. This results in a hierarchy of all the planned products to be produced, wherein each product is sufficiently documented using a written narrative and all interrelations and dependencies between products are modelled using a Product Flow Diagram. The time needed to accomplish tasks is estimated and scheduled and any potential risk is assessed and documented as well.

![Traditional Project Management Lifecycle](image)

**Figure 2-16 : The Traditional Project Management Lifecycle, with upfront scope planning\textsuperscript{[50]}**

PRINCE2 offers change control process and technique to capture and analyse change requests and a series of processes to obtain decisions on changes and manage their implementation. These include the creation of an Exception Report (as defined in an Exception Plan) and letting the Project Board decide on whether or not to proceed with a change.

SCRUM

In contrast to traditional project management, Agile methods embrace scope changes as they consider them unavoidable. In contrast to traditional projects, resources and time are typically fixed in agile approaches, and it’s the scope that is allowed to change. One of the key success criteria in traditional
projects is the extent to which the initially defined scope is followed (i.e. the least amount of scope creep is introduced). In Agile however, it is more important to be able to efficiently and effectively respond to change. The success criterion in Agile thus rather reflects the amount of business value provided to the customer.

In SCRUM, the iterative and incremental process itself is what manages scope. Except for auditing purposes, no additional document outlining procedures for scope management is needed. Scope is managed by use of the Backlog, but it can be redefined constantly, as part of the release planning and iteration planning meetings and by the management of the product backlog.

![Figure 2-17: The Agile Project Management Lifecycle, with iterative scope planning](image)

SCRUM fully incorporates the concept of Rolling Wave Planning and Progressive Elaboration, which utilize a process of planning for a project in waves as the project becomes clearer and unfolds. The products for the initial sprint(s) are documented in more detail, whereas the longer term deliverables are only described on a higher level and planned through key milestones for the project. Because the short timeframe of an iteration, this reduces the amount of detail and the complexity of estimating.

### 2.6.3 Time Management

**Definition**

Time management deals with the ability to plan, execute and finish the project in a timely manner. It incorporates project management processes which deal with defining tasks, tasks durations, scheduling tasks and ensuring adherence to the schedule. Time management is a crucial part of any successful project.

**PRINCE2**

*Product based planning* is a fundamental part of the PRINCE2 approach to project management. It is a method for identifying all of the tasks that make up or contribute to delivering the objectives of the project, and the associated work required to deliver them [24].

Initially, a *product breakdown structure* is created upfront, usually for the entire project. The objective of the breakdown is to ensure all necessary products are identified and captured. The breakdown is iteratively refined until all of the requisite products are present and of sufficient granularity to be
described in detail. This results in a hierarchy of products and sub-products that comprise the final end-product. These products include more than the actual end user deliverables, but also comprise all intermediary documents required to come to the end result. These include for example the functional analysis, test scenarios, etc.

Figure 2-18 : An example Product Breakdown Structure [25]

Once all deliverables are identified, they are prioritized. This is achieved by creating a product flow diagram which determines the order of precedence of products. Typically, it includes multiple and complex parallel paths. It is comparable to PERT (Project Estimation and Review Technique) charts used for critical path analysis in other traditional project management methodologies.

Once the sequence of tasks is determined, all task effort is estimated and resources are assigned. Usually a top-down effort estimation is used initially, in which management and a few key individuals provide high level estimates for top level tasks. These are later reconciled with bottom-up estimates as provided for the detailed tasks by the team members. After resource levelling and setting control points (usually at stage boundaries), this results in the final planning. This plan serves as a baseline and for each of the stages within the project timeline, project time tolerances are set. When task durations exceed these tolerances, the project board will decide on how to progress. This may for instance result in additional resources being assigned or scope to be cut. In any event, the planning is revised to accommodate any changes resulting from decisions made through Exception Management.

SCRUM

In Scrum, as opposed to PRINCE2, it is not necessary to have a full list of all requirements at the beginning of a project. The Product Backlog is the container for requirements and may contain rough time estimate of the tasks. However, since the Product Backlog remains dynamically updateable during the course of the project, time management within Scrum does not attempt to estimate the project as a whole through individual tasks, but rather have strict control of the tasks, as they come up.
During the Sprint Planning meeting at the beginning of each Sprint the top prioritized items are selected, and moved to the Sprint Backlog. In this process they are refined, clarified and given a more fine-grained time estimate. A tool to see the remaining work that needs to be done during a Sprint is the Sprint Burndown Chart, which can be a simple graph, showing how many work hours are left in total for the current sprint.

The approach to time management differs in another important aspect as well: a Sprint will *always* end on time, and any meetings and activities are very strictly time-boxed. The purpose of this is to have a continuous flow in the process and to get the work done, so that the team is not stalled by overanalysing requirements, details and issues. Items that for different reasons could not be completed will be return to the Product Backlog to be revisited in the next Sprint.

### 2.6.4 Cost and Procurement Management

**Definition**

Project Cost Management includes the processes involved in estimating, budgeting, and controlling costs so that the project can be completed within the approved budget. Procurement management is closely related and represents the process organisations use to purchase economic resources and business input from suppliers or vendors. This process helps organisations negotiate prices and get the best quality resources.

**PRINCE2**

PRINCE2 provides few details on actual cost management and virtually none on procurement management. The project budget is mostly interpreted as a man-days budget which can be spent on task effort and thus follows the planning, scheduling and change control processes described earlier. PRINCE2 does mandate the setting of tolerance levels of cost aspects of a project, in order to handle any deviations through exception management. In contrast to the PMBoK, PRINCE2 does not elaborate further on the management of a financial budget, procurement techniques or specific cost management techniques such as Earned Value Management (EVM), Programme Analysis and Review Technique (PERT) and Reserve Analysis and Cost of Quality (COQ) analysis. While PRINCE2 does not mandate any of these tools or techniques, it can easily work together with them and this is often the case when implementing PRINCE2 in practice.

**SCRUM**

Scrum does not claim to be a full-fledged project management methodology. Cost and Procurement Management is one of the areas which are not covered by the formal Scrum methodology.
2.6.5 Quality Management

Definition

Project quality management is the discipline that is applied to help ensure that both the outputs of the project and the processes by which the outputs are delivered meet the requirements of all stakeholders. It generally consists of three main components: quality control, quality assurance and quality improvement.

PRINCE2

Quality Management is about checking the quality of work done on the project, either by testing it or reviewing the work in some way. PRINCE2 defines a processes and techniques technique for controlling the way changes impact the project in order to prevent the project going off in the wrong direction. At the project initiation phase, a Project Quality Plan is constructed, which defines how the supplier intends to deliver products that meet the customer's quality expectations and the supplier's quality standards. The plan describes the customer quality expectations, the organisational or programme quality management system and standards as well as the quality-control and audit processes. Furthermore, when creating the product breakdown structure, every product is annotated with specific quality requirements and acceptance criteria which are checked on product delivery before final acceptance. PRINCE2 also defines the quality review technique. This technique ensures a project's products are of the required standard and meet the defined quality criteria. On delivery of a product, the product quality is discussed in a quality review meeting, which identifies any errors in the product. The meeting joins people who have an interest in the project's outputs and people on the project team able to address issues identified. The quality review meeting will not attempt to solve the problems it identifies, but rather determine the impact on the project planning and the next steps to take. The dates these quality management activities take place are planned in upfront in a Quality Register.

In terms of roles, corporate management will provide the details on the organisational quality management system and the project board will approve the quality management strategy and product descriptions. The Senior User role acts as a liaison towards the customer in order to formulate customer quality expectations and acceptance criteria as well as approving product descriptions. The Senior Supplier role reviews the same items but from the supplier perspective. The project manager formalizes all of the above and ensures that team managers implement the quality control measures agreed. Team manager ensure that the products are created in line with their descriptions, and keep the project manager regularly informed on product quality status. Project Assurance assists and advises the project manager on the implementation of all quality matters. Finally, Project Support will provide administrative support for the quality controls and quality records.

SCRUM

Quality management is not formally part of Scrum, but is very easy to incorporate, depending on the standard quality approach in the project organisation. In Scrum, quality planning will typically be performed both at the start of the project and in each Sprint.

Quality Control from a project management perspective is the process by which the output of the project is evaluated and measured to verify that it meets the quality expectations, but focus is also on finding issues in the implementation that need to be fixed. Quality Assurance can be said to be part of the agile approach. The Product Owner’s presence and participation in the project fulfils the need of the customer having confidence in the quality of the process. As the Team is cross functional, testing and Quality Assurance (QA) skills will be present during the full process cycle. Also, at the end of each Sprint the Product Owner has the power to
accept or reject the output, which raises the stakeholders’ confidence in the quality throughout the whole project.

The iterative nature of Scrum, where knowledge and improvements are continuously fed back into the development loop aids in the aspect of Quality Improvement. Faulty test cases and testing methods, as well as development can be fixed on the fly, and the daily Scrum meetings provide a good forum for introducing improvements in the on-going work.

2.6.6 Human Resource Management

Definition

Human Resource Management includes the processes that organize, manage, and lead the project team. It helps ensure that the proper people are working on a project, that everyone is working efficiently and the right people have been scheduled for the tasks they are best adapted for.

PRINCE2

PRINCE2 defines a Four Layer Management Model (as illustrated in Figure 2-20) which can scale according to different project environments and sizes. To achieve this, each layer is defined as a set of roles, each of which can be allocated to one person, shared by several people or combined according to the specific needs of a project.

![Figure 2-20: The PRINCE2 Four Layer Management Model](image)

**Project Board**
The Project Board is appointed by Corporate or Programme Management to provide overall direction and management of the project and is ultimately accountable for the success or failure of the project.

**Project Board**
The Project Board consists of the *Project Executive*, the *Senior User* and the *Senior Supplier* roles, representing respectively the interests of the Business, the end Users and the Suppliers/Developers. The Executive is responsible for the project as a whole and must ensure the return-on-investment provided by the project, while balancing the demands of the Business, Users and Suppliers. The Senior User manages the specification of the final product to be delivered by the project. This role acts as a proxy representative for the end users and will monitor the project to ensure the end product meets the objectives set in the Business Case, in terms of quality. This Senior Supplier protects the interests of the parties implementing the project products and has the authority to acquire and commit resources as required.

**Project Manager**
The Project Manager runs the project on a day-to-day basis, on behalf of the Project Board. The Project Manager is responsible for ensuring that the project deliverables meet the required and predetermined standards of quality within the given cost and time constraints.

**Team managers**
This role is only applicable in larger scale projects, where team members are divided in sub-teams of specialists, each of which is headed by a Team manager. The team manager in turn takes direction from the Project Manager.

**Project Assurance**
Assurance provides independent monitoring of all the project aspects and covers the interests of all above mentioned parties. It is the responsibility of Project Assurance to identify, report and escalate any potential issues as soon as (or preferable before they) arise.

**SCRUM**
At a first glance, the Scrum human resource management seems very simple. As mentioned in chapter 2.2.5, there are only 3 core roles, Product Owner, Scrum Master and the Team members.

**Product Owner**
The Product owner is the person that is finally responsible for the outcome of the project, and it is his task to ensure that the ROI is positive. As a representative of the customer, the Product Owner will (help) generate/define requirements for the project, prioritize between the requirements as well as add, remove and change the scope of requirements as demanded by market, the time plan and the budget for the whole project. The Product Owner is also involved in quality control, as he has the power to accept or reject the outcome of tasks. It is not recommended that the Product Owner and the Scrum master is the same person.

**Scrum Master**
The Scrum Master is basically a team lead for the Team. Rather than being a manager, the Scrum Master helps and supports the Team by helping them resolve issues, both internally and externally. This involves making sure the team have the resources they need to perform their work and that the communication within the team is working. The Scrum Master is also responsible for the making sure the Scrum process is followed, e.g. setting up the Sprint meetings (daily scrums, reviews, planning meetings).

**The Team**
The Team is the group of people who actually implement the project. The team should be cross-functional (including people with different skill sets and expertise) to be able to cover all aspects of the project. The team should not be too large (this may cause issues such as long meetings, need of coordination and management) or too small (the team need to be able to perform all the tasks, and have enough time to do it). As the team is to be self-organizing and empowered to take decisions within the project boundaries, the requirements on team members are high.

Except for these core roles, there are also other people who will come into contact with the Scrum project and team. Stakeholders such as end customers and vendors, different kind of managers in line organisations, project managers, support people etc. can at times give some input or contribute to a smaller degree and must be taken into account, but they are not formally part of the Scrum process.

### 2.6.7 Communications Management

**Definition**
Communications management consists of processes to identify communications requirements, technologies, constraints and assumptions. Communication planning involves identifying and meeting the information needs of the project stakeholders. Specifically, identifying which people need what information, when the information is needed, how to structure information flows and how the information is collected and communicated.

**PRINCE2**

At the initiation of a PRINCE2 project, a *Communication Plan* is documented as part of the Project Initiation Document. This documents how information will be disseminated to, and received from, all stakeholders in the project (see examples in Figure 2-21). It identifies the means and frequency of communication between the stakeholders and is used to establish and manage on-going communications throughout a project. Specifically, it includes:

- Identification of stakeholders their information requirements
- Time frame or period the stakeholder needs the information
- Description of when and how information is collected and who collects it
- Document distribution methods and frequency of distribution
- Handling procedures for temporary storage and final disposition of project documents
- Regular status reports, scheduled project team meetings, updates with the steering committee,

![Figure 2-21 : Possible project stakeholders](image)

**SCRUM**

In Scrum, there is no formal communication planning. Stakeholders can (passively) attend the Scrum meetings, and the Burndown Chart and Backlog documents are open for all to view and show the status of the project. The Product Owner is the assigned point of contact towards external stakeholders, and internal communication is facilitated by small teams working in the same geographic locations as well as on the Daily Stand-up meetings.
### 2.6.8 Risk Management

**Definition**

A risk is something that may happen during a project lifecycle and if it does, will have a positive or negative impact on the project. Each project is expected to take on some level of risk if it is to achieve its objectives. Risk management then, is the identification, evaluation and prioritization of these risks, followed by a coordinated application of resources to minimize, monitor, and control the probability and impact of negative risks or to maximize the realization of positive risks (‘opportunities’).

**PRINCE2**

PRINCE2 describes certain mechanisms of risk management in order to effectively manage a project’s exposure to risk; by taking action to keep exposure within an acceptable level and in a cost-effective way. At project initiation, the project board and project manager define the level of risk that they are willing to take on for various component of the project. The tolerance levels may be different for different parts of the project. They also agree on the associated time and cost contingencies associated with any mitigating actions to take in case of risk realization. The project board is responsible for ensuring that all risks are managed whereas the project manager has the responsibility to identify, log and regularly review the risk. Risks are recorded and updated in the **Risk Log**. Risk management policies are properly documented and their importance clearly communicated to the staff.

![Figure 2-22: The PRINCE2 Risk Management Cycle](image)

The PRINCE2 risk management cycle is illustrated in Figure 2-22 and is further elaborated in the PRINCE2 Guide[25].

**SCRUM**

Risk management is another area which is not formally covered by the Scrum methodology. Projects are free to handle risks according to best practices of whatever industry the project belongs to. According to Ken Schwaber, one of the founders of Scrum:

“Scrum purposefully has many gaps, holes, and bare spots where you are required to use best practices – such as risk management. Scrum then shows you how well that approach works through transparency, so you can continually optimize the approach.”[2]
There are many ways risk management can be incorporated in Scrum. The Product Owner being present throughout the project cycles and the iterative approach of evaluating requirements and priority effectively deals with the risks of unclear requirements and lack of customer communication. Secondly, other standard risk management approaches can easily be integrated with Scrum. Risk identification and evaluation can be part of the regular meetings (both at beginning of project and for each Sprint), risk monitoring can be dealt with at the daily scrums and followed up at the Review meeting. Handling the risks will be done by the Team within the normal Sprints.
3 Method

The purpose of this chapter is to describe the research methodology considered for and used in writing this thesis. It starts out by describing the initial research that was performed, then goes on to describe relevant research methods, which of the methods were selected and why. There is a sub-section describing how we arrived at relevant research questions through the use of an organisational change model, a sub-section on how the interviews were planned, composed and performed, and finally a discussion on the reliability and validity of the results.

3.1 Prestudy and approach

The first source of information was reviewing relevant literature which let the authors of this thesis gain further insight into the strengths and weaknesses of both traditional and agile methodologies, the contexts in which they are most successfully applied, as well as to get an overview of and understanding for the problems and issues usually encountered when trying to introduce agile methodologies into an organisation employing traditional methodologies.

Literature streams that were used consisted of both the reference literature provided by the respective founding organisations, papers on the alignment/hybridization of multiple methodologies, as well as concrete case studies relating to the effects of introducing agile methodologies into traditional organisations. All this information can be said to constitute the secondary data sources for our thesis, and helped us pinpoint relevant problem areas related to the organisational transformation that takes place when introducing agile project management methodologies.

The information gathered was then used to formulate questions for a number of interviews, which have served to collect more qualitative data from experts (project managers) that have been part of an organisational transformation where agile methods were introduced. In parallel, an analysis of documented cases has been carried out. These data were the primary data sources for the thesis. Once all the data were collected, analysed and compared against the problems and pitfalls, an attempt was made to formulate best practices for introducing agile methods into traditional organisations. The end result constitutes the main output of this thesis: the conclusions and suggestions for further research.

3.2 Quantitative methods

Quantitative research methods deal with data that can be quantified (analysed through numerical and/or statistical processes) [56]. Data can for instance be collected through questionnaires, measurements, gathering data through secondary data sources and archival data etc. In general, it is easier to measure and judge the validity of the end result when quantitative methods are used, although this is largely dependent on populations and sample sizes.

3.3 Qualitative methods

Qualitative research methods focuses of getting an in-depth understanding of the object/phenomena being studied, the “how” and “why”.

3.3.1 Case studies

Just as the name implies, a Case Study focuses on studying a certain “case”, which might be a project, a certain situation or even a person. According to Garson [22], a case study “may be particularly helpful in generating hypotheses and theories in developing fields of inquiry”. Yin, in his book Case Study
Research, elaborates on the lack of a good definition of the case study as a research methodology, and proceeds to formulate a technical definition of the term[^76]:

“1. A case study is an empirical inquiry that
   - investigates a contemporary phenomenon within its real-life context, especially when
   - the boundaries between phenomenon and context are not clearly evident.

2. The case study inquiry
   - copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result
   - relies on multiple sources of evidence, with data needing to converge in a triangulation fashion, and as another result
   - benefits from the prior development of theoretical propositions to guide data collection and analysis.”

Tellis[^68] lists 6 sources of information in case studies:
- Documents
- Archival records
- Interviews
- Direct observation
- Participant-observation
- Physical artefacts

Yin explains that it is possible to study a single case (for instance when we want to study a critical case in depth) or several cases, and to use a holistic approach or an embedded approach where several units of analysis are studied.[^76].

As with most qualitative methods, the main drawback of the case study is the difficulty of using the findings in a broader scope, e.g. generalizing from them, as validity of the findings is restricted to similar cases. Other criticisms are difficulties of performing the case study in a rigidly scientific way, and that they produce unstructured data.

### 3.4 Mixed methods

It is possible to use multiple research methods and combine the results. For instance, to use several quantitative methods to improve the validity of the result, or to combine a quantitative method with a qualitative one (to gain more in-depth insight into some area).

Saunders[^56] describes the paths we can take while designing our methods as following:

![Figure 3-1 - Research choices according to Saunders[^56]](image-url)
3.5 Research methodology selection

Saunders [56] mentions two main approaches to research, the deductive approach and the inductive approach. The deductive approach focuses on testing theory, e.g. we have or arrive at a theory, that needs to be formulated in such a way so that it can be tested (measured, evaluated, verified). The inductive approach instead focuses on building theory to explain (understand, define) a problem, analysing the data and formulating a theory.

From the nature of the problem statement in this thesis (focus on “how”), as well as the questions of interest to the authors, it was decided early that we would use the inductive approach and focus on qualitative research methods.

As the questions of where and when to apply the different project management approaches are open, and it is difficult to find large amounts of projects where only a few variables differ, a quantitative method approach would not be very successful.

Since during our pre-study, we already performed an extensive literature review and in addition we already had some practical experience with traditional and agile project management methods, Grounded Theory (one of the qualitative methods that were considered from the beginning) was deemed unsuitable for our cause, as Grounded Theory assumes a completely unbiased approach without any pre-research literature review or conversations about the theory.

A combination of case study and a qualitative Survey Study was initially chosen as the research method. After reviewing the drawback of surveys (low response rates, reaching target groups, answering biases, etc.) it was decided to perform a number of interviews instead, as we are targeting a small group of people with a specific set of knowledge/experience. According to Saunders, our target group (managers) are also more likely to agree to be interviewed rather than to answer a questionnaire [56]. The strategy chosen to prepare and execute these interviews is described in chapter 3.6. The interviews were performed through on-line chat and on-line open-ended questionnaires.

3.6 Interview strategy

3.6.1 Target audience

The target sample group (audience) for our interviews were primarily managers within organisations that have introduced or are in the process of introducing agile project management methods. They are best suited to be able to answer the questions within the 6 areas identified in the Burke-Litwin model as being the most relevant to us. Team-members of agile teams were also a good secondary input-stream, as they had further insights, specifically in the fields of Work unit climate and Individual performance, but also gave different viewpoints on the other areas.

3.6.2 Strategy

The strategy to reach these target groups was the following:

We used LinkedIn as the base to reach both our personal networks and identify potential candidates, and we used the LinkedIn Groups to reach further individuals who matched our target profiles. A benefit of using LinkedIn for this kind of research is that it’s less “anonymous” on the researchers’ part, e.g. the person being interviewed can also get some insight in who the researchers are and might feel more inclined in participating. Additionally, it gave us an easy means of verifying the past experience of the interviewees. The complete list of LinkedIn groups we targeted for contacting
interview candidates is listed in Appendix 8.2. A concern with this approach was that it would not generate enough answers, e.g. that we would not be able to find enough people to interview. Depending on how extensive the answers would be we set the aim at conducting 5-10 interviews of good quality.

As a backup to the interview approach, we also created a web-questionnaire with the same set of questions that were the base of the interview. The reasoning behind this was to give individuals who were not inclined to being subject to an interview another venue into participating in our research. Reasons for not wanting to be interviewed might be time-constraints, feeling uncomfortable or other reasons, and thus the possibility of answering the questions in a questionnaire format (which can be done at any time, and probably takes less time) gives a good chance of increasing our answering rate.

As mentioned in chapter 3.5, the drawback with surveys is often low response rates, incomplete surveys, and where questions are open ended data tends to be of low quality. Since the survey was considered a backup these drawbacks were considered acceptable.

### 3.6.3 Interview Composition

In order to facilitate the analysis of the gathered data, we have categorized the questions according to the model derived in chapter 2.2. For each dimension in this model, we basically wanted to solicit information on the main challenges interviewees experienced in that organisational dimension, as well as on (un)successful approaches taken to overcome these challenges. Therefore, our questions consisted of the following parts:

- an introduction in which we explain the motivation for the interview, provide instructions/guidelines and detail additional considerations.
- a context section, containing some general pre-screening questions to establish some basic context on the nature of the participant’s organisation, experience and role.
- the main questions section, containing an average of two questions per organisational dimension. For each dimension, we provide some short (single line) context, based on the differences between traditional and agile project management, as researched in chapter 2.

Each of the individual questions is open-ended and formulated in such a way as to encourage the interviewee to provide detailed information about either specific challenge encountered and/or related practices applied in the different organisational dimensions. The main questions are listed below and the complete set of questions as represented to the interviewees is listed in Appendix 8.1.

<table>
<thead>
<tr>
<th>Dimension of Model</th>
<th>Context</th>
<th>Research questions and observations in literature</th>
<th>Interview questions</th>
</tr>
</thead>
</table>
| **Organisational Culture** | Agile methods proclaim different core values and principles than traditional methods (e.g. emphasis on innovation, team-work, customer satisfaction,…). | • What is the relationship between organisational culture and the post-adoption deployment of agile methods? \(^{[29]}\)  
• What does the Agile professional culture entail? \(^{[61]}\) | • Was agile adoption initiated from a strategic vision perspective (top management or business) or was it introduced bottom up?  
• What are your organisation’s main drivers for introducing agile practices?  
• What were the main difficulties at (e.g. resistance to agile ideas or changes required in cross-departmental processes, customer |
<table>
<thead>
<tr>
<th>Leadership</th>
<th>Agile project management is often accompanied by a shift in leadership style from command and control to increased team autonomy and accountability.</th>
<th>• Does the style of leadership influence the successful and sustainable implementation of Agile/Lean methods? [21] • Does the role of leadership change during the initiation and implementation phase? [21]</th>
<th>• How did management and team members deal with changes and what was undertaken to guide this change in leadership style? • Which new competencies did management have to adopt to accommodate these changes?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure</td>
<td>Agile teams are often composed differently from traditional project teams and have an increased focus on self-organisation, autonomy, communication and collaboration.</td>
<td>• How do you merge agile, Lightweight processes with standard industrial processes without killing agility? [9]. • Agile team members often cross the boundaries between standard position descriptions and might require significantly more skills and experience to adequately perform [9].</td>
<td>• What kind of restructuring was performed in your organisation and how were these changes received? • What kind of training was required to overcome the learning curve?</td>
</tr>
<tr>
<td>Management Practices</td>
<td>Agile project management involves closer collaboration with stakeholders and deals differently with project management aspects such as scope, risk and quality management.</td>
<td>• How do agile management approaches differ from traditional ones? [20]</td>
<td>• What were the main changes in management practices introduced at your organisation and what were the observed results (both positive and negative)?</td>
</tr>
<tr>
<td>Work Unit Climate</td>
<td>Agile methods emphasize teamwork, drive and motivation.</td>
<td>• How do agile methods affect flexibility, employee satisfaction and commitment, user satisfaction and user involvement? [61]</td>
<td>• How did the introduction of agile teams affect the motivation/job satisfaction, expectations, and interrelationships of team members? • How was team work facilitated or hindered?</td>
</tr>
<tr>
<td>Individual and Organisational Performance</td>
<td>Agile methods proclaim to increase both efficiency and quality.</td>
<td>• Agile methods and their attention to prioritizing requirements and responding to changes in stakeholder value propositions are pushing us in more high-payoff directions [10].</td>
<td>• Has agile adoption at your organisation resulted in any measurable increase or decrease in performance and/or quality at either an organisational or individual level? • What kind of notable changes have been observed in customer satisfaction and/or interactions?</td>
</tr>
</tbody>
</table>

Table 3: Interview questions
3.6.1 Data analysis approach

All of the gathered data – irrespective of the channel through which it was gathered - was transcribed and structured in the same format. As each of the questions was already implicitly mapped to one of the organisational dimensions of our analysis model, this allowed us to directly evaluate every individual response in the right context and determine whether relevant information on challenges or best practices could be derived for that dimension. The data was compared to the information learned through our literature review, as well as conclusions drawn from evaluated case studies. Where data from multiple sources re-enforced each other, it was included in our final model. Contradictory results were explored further in an attempt to explain their cause.

3.7 Reliability

Except for the drawbacks mentioned for quantitative methods in general in chapter 3.3, there are a few other points regarding reliability of the thesis results that is important to discuss. Saunders mentions three issues that can be identified for the type of interview we perform:

- Reliability
- Forms of bias
- Validity and generalizability

3.7.1 Reliability

The results (answers) to qualitative questions asked during an interview are not necessarily repeatable (e.g. even the same question asked to the same individual at a different point in time might render a different answer, due to experience, changed circumstances, etc.) They represent the opinions/knowledge of the interviewee at the time they were asked. Hence it is important that the questions themselves are well constructed, and that it is clear exactly for what purpose each question is being asked.

The clarity of interview questions was verified by testing them on a few people before the main run. This was to get feedback on the formulation and that nothing was unclear. During an actually interview such issues can be resolved on the fly, but for the answers generated through the online survey, it is very important that there are no doubts as to what the questions mean.

Another reliability concern is the quality of answers gathered through the LinkedIn / online interview approach. As mentioned in chapter 3.6.2, the LinkedIn approach gives us the possibility to verify the backgrounds and experiences of the interviewed individuals. Compared to the web-survey approach this gives us a much better assurance of the quality of answers. However, as with all situations where you can not physically verify the identity of a person, we cannot be sure that the answers are not provided by a “made up” identity.

3.7.2 Forms of bias

Saunders discusses several factors that can affect the bias of the interviewee. These include the level of knowledge of the researcher, what information is provided to the interviewee, the location where the interview takes place, the nature of the questions, cultural differences etc.

As the interviews were performed on-line, some of the influences are either not applicable or not under the researchers control. These include interviewee’s perception of the researchers (appearance, body language etc.), location (where the interview took place).
In order to avoid slanting the answers in any specific direction, an effort has been made to make the questions neutral, e.g. not indicating that the transition to agile project management should lead in any specific direction. This is done through consistently asking open questions.

### 3.7.3 Validity and generalizability

This is discussed in the Validity section, where we talk about further limitations as to the applicability of the result.

### 3.8 Validity

Validity concerns the adaption and translation of theory into the reality. Yin \[76\] developed three types of validity: construct validity, internal validity and external validity.

#### 3.8.1 Construct validity

To meet construct validity, Yin \[76\] indicates the importance of selecting the specific types of changes that are to be studied and relating them back to the original objectives of the study. For this thesis this has been done by associating questions to each of the dimensions of our research model (chapter 3.6.3). Additionally, Yin \[76\] states, possible case study tactics are to use multiple sources of evidence, establish a chain of evidence and have key informants review draft case study reports. For our thesis, we use open-ended interviews and case studies documented in academic papers as sources of evidence.

#### 3.8.2 Internal validity

Internal validity concerns the matching and congruence of the findings to reality. Merriam \[41\] describes several approaches for ensuring internal validity. One such approach is triangulation, in which multiple sources of data or used. For this thesis we have checked for parallels and inconsistencies between data gathered from interviews of people with different roles/perspectives on the subject matter (external consultants, internal project managers, team members), observations and case study documents. Another common strategy for internal validity are member checks. We have made our draft analysis data available to interviewees in order to gather feedback. In addition peer examination was applied, in which other master thesis students have provided their feedback on this thesis in two draft stages. A table of the participating interviewees’ profiles can be found in chapter 4.1.1.

#### 3.8.2 External validity

External validity concerns the extent to which the findings of a particular case study can be generalized or replicated to apply to other situations. The higher the external validity, the higher the level of generalisation (Yin \[76\]). Merriam \[41\] describes two strategies for increasing external validity. These include providing sufficient detail in order to allow the readers to decide whether the situation is applicable to their case. We have attempted to provide a detailed description of the context of each of the different case studies (chapter 4.2.2 and 4.2.3) and interviewee profiles (chapter 4.1.2) in order to provide our readers with sufficient background.
4 Data Collection and Findings

In this chapter we provide an overview of the data gathered through interviews and case studies. The findings will be analysed further in the next chapter.

4.1 Interviews

This section examines the data gathered through the semi-structured interviews, as described in chapter 3.6.

4.1.1 Brief profile of participants

A total of 15 people were interviewed online, over means such as Skype and mail. However due to the on-line nature, not all participants completed the full interview. Therefore, we disregarded any participants which did not answer the core questions. After applying this filter, 9 relevant interviews remain. The table below provides a summary profile of the interviewee, his or her position, company and type of project.

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Role</th>
<th>Company</th>
<th>Size</th>
<th>Sector</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interviewee A</td>
<td>Software Factory Manager</td>
<td>Inworx</td>
<td>101-1000</td>
<td>Information Technology</td>
<td>Argentina</td>
</tr>
<tr>
<td>Interviewee B</td>
<td>Software Development Consulting</td>
<td>Hayes Management Consulting</td>
<td>1-100</td>
<td>Healthcare consulting</td>
<td>USA</td>
</tr>
<tr>
<td>Interviewee C</td>
<td>Quality Assurance</td>
<td>Aricent</td>
<td>1000+</td>
<td>Communication Services</td>
<td>India</td>
</tr>
<tr>
<td>Interviewee D</td>
<td>Executive</td>
<td>Falling Blossoms</td>
<td>1-100</td>
<td>Agile Adoption Consultancy</td>
<td>UK</td>
</tr>
<tr>
<td>Interviewee E</td>
<td>Consultant</td>
<td>PLO Consulting</td>
<td>1-100</td>
<td>IT Consulting</td>
<td>France</td>
</tr>
<tr>
<td>Interviewee F</td>
<td>Project manager</td>
<td>The Tertiary Education Commission</td>
<td>101-1000</td>
<td>Government</td>
<td>New Zealand</td>
</tr>
<tr>
<td>Interviewee G</td>
<td>Project manager</td>
<td>Nokia</td>
<td>1000+</td>
<td>Telecom</td>
<td>India</td>
</tr>
<tr>
<td>Interviewee H</td>
<td>Project manager</td>
<td>Christelijke Mutualiteit</td>
<td>1000+</td>
<td>Healthcare</td>
<td>Belgium</td>
</tr>
<tr>
<td>Interviewee I</td>
<td>Team leader/Scrum Master</td>
<td>SEB</td>
<td>1000+</td>
<td>Banking</td>
<td>Sweden</td>
</tr>
</tbody>
</table>

Table 4: Interviewee profiles

The roles of the interviewees display a significant diversity. A number of interviewees are experienced project managers, but some also have roles at different levels (e.g. a software development team member, an executive). There is also a good mix of people facing agile adoption in their own organisation and people who provide external consultancy in other organisations which are in the process of adopting agile practices. These factors lead us to believe that the different perceptions and experiences of the interviewees may provide different viewpoints on the subject matter, while all are very relevant and valid for our research.

In terms of organisations, there is quite some variety in company sizes and sectors. In addition, people have participated from all over the world, which helps boost the general character and therefore the external validity of the gathered data.
4.1.2 Information acquired during interviews

This section provides a summary overview of the data gathered in the interviews. Since all questions were optional, some interviewees have provided more input than others, but all have shed light on at least a number of the dimensions of our research model. Below, we have summarized the data per interviewee. In the analysis section, we have aggregated and restructured the relevant data per research domain in order to draw our conclusions.

**Interviewee A**

Interviewee A works as a Software Factory Manager at an IT Solutions company in Argentina which mainly targets the insurance sector. They have been using a traditional waterfall based methodology up to approximately three years ago, after which an Agile SCRUM methodology was introduced. Typical projects range from two to three months and 2 to 3 team members up to projects of one to two years with a 12 to 15 people sized team.

The agile adoption was initiated by the middle management. The main drivers of the organisation for introducing agile practices according to Interviewee A were “to raise customer satisfaction, avoid the risk of non-delivery of what the customer expects (i.e. hidden requirements or expectations) and better information on what is going on in a project”.

The main difficulties while introducing agile practices were “changing the mental model, resistance to collaborate across functional silos, a lack of involvement, difficulty to find a good Product Owner (either a customer or internally), customers are used to expecting fixed price projects, etc.”.

Interviewee A also indicates that management facilitated the necessity of changes in leadership style and autonomy through coaching the team when difficulties arose. In terms of competencies which management had to master to accommodate the necessary changes, Interviewee A states that “changing the ‘command and control’ mental model is, even now, the hardest challenge”.

Regarding the change in team member responsibilities, Interviewee A stated: “the team has to take responsibility for the project outcome instead of the project manager as in the traditional approach”.

When questioned about the training required to overcome the learning curve, Interviewee A answered: “We follow mainly SCRUM and the rules, artefacts, and ceremonies are quite easy to understand. The main problem is to buy-in to the spirit. No training is possible for that issue; it's a matter of detecting deviations and coaching the team; an endless duty of Scrum Master role”.

**Interviewee B**

Interviewee B works as a Development Project Manager at a US based consultancy firm, consisting of approximately 100 people and focused on the healthcare sector. The development division consists of approximately 15 people and develops, markets, installs and supports healthcare applications. Agile methods were introduced two years ago by Interviewee B herself. She illustrates the situation before Agile was adopted: “we are a very small development group, therefore the prior development processes were relatively ad hoc and informal. Written requirements and design docs were of varying degrees of specificity. Engineers participated at a high level in making many design decisions due to lack of a focused analyst. One product was developed by a solo engineer (very high level, very good at business analysis as well as engineering).”. The main reasons for going ahead with agile adoption were ”Shorten time to market, more visible progress and accountability to published dates.” Some basic team restructuring was required to construct an agile team: ”We had a small team (4-5 people) who were mostly segregated onto this team to build a new product. In reality several people had other responsibilities that we were mostly able to offload over about a 9 month timeframe.”.
In response to how management dealt with the changes, Interviewee B responded: "Management loved it, they got monthly presentations of progress to date, demo’s, release burn-downs so they can visualize progress, impediments and achievements, etc.” The engineers however were less enthusiastic however and had many frustrations concerning the lack of upfront detailed specifications. Interviewee B elaborates: "I (Scrum Master) had to work with disgruntled engineers, keep them focused on our goals, get them out of 'is it written down' to 'let's solve the problem for the customer' and 'focus on high priority development items’.”

Interviewee B summarized the main difficulties which arose as follows: "The engineers were resistant, they were uncomfortable when everything was not written down specifically upfront. I think this was specific to the engineers on this project who were very used to waterfall processes at their last job” As a second difficulty, she added: "development of infrastructure can be sub-optimized because it gets chunked into monthly increments, rather than taking enough time to architect the whole large vision”.

With regards to motivation and job satisfaction, the agile adoption process knew a difficult start, however some improvements have been noticed over the past two years. Interviewee B elaborates: "One engineer resigned. Team relations were very difficult for quite a long time (in 25 years in the software industry I have never worked in a more difficult team environment). Note that my prior experience had been with Agile teams which worked very well together. Over 2+ years, I've seen some real growth in the cross-functional skill sets of the team, and the project estimation and initiation process has become much more seamless.” When asked which measures were taken to facilitate team work in the new organisation, Interviewee B states "Not much. We need to do more with this.” In terms of general training, she adds: "Very little, we are a small company and did not want to spend significantly on training. I attend a 'scrum master' training session, I think it was about 4 days long. I have done Agile at a prior job, and received some extensive training there many years ago (it was a large software development firm).”

Interviewee B speaks positively of the changes in management practices: "Scope management was greatly improved in my opinion. It was important to management to get a product out in about a year, we managed scope each month to achieve that result. We were able to hire our first dedicated QA resource as a result of our monthly demos to management where we hammered this every month as a 'risk' factor”.

When asked whether any actually measurable increase or decrease in performance and/or quality had resulted from agile adoption, Interviewee B answers: "Hard to compare because you don't know what would have happened if you had not used Agile. My opinion is that we delivered a new product in a year as promised, with active on-going involvement of several customers, and now have a live product with a happy and referenceable client base. That would not be the general outcome of most new product development efforts, so I see it as an improvement”. She indicates however that there was a notable change observed in customer satisfaction: "The customers are happy and referenceable. We had 3 customers who worked with us weekly for a year during development, and they enjoyed the process and worked with us to prioritize competing requirements and priorities.”.

Interviewee B also provided some closing thoughts: ”I attended a session at MIT a year or so ago which highlighted Agile adoption in a couple of different industries. The consultant 'expert' leading the session made a comment to the effect that 'most agile projects fail because of' lack of training for the team members (or similar). I took issue with this, if you have a development methodology that is not able to be successful in the majority of instances when implemented by professionals in the industry, there is something wrong with it. The presenter summarized a question I asked by saying "How can you get better at doing Agile practices’, and I corrected him. My question was 'How can you deliver better products, on time, with customer satisfaction’. Too much time is spent with Agile practitioners talking about the 'proper' way to do Agile. The goal is not to do 'Agile' by the book. The goal is to deliver products successfully. If agile has a >50% failure rate, then some rethinking is required.”.
**Interviewee C**

Interviewee C works as a Quality Director of the quality assurance department of a large India based Communications Services company. Agile methods were introduced in 2009. Interviewee C adds “We have used waterfall and its variations to great success. We are a CMMi Level 5 organisation as well as TL 9000 certified”. The projects at the company vary from small projects for 3 to 6 team members, up to programs which involve more than 100 people.

Agile adoption was initially inspired from a Business perspective and Interviewee C states that the main driver for adoption was to “Raise customer satisfaction by increasing flexibility”. When asked which kind of restructuring was performed in order to facilitate agile adoption, Interviewee C answered “The re-structuring is not done at an organisation-wide level. It is local and so far the impact has not been analysed”.

Interviewee C summarizes the main difficulties which occurred during the introduction of agile practices: “Lack of appreciation of key requirements and principles is still a challenge. We use different means of communicating and bringing in changes through external coaches and internal sponsors who understand. Implementation of Engineering practices is the key challenge that is the current focus now”. The company did provide training to overcome the learning curve: “Training and Overview of Agile and Scrum is offered across the board on a regular basis.”

The company also faced difficulties dealing with changes in leadership style, resulting from agile adoption. Interviewee C states: “They are still getting used to it. They resist, ridicule, question and try to hold on to their command and control style and are generally happy being naysayers!”. Interviewee C adds that in spite of the internal resistance, the agile adoption process is still going on, as it is driven as a business requirement.

**Interviewee D**

Interviewee D is an Executive at an Agile Adoption Consulting firm located in the United Kingdom. He is a Transformational Leadership Specialist with over twenty years of experience in leading and advising on transformation efforts within software and technology product development businesses. As such, he works together with progressive senior managers and C-level executives of UK technology businesses for which effective software and technology product development is a business imperative. The projects he is involved in are usually executed in teams of 6 to 9 people and last on average from 3 to 6 months. Agile practices were first introduced as early as 1994 and the company transitioned from RUP to Scrum and Kanban.

He has advised organisations where agile adoption was initiated both bottom-up and top-down, however according to Interviewee D, the main drivers for agile adoption are “Fashion and fad”. The main difficulties with the introduction of agile adoption according to Interviewee D are “alienation from the rest of the (non-agile) business”. Interviewee D also points out that usually management does not deal with the necessary changes in leadership style and team autonomy to make agile a success.

Interviewee D indicates that coaching is the mean measure used to facilitate team-work in the new organisation. According to Interviewee D, the main restructuring required is the forming of self-organizing teams. Interviewee D notes however that while this is received well by the team members, this structure is in his experience received poorly by everyone else. Interviewee D also observed an improvement of individual motivation and team performance in the short term, however in the longer term these are followed by a decreased motivation and decreased performance. Also, in spite of increased customer interaction, the adoption of agile methods has led to increased customer frustration and alienation.

Interviewee concluded the interview with the comment “Agile project management should be the responsibility of the (whole) project team. ‘Agile project manager’ is an oxymoron”.

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**Interviewee E**

Interviewee E works as an independent IT consultant in France, focusing on information systems. He has previously held various management positions, mostly working within the IT field in the automotive industry. He has been working as a coach/teacher for incremental development and Agile methodologies, as well as a team leader for Agile teams, as well as with traditional methodologies such as SDM.

His first contact with agile approaches was in 1995, with RAD (Rapid Application Development). Incremental development was performed, with time boxes of around one month. However, the agile introduction was never made permanent, as the initiative was not supported by the middle management. The team was dissolved during a reorganisation and that marked the end of the try.

**Interviewee F**

Interviewee F works as Project Manager in a governmental department New Zealand, consisting of around 270 staff members. She has many years of experience from consulting and management within the IT area. Teams are around 5 to 10 people, and typical project duration vary between 3 months and 2 years with budgets up to several millions NZ$.  

The company normally uses a traditional waterfall-like project model, but has run a successful agile project some years back, and a second one was done recently. They used a Scrum-like approach, with “sprints, stories, show & tell, retrospectives, planning sessions, velocity etc.”

The current Agile project was initiated bottom-up by an IT-manager, and forced on the team. The main drivers were to get the team to actually deliver (there had been unsuccessful attempts to get the project to deliver during several years), and the approach was to have a short timeframe in which something had to be delivered.

Difficulties while introducing agile practices included:

- “Poor understanding by senior management of what Agile meant in terms of fixed deliverables”
- “The team was the biggest issue. The change in thinking was very difficult (to not have everything detailed up front)”

The approach itself also lacked an overall plan, there was no release planning, and although there was focus on customer interaction the architecture that was the outcome of the project ended up more complicated than required.

When it came to management practices, very little changed from the traditional PM method used before. Interviewee F states that “The metrics in the regular reporting changed to points per iteration. Quality was never really measured at the management level. Risk was managed through the block board (impediments) and weekly reports”.

According to interviewee F, the changes in management style went smoothly, and management did not really have to master any new competencies. Except for having an experienced Scrum master, no special guidance was needed for the team to adjust to self-management; “They took to it after an iteration or so”.

When asked how the introduction of agile teams affected motivation, job satisfaction, expectations and interrelationship of team members, the answer was that it was very challenging, and some team members even left. The struggle to have team members accept the agile approach put stress on the PM and the BA/Scrum master, but in the end, it seems to have paid off: “However, they changed their
attitudes a lot, without ever realising. Enforcement of collective code ownership, cross-skilling, and constant integration became second nature.”

Part of the problems might have stemmed from the lack of training of team members and staff. According to interviewee F, “Some team members had ‘done agile’ and therefore had a concept of how it worked - which was only SOME of the practices. If we did it again I would insist on training for all so that they are all on the same playing field.”

Some of the measures taken to facilitate the new teamwork were to encourage the team members to pick up any task, e.g. not stick to traditional roles, and great care was taken to make sure the “retrospective” results we taken into consideration and integrated in the process.

In the end, Agile was not adopted by the organisation.

**Interviewee G**

Interviewee G works with project handling at a large (1000+ employees) Telecom company in India. The projects are mostly long-term, with constantly changing requirements (such as changes to functionality and adding new features).

Before introducing Agile around 2 years back, they used a traditional waterfall-type project model. The decision to introduce agile methodologies was a top-management decision, and the main drivers were to shorten time to market and increase flexibility.

The company took the agile approach seriously, and provided ample training for both team members and management on how Agile works, what the benefits are etc.

Interviewee G listen the main challenges of introducing agile practices to be:

- “Making people feel comfortable”
- ”Explaining the roles”
- ”Explaining to team members how it is not micromanagement”

The lack of clear roles proved to be difficult at first for team members, who were used to getting clear directions, and the team leaders (previous managers) had a hard time not to try to micro manage the teams.

Other problems that occurred was that some teams stared practicing their own versions of agile, and management felt that authority was slipping through their fingers.

On the other hand, overall quality improved. Project duration became shorter, and development cycles became faster. Risk identification improved, and flexibility of scope became better. According to interviewee G, employees had mixed feelings on how the new way of working influenced them. Some felt it was very effective and adjusted easily, while others felt it was just another way management tried to micro manage their work.

In the end, “after lots of misunderstanding and difficulties, management and teams were able to accept and practice agile”.

When asked if agile adaptation had resulted in measurable changes in performance, quality and customer satisfaction, interviewee G means that these areas worked very well even before, and it’s hard to say if it improved or not.

**Interviewee H**
Interviewee H works as a Project Manager at a large (1000+) employees Belgian company in the healthcare business. Development teams consists of 5 to 10 people, and the IT-projects vary in scope from a few man day to thousands man days, the larger ones being divided into multiple phases. Up until two years ago an in-house methodology based on PRINCE2 was in use. Since then, Scrum has been introduced and is being used for certain projects, the target being to have migrated completely to Agile project management by 2013. The main drivers for introducing agile practices were to increase flexibility and be better equipped to deal with a varying scope, and the idea came initially from a senior team-member who managed to sell the idea to top management.

There was no specific training performed before going agile, except for some team members that were sent on a Scrum Master course, but rather “It was mostly trial and error, but it didn't take long before everyone got into the agile spirit.” The new way of working has influenced motivation and team spirit, “In the agile projects, team members were more closely involved with all aspects of the project and it seems to have had a positive effect on motivation and team work.” Interviewee H also stated that “This way they were much more involved with the project objectives, had direct contact with the customer and could immediately discuss any issues in group.”

The shift to Agile has affected the group dynamics and the balance between project manager and group members within the project team. “In general, we had to learn to relinquish some control, since during the sprints the teams work mostly in a self-directing mode and the project manager only follows progress from a distance and interacts only when significant issues or risks occur. Instead, we had to learn to take up more a role of 'champion' of the project. In other words, we had to promote the vision, act as a mentor, encourage the team and facilitate wherever possible.” There were also changes on organisational level. “We moved away from fixed project teams and created scrum teams based on specific expertise. That way, these expert teams work on tasks for multiple projects within a sprint.”

Regarding what the main changes in management practices were, interviewee H said that “While our practices for risk and quality management did not change significantly, the concept of a variable scope (and consequently budget and planning) was a major change. A mind shift was necessary at the level of our customers, management and business. Our (internal and external) customers no longer needed to provide detailed requirements for the entire project upfront.” This also meant some limitations, for instance fixed price projects and projects that needed to have a specific deadline could not be undertaken. “Instead, just as the scope, the planning and budget needed to be estimated roughly for the entire project and were refined in detail for each next iteration (usually 1-3 months).”

The main difficulty perceived by interviewee H was adjusting to a different way of interacting with the customer during the projects. “Initially, some internal customers had trouble with the amount of time they needed to invest to be so closely involved throughout the project, but eventually they mostly came to appreciate the closer involvement.” This has also influenced the customer satisfaction. “There is definitely a closer interaction with customers.”

Finally, in answer to if the agile adaptation has affected performance and quality interviewee H stated that although it seems employees like working Agile and has a greater personal commitment, “It is still a little too early to assess whether project performance has significantly increased for agile projects. We hope to gather some factual data on this within the next few years as agile is rolled out to all projects.”

Interviewee I

Interviewee I is a team leader and Scrum master at a large Swedish company in the banking sector. As of January 2011, Scrum was introduced, whereas previously ITIL was used for service management and for dealing with daily operations, SEB-RUP when working with improvements and sometimes ad-hoc processes for other implementations. The team consists of 15 people, active in operations, IT Management, infrastructure and maintenance.
Agile was introduced bottom-up and the main drivers were “improving daily operations and being able to have a working environment in which people don’t get burned-out. The business focus is to be able to adhere quickly to legal requirements and to keep quality.”

No significant restructuring was necessary. Interviewee I states: "I just took the role to control the board and implemented daily scrum. I changed the meetings from one person (the old team leader) talking to allowing each member to say something for 1-2 minutes. Then I introduced the KanBan approach and the Scrum methodology”. "Daily scrums of 10 minutes are held, plus 5 minutes walking through the board. All improvements are planned into Sprints 2-3 weeks. The KanBan board is used for the daily operations activities. Retrospectives are held at the end of each Sprint and demo day”. Also, no training was introduced: ” None, just communicate the importance of information sharing and teamwork”.

The main difficulties which occurred during the introduction were: "To make the senior members share their knowledge and to understand the concept of a product/sprint backlog. Enforcing the junior members to take the difficult tasks and emphasizing that the seniors had to help. And as a team leader to constantly communicate with the members”. Interviewee I adds: "The problem was that there were a lot of conflicts between team members, task were dependent in the individual, there was no real knowledge sharing. There were problems with estimating time, meeting goals and to prioritize correctly.

In spite of these difficulties, some improvements became clear quite soon. "The most important change was the communication atmosphere that has been improved, by the fact that we constantly communicate.” "The main benefit from adopting was to improve the team cooperation, knowledge spreading and to finally being able to prioritize and to have a better communication with the business. The problem is that slackers can have a hard time to accept this way of working as everything is on the table every day, which can lead to other types of conflicts.”

When asked about observed changes in individual and team motivation, Interviewee I states: ” They seem to be more relaxed, the cooperation between members has increased. To see progress every two weeks increases confidence”. Interviewee I also notes that different personalities deal differently with the introduction of Scrum: "Shy individuals grow as they get used to talk about their subjects, technical personnel can focus on technique and solutions. Conservative and lazy people have problems with this because they get caught”.

Not only the technical team, but also the business gained from the agile adoption: ” The business are very satisfied with our progress and thinks it is easy to follow our progress and to weight their priorities. They now know what an additional change might cost and this makes it easy to decide what to do and when it can be done.”

Agile adoption also had a positive effect on productivity: "We have noted that we can increase the number of development actives in a Spring considerably. We have also gotten a good measurement of the support costs and can easily capture and register problems during hardware failures etc.”

4.2 Case Studies
This section examines the data gathered through reviewing existing case studies. This alternate source of data allows us to analyse whether the data reinforces, complements or contradicts the data gathered through the interviews.

4.2.1 Brief description of cases selected
Two case studies were selected to complement the data gathered during the interviews. They are listed below:
Rather than duplicating the case study details described in these external sources, we have provided short summaries of the relevant findings below.

### 4.2.2 Case Study 1: Going Agile - A Case Study

The objective of the case study was to study how agile techniques were adopted by Snowden Technologies.

Snowden Technologies is an Australian company that provides IT solutions for the mining industry, focusing on information systems, integration of software and business intelligence. In order to be able to meet the demands of increased speed of change they decided to incorporate agile methodologies in their development process. They also hope for outcomes such as better time estimation, increase quality and better knowledge transfer.

Some of the challenges that were met are listed below:

- Difference between business expectations and what was actually delivered. This was caused by lack of project ownership as well as unclear scope/requirements.
- Tools for information sharing/distribution were not as effective as hoped.
- Communication between different geographic locations proved hard.
- Iterative development did not match well with Project Management planning, and the agile principles had to be circumvented to a certain extent.
- Alignment with in-house project management tools caused loss of flexibility.

In general, the inclusion of agile methodologies was considered successful, and also provided the company with a broad array of “lessons learned”. The most important one was considered to be to include as many people of the staff as possible in the changes, to facilitate feedback routines and information distribution. Some physical contact (visits) between staff in different geographical offices improved communication and let to closer cooperation.

Another important lesson was to slowly phase in techniques and approaches, rather than to change everything at once. That way, the process can be adjusted during continuous feedback.

Specific goals should be set, so that it’s clearly visible what improvements the agile methods bring. This will ensure that involved stakeholders feel they are getting value for their effort, and reduces the resistance to change.

### 4.2.3 Case Study 2: Forming to Performing

This case study concerns the adoption of agile techniques in a very large (300+ people) in the healthcare sector. The transformation lasted two years and was performed under guidance of an external consultancy firm (ThoughtWorks). The case study describes how the team progressed through Tuckman’s Phases of Group Development [69] (The Forming – Storming – Norming – Performing model; see figure below).
The main challenges faced during the forming and storming stages of the transformation were:

- Minimal cross sub-team communication and collaboration were happening after the teams were restructured into agile teams
- Processes were initially unclear to team members due to lack of proper leadership and direction
- The team felt micro-managed when existing project manager took on role of agile Scrum master
- The team had difficulty estimating tasks due to the lack of well-defined acceptance criteria
- Good practices were defined during retrospectives, but these were never subsequently implemented
- People had tendencies to work on low hanging fruit tasks first instead of starting with the high risk (and high business value) tasks

Many steps were taken to overcome these challenges. Outside coaches (agile experts) were hired, agile books were distributed among the team members and brainstorm sessions were organized to come up with solutions. Also, team activities were organized to encourage teamwork. After several months, the teams evolved to the norming and performing phases, leading to the following positive results:

- Inter-team competition became apparent after management introduced metrics to measure the agility of each team.
- Leaders emerged in the teams and the teams self-organized and took ownership of their tasks
- Conflicts were resolved faster and decision-making became second nature
- Team members adjusted their behaviour to each other as they developed Agile habits that made teamwork more natural and fluid
- Building a personal rapport with the client helped understand customers better and improved trust and collaboration were established with the customers
- Rotating responsibilities within the team made each team member feel special and valued

Some best practices suggested include introducing a dedicated quality assurance role to ensure proper acceptance criteria are defined, hosting weekly inter-team meetings to ensure a cross-team dissemination of knowledge and ideas and encouraging closer cooperation of management with teams in a facilitating role.
5 Analysis

Data analysis was performed in two phases. The literature review concentrated on finding data relevant to the project management fields mentioned in chapter 2 (Theory). The information under these fields was then categorized and ordered according to our analysis model (chapter 2.2), so that ideas and questions could be extracted.

Once questions for the interview had been constructed, the interviews together with a review of two additional case studies were carried out. The new gathered data was analysed and compared to the initial data summarized from the literature review. In this chapter, the analysis process is clarified and differences/disparities are analysed for each of the dimensions of our analysis model.

5.1 Organisational Culture

The literature review illustrated how Agile adoption has a major impact on organisational culture as it proclaims different values than traditional methodologies. These include the emphasis on innovation, self-organisation, team-work and customer satisfaction, instead of structure and control.

Analysis of the interview data tells us that agile adoption is initiated both bottom-up (team members) and top town (senior or middle management) for a variety of reasons, including the raising of customer satisfaction (Interviewee A, C and I), shortening the time to market (Interviewee B and G) and increasing flexibility (Interviewee G, H and I). In spite of the different motives and means of introducing agile practices, all participants have indicated major challenges related to changes of in organisational culture. Interviewees A, B and F all describe internal resistance of team members to changes in processes, such as the necessity for collaboration over functional silos, lack of an overall planning and the short phased monthly work increments. Such unclarity of the new processes was also an issue in Case study 2. Interviewees B and C also identify the problems getting used to the flexible requirements and lack of detailed upfront specifications. This finding is also supported by Case study 2. Getting the customer to invest enough time to work more closely with the team in an agile fashion also proved to be difficult, as explained by Interviewees A and H. Interviewees D and F mentioned the alienation which occurs when parts of the business or senior management are not involved or aware of the implications of introducing agile practices. This may lead to a lack of leadership and direction, as occurred in Case study 2. Finally, Interviewee I indicates that an agile mentality may clash with more traditional or reserved personalities, as well as slackers who oppose the transparency and daily follow-up of work performed.

Most of these challenges seem to stem from all stakeholders (team members, customers, management, business) needing to mentally adapt to the reduction in structure and organisation and the increased interaction required between all types of stakeholders. Interviewee C indicates his company has dealt with these challenges by hiring external coaches and gaining internal sponsorship of key stakeholders. Interviewees G and I also emphasize the need to make people feel comfortable upfront by clearly explaining everyone’s roles and the implications of changes in management. Case study 1 also indicates that it is advisable to slowly introduce these types of changes, so everyone can adjust in time. In addition, clear goals should be set to inform every one of the value agile methods bring.

5.2 Leadership

Agile project management is often accompanied by a shift in leadership style from command and control to increased team autonomy and accountability. In this section we examine the interview and case study data to determine which challenges manifest themselves in this domain.
Most interviewees agree that changing the “command and control” mental model is the hardest challenge. Interviewees A, C, F, G and H all indicate that it takes time for management to adapt to these changes and in an initial phase management may resist and question the approach, while trying to hold on to the command and control style. Case Study 2 paints a similar picture, where the project manager took on the role of Scrum master and continued micro-managing. Only Interviewees B and I describe a different experience wherein management loved the changes agile adoption introduced – especially the visual daily reporting and monthly progress demos.

The companies of interviewees A and H provided coaching and courses to team members and especially to the Scrum master, as this role takes on some of the responsibilities (such as day-to-day follow-up and task breakdowns), which were previously in hands of the project manager. Interviewees F, G and I describe a situation wherein no specific guidance was required as after some time of turbulence and misunderstandings, self-management started to emerge and the management and teams were able to accept and practice agile.

Relinquishing control to the Agile Iteration Manager and Team appears to be the main problem. The Project Manager should take on the role of facilitator instead of controller. Facilitation in this context, means removing obstacles which impede team performance, while remaining responsible for overall project monitoring, budget control, financial performance tracking, mentoring and leading, scope/change/issue/risk management, status reporting communication to executive management, resource acquisition and governance. Yet, in terms of team control and daily follow-up, the project manager needs to place trust in the team and scrum master. As Case Study 2 illustrates, this can be achieved by encouraging the team to take ownership of sprint objectives and fostering communication.

5.3 Structure

Agile teams are often composed differently than traditional project teams and have an increased focus on self-organisation, autonomy, communication and collaboration. In this section we analyse the interview and case study data to pinpoint the main challenges and best practices in this area.

Interviewees A and D accentuate the fact that the new teams were self-organizing and that the team had to learn to take on the responsibility for the project outcome, where this previously was the responsibility of the project manager. Interviewee H also underlines the move away from fixed project teams to cross-functional teams with a shared expertise. Interviewee C indicates that the restructuring at his company was limited to a local part of the organisation. Interviewee B notes that initially some of the new team members still had to fulfill responsibilities related to their original role, which impeded performance. However, during the subsequent months they were able to offload most of these additional responsibilities. In terms of training some Interviewees (B, C, G) report trainings to cope with the new others, while other organisations (A, F, H, I) did not provide such training.

Case Study 2 documents the fact that initially minimal cross sub-team communication and collaboration were happening after the teams were restructured into agile teams. These issues were resolved by organizing team activities and brainstorm sessions to encourage teamwork and communication. The introduction of team based performance metrics also encouraged health inter-team competition and rotating responsibilities within the team made each team member feel special and valued.

5.4 Management practices

Agile project management involves closer collaboration with stakeholders and deals differently with project management aspects such as scope, risk and quality management. This section analyses the interview and case study data to identify the main challenges and best practices in the area of management practices.
It is difficult to find a common thread among the interviewees regarding what changes in management practices and how this affected results. Interviewees B and H both agree that changes in scope management are necessary, and that this also has a positive effect on output, since the improved flexibility in scope-management makes it easier to deliver continuously. In organisation H, this is also one of the largest challenges, as it influences both management thinking as well the business directly (for instance, it is not possible to take on fixed price projects or have fixed delivery dates for the project as a whole). Interviewees B, F and G also indicates that risk management was improved as a consequence of introducing agile.

Case Study 1 also takes up Scope definition and management as a challenge. The lack of “big picture” initially caused misunderstandings between the business and the project teams. The business had a view of what was to be delivered, and the team following an agile approach delivered something else. Also, within the team there was confusion on what the scope should be, caused by lack of communication between team-members. This was resolved by experience, feedback and the realization that it is actually the team that together with the business decides the scope.

5.5 Work Unit Climate

Agile methods emphasize teamwork, drive and motivation. In this section we explore the main challenges discovered during the data analysis of the interview and case study, in order to list best practices in this area.

Interviewees B and F both indicated that the introduction of agile teams initially caused stress to the organisations, and had examples of engineers/team members quitting their positions. The empowerment that comes with self-regulation team gives a certain degree of freedom, but also extended responsibilities and some people are not comfortable with that. Initially this causes some loss of drive and motivation. Interviewees F and G also indicated that the breakup of the traditional manager/subordinate structure caused stress on the previous managers, who had difficulties accepting their role as just a person in the team, thus affecting the whole team, and this was also noted in Case Study 2.

Interviewees H and I saw positive effects on both motivation and team work, once the team members got hang of the process and felt personal involvement with the objectives of the project, while Interviewee D saw short term improvements which deteriorated over time.

In order to facilitate the team-work in the new teams, Interviewees D and G provided coaching to team members, while Interviewee B confess this was lacking on their part but should be done. In organisation H, the project managers took the role of ‘champions’ of the projects, mentoring the team members rather than managing them, and had to learn to let go of some of the control in order to empower the team members.

Case Study 1 hinted on the difficulties in communicating between different geographical locations, which could in part be bridged by physical visits. Generally this is not an issue in Agile methodologies, as teams tends to be small and work close together, but large projects with sub-teams might experience these problems. In Case Study 2 the self-organisation worked well once the micromanaging issues had been solved, conflict solving worked better and conflicts were resolved faster. Rotating responsibilities also seem to have had a good influence on team spirit and individual work satisfaction.

5.6 Individual and Organisational Performance

Agile methods proclaim to increase both efficiency and quality. In this section we analyse the interview and case study data to find the main challenges and best practices in this area.
Most interviewees find it hard to tell if efficiency and quality has changed in a positive or negative direction. Interviewees B and I claims to see an improvement – in B’s example, a product was delivered successfully in a year, an outcome she would not have expected from most product development efforts. Interviewee H also sees an improvement in quality, but claims it is too early to assess general project performance. What can be said in general is that none of the organisations that introduced agile seems to have taken a baseline of quality and performance before introducing the agile methods. Without this kind of metrics, it is difficult to objectively measure how efficiency and performance changes.

Most interviewees agree that customer interaction has increased. For interviewees B, G and H this seems to have resulted in a higher customer satisfaction, and Case Study 2 also confirms that working closer to the customer leads to higher customer satisfaction. The exception is organisation D, where the increased customer interaction instead leads to increased customer frustration.
6 Conclusions and recommendations

This chapter provides a summary of the analysis detailed in the previous chapter and discusses our conclusions and their implications. We then identify some areas for possible future research.

6.1 Summary

In this master’s thesis, we have investigated the organisational impact of introducing an agile project management methodology in a traditional company. We have identified the major challenges for different organisational factors and based on interviews with practitioners, we have formulated associated best practices for overcoming these challenges.

Based on the Burke-Litwin organisational change model, we have selected the organisational areas we deemed to be most relevant in this context of our research and the most susceptible to agile adoption challenges (see chapter 2.2). For each these areas we have formulated research questions derived from a literature review of the differences between traditional and agile project management. Based on these research questions, we have performed targeted interviews with experienced practitioners. In addition, two relevant case studies were evaluated. Through analysis of the gathered data, we have identified the most common agile organisational adoption challenges and related best practices for each of the areas of our research model.

6.2 Conclusions

Some of the most common challenges encountered during agile adoption involve the adaptation to an environment of reduced structure and control (section 5.3) as well as the changes in team dynamics (section 5.5). Without proper guidance, this can lead to a reduction in performance and a lack of motivation (section 5.6). Additionally, project managers often seem to have a hard time letting go of the traditional ‘command and control’ mentality (sections 5.2, 5.4), thereby hindering or negating the benefits of agile methodologies. Finally, the situations where agile adoption is limited to a single department are often unsuccessful, since this leads to miscommunications and misunderstandings across departments, as well as distancing and isolation of teams from each other (section 5.1).

The identified challenges clearly indicate that the adoption of agile project management is not just about introducing a new set of rules or techniques. Instead, it involves a major organisational change, which affects many stakeholders, from executives to clients and individual team members. This is consistent with the findings of Livari and Livari who investigated the relationship between organisational culture and the deployment of agile methods, as well as Siaskas and Siaskas, who conclude that the agile culture imposes a highly competitive environment with cultural and social implications. In order for an agile approach to successfully take roots, a mental mind shift is required. Based on our analysis, we conclude that executives must champion, disseminate and reinforce the agile vision across the entire organisation. Managers must evolve from project drivers to project facilitators, thereby learning to relinquish command and control in return for increased vision setting and guidance. Team members must take increased ownership and responsibility for their tasks and learn to collaborate more closely as a self-organising and self-controlling team. Finally, clients must actively participate during the entire lifecycle of the project.

Burke and Litwin highlight the interdependencies of the different organisational factors in their model and emphasize the need to tackle issues on all these levels in order to gain overall efficiency. From the interviews and case studies we can indeed conclude that an issue in any one of the analysed organisational areas can severely impact project success, if not properly addressed. Many of these challenges can be gradually overcome however, by the support of a high-level internal sponsor who champions the agile vision top down, by initial coaching through an internal or external agile expert,
by introducing more team events and team metrics to support collaboration, by empowering teams
through collaborative decision making and reduced micro-management and by gradual closer and
continued involvement of customers in all phases of a project.

An agile transformation is obviously not an overnight event. In all examined cases, it was a process
which took several months to take complete effect. In the situations where the challenges were
successfully overcome however, it generally increased the potential for higher customer satisfaction,
improved flexibility and augmented team motivation.

6.3 Implications and recommendations

6.3.1 Theoretical implications

While the main focus of this thesis was on deriving practical-oriented recommendations (best
practices), our analysis was founded on academic theory. A lot has been written about agile adoption,
but relatively few academic literature is available on the subject. Most of the existing papers focus on
the practical tools and techniques applied by Agile methods at a project level, but little research has
been done on the organisation-wide implications.

In order to perform a theoretically supported analysis, we have linked the issue of agile adoption to
theory on Organisational Development and Organisational Transformation. The main theoretical
contribution of this thesis is the derivation of an Agile adoption model (a subset of the Burke-Litwin
model \cite{12}), elaborated in chapter 2.2, which is the theoretical model for our analysis and the
framework used to classify and organise the resulting organisational challenges and best practices.

6.3.2 Practical implications and recommendations

Through the data collection and then the analysis performed in chapter 5, we have identified the main
challenges encountered during agile adoption within an organization. The sections below presents our
concrete recommendations for overcoming these challenges for each the different organisational
change areas of our derived change model (chapter 2.2).

Main challenges and best practices related to Organisational Culture

For the area of Organisational Culture, we see a clear need for education and coaching, as well as the
need for the transformation to be supported from management level. There is a trade-off here,
education and coaching is a cost to the organisation and takes time, but we believe that the effort pays
of in a short time span, and helps increase motivation and efficiency at project level.

<table>
<thead>
<tr>
<th>Main Challenges</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee resistance to changing processes and reduction of structure</td>
<td>Have an internal or external agile coach clearly explain the new processes and introduce these changes gradually</td>
</tr>
<tr>
<td>Dealing with changing requirements and specifications</td>
<td>Have the agile team take ownership of the requirements and ensure specifications at a iteration level are clearly defined</td>
</tr>
<tr>
<td>Getting the client to be closely involved during the entire process</td>
<td>Also coach the client in the agile processes and explain the motivation and benefits of the approach</td>
</tr>
<tr>
<td>Lack of an agile vision and direction of senior management and the business</td>
<td>Find a high level internal sponsor who fully supports agile adoption and helps disseminate this vision across the entire organisation</td>
</tr>
</tbody>
</table>

Table 5: Challenges and recommendations related to Organisational Culture

56
Main challenges and best practices related to Leadership

The demands on the organisation within the area of Leadership are more complex. The leader role in an agile project is not as clearly defined as in traditional project management methodologies, and requires more motivational and coaching skills, as well as the courage to “let go” of some control and trust the team members. According to DuBrin, a participative leadership style will work well when the leader is one of the team, and shared leadership is often the mark of a high-performing team[19]. Often, the best team-leaders in the new teams might not be the same persons that used to be project managers, and this is something that needs to be carefully considered.

<table>
<thead>
<tr>
<th>Main Challenges</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relinquishing control and micro-management</td>
<td>Coach a (non-project manager) Scrum master in which project management can trust to perform day-to-day follow-up. Involve the team in important decisions.</td>
</tr>
<tr>
<td>Evolving from project driver to project facilitator</td>
<td>Let the team take ownership of well-defined sprint objectives. Remove obstacles and provide an environment in which the team can operate autonomously with minimal distractions.</td>
</tr>
<tr>
<td>Leading the team through a period of initial chaos during agile adoption</td>
<td>Champion and reinforce the overall vision. Motivate the team and play a role as mentor. Foster inter- and intra-team communication.</td>
</tr>
</tbody>
</table>

Table 6: Challenges and recommendations related to Leadership

Main challenges and best practices related to Structure

Agile teams are composed differently from traditional project teams and have an increased focus on self-organisation, autonomy, communication and collaboration. The increased responsibilities of team members and reduced direction by the team leader requires a higher level of confidence from the individual team members as well as increased teamwork. It remains crucial that the project manager and/or Scrum master provide sufficient guidance and motivation in this respect, especially in the early phases of agile adoption. According to DuBrin[19], the keys for the transition to effective team member empowerment are: sharing information, providing sufficient training and support, gradually replacing traditional organizational structure, allowing individuals and teams to determine how to achieve objectives and above all, trusting in employees to do the right thing.

<table>
<thead>
<tr>
<th>Main Challenges</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team may feel without direction due to reduced control of project manager</td>
<td>Introduce public team based performance metrics, to stimulate team self-organisation and emergence of natural team leaders</td>
</tr>
<tr>
<td>Alienation of agile teams from each other and rest of organisation</td>
<td>Organize inter/intra-group activities and team brainstorm sessions to encourage teamwork and communication</td>
</tr>
<tr>
<td>Team members may not be fully dedicated due to other pre-agile responsibilities</td>
<td>Offload team member responsibilities which distract from the agile project work (should be handled by the facilitating role of the project manager and scrum master)</td>
</tr>
</tbody>
</table>

Table 7: Challenges and recommendations related to Structure

Main challenges and best practices related to Management Practices

Agile adaptation has practical implications within the Management Practices area. The difference in scope management gives rise to a very different approach, especially during the initiation of a project, and fixed price projects are difficult to attempt since they often requires the scope to be defined in detail before the project starts.
<table>
<thead>
<tr>
<th>Main Challenges</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamic scope management limiting what type of projects can be undertaken</td>
<td>Making business and customers understand the change in approach, e.g. explaining the concept of rough draft and iterative refinement.</td>
</tr>
<tr>
<td>Unclear scope management</td>
<td>Initial scope draft to be defined by team together with owner. Iterative refinement of scope and good feedback routines.</td>
</tr>
</tbody>
</table>

Table 8: Challenges and recommendations related to Management Practices

Main challenges and best practices related to Work Unit Climate

Within the area of Work Unit Climate, we see several implications which are also closely related to the area of Leadership. In a self-managing team the team-spirit is very important, and attempts at micro-management can have very negative consequences on spirit and performance. DuBrin mentions minimization of micromanagement as a core ingredient of employee (team) empowerment [19]. The team composition is also very important; role definitions and responsibilities of team members tend to be more dynamic within an agile team, and old team members that move into the new teams need be able to accept this.

<table>
<thead>
<tr>
<th>Main Challenges</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relinquishing control and micro-management</td>
<td>For the team to feel ownership of the project, thus raising motivation and promote teamwork between the team members, micro-management should be eliminated as far as possible.</td>
</tr>
<tr>
<td>Stress to both team members and managers, caused by the change in team dynamics.</td>
<td>Coaching of team members to understand their responsibilities and what is expected of them, but also to understand what the new possibilities are.</td>
</tr>
<tr>
<td>Expanded responsibilities</td>
<td>Rotating responsibilities and encouraging team members to pick up new kinds of tasks works well as a tool to let both individuals and the team as a whole to grow.</td>
</tr>
<tr>
<td>Incompatible personalities</td>
<td>Some people might never feel entirely comfortable in an Agile organisation, and they should be identified quickly so that they do not poison the team spirit.</td>
</tr>
</tbody>
</table>

Table 9: Challenges and recommendations related to Work Unit Climate

Main challenges and best practices related to Individual and Organisational performance

When it comes to Individual and Organizational performance, it is important to be able to measure how the organizational change has affected performance. Today this is often forgotten, and hence the organisation is later unsure if agile adaptation has been successful from a performance perspective. Metrics should be defined beforehand and a baseline taken before agile adaptation is started.

<table>
<thead>
<tr>
<th>Main Challenges</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficulty in knowing whether the Agile introduction has affected quality and performance in a positive or negative way</td>
<td>Establish metrics to be able to measure these parameters</td>
</tr>
<tr>
<td>Transition: from customer interaction only at the start/end of the project to customer interaction throughout</td>
<td>Gradually involve customers more and more.</td>
</tr>
</tbody>
</table>

Table 10: Challenges and recommendations related to Individual and Organisational performance
6.4 Possible future research

During the writing of this thesis, we have identified several possible directions of further research. Since this was an exploratory study based on the input of a limited number of interview participants and two case studies, it would be interesting to further examine whether our conclusions still hold for a larger sample size. Also, the difference in how the adaptation is perceived by the different participants (e.g., team members, management, customer) could be further explored. In addition, it would be interesting to perform a dedicated case study in a company at the verge of adopting agile practices, to evaluate the concrete effects of our proposed best practices.
7 Reference List


8 Appendices

8.1 Interview questions

Introduction

In the context of our Master’s thesis in the field of Business Administration at the Blekinge Institute of Technology, we are conducting research related to the Organisational Challenges when adopting Agile Project Management practices in Traditional Organisations. In light of this, we are looking for input from experienced project/programme managers and team members who are working (or have worked) in a company environment where agile practices are/were first introduced. This open ended interview questionnaire is intended to illicit information concerning both the main challenges organisations face during such transformations, as well as best practices for overcoming these challenges.

All provided company identification data will be held strictly confidential and analysis results will solely be published on an aggregate basis. Of course we will be happy to share the results of our final thesis reports with all participants.

Feel free to forward this questionnaire to any potentially interested parties who fit the participant profile. The end date for our data collection is May 1st 2011. For any questions about this study, do not hesitate to contact us.

Thank you very much for your participation!

Rami Hansenne rahd09@student.bth.se
Allan Hibner alhf09@student.bth.se

Participant Profile

- Name (will not be published):
- E-mail (will not be published):
- Company name (will not be published):
- Company sector:
- Company size: 1-100, 101-1000, 1000+ employees
- Function:
- Country:
- Would you like to receive the results of our thesis on completion: (yes/no)

Context

- Please briefly describe the usual type, scale and duration of projects and average project team size at your organisation.
- Which traditional project management methodology (e.g. PRINCE2, PMBoK, custom in-house,…) has been in use at your company and which type of agile practices (e.g. SCRUM, DSDM,…) are being/have been introduced?
- As of when were agile project management practices introduced at your company?

Main Questions

Organisational Culture
Was agile adoption initiated from a strategic vision perspective (top management or business) or was it introduced bottom up?

What are your organisation’s main drivers for introducing agile practices (e.g. shorten time-to-market, raise customer satisfaction, increase flexibility, …)?

What were the main difficulties while introducing agile practices (e.g. resistance to agile ideas or changes required in cross-departmental processes, customer interaction,…) and what was undertaken to overcome these difficulties?

Leadership

How did management and team members deal with changes in leadership style and autonomy resulting from agile adoption and what was undertaken to guide this change?

Which new competencies (if any) did management have to master to accommodate these changes?

Structure

What kind of team and responsibility restructuring was performed in your organisation to accommodate agile methods and how were these changes received?

What kind of training was required to overcome the learning curve?

Management Practices

What were the main changes in management practices (such as in terms of scope, risk quality management) introduced at your organisation resulting from agile adoption and what were the observed results (both positive and negative)?

Work Unit Climate

How did the introduction of agile teams affect the motivation/job satisfaction, expectations, and interrelationships of team members?

What measures were taken to facilitate teamwork in the new organisation?

Individual and Organisational Performance

Has agile adoption at your organisation resulted in any measurable increase or decrease in performance and/or quality at either an organisational or individual level?

What kind of notable changes have been observed in customer satisfaction and/or interactions?

Other

Do you have any comments, suggestions for further investigation or other information related to the topic of agile project management adoption?

Thank you for your participation!
### 8.2 LinkedIn Target Groups

The following LinkedIn groups were approached for soliciting interviewee participants:

<table>
<thead>
<tr>
<th>LinkedIn Group</th>
<th>Group Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agile Project Managers</td>
<td>“Group for Agile Project Managers (Scrum, XP, User Stories, Hyb) and Employment / Digital Agencies involved in hiring for Agile projects and contracts. All profiles are pre-screened for admission to this group making a small group for real professionals.”</td>
</tr>
<tr>
<td>Agile Alliance</td>
<td>“Purpose: To connect Agile practitioners. Join this group if you support Agile Alliance and Agile in general. One of the easiest ways for us to connect people was using LinkedIn. By recommending or certifying each other, via Recommendations feature in LinkedIn, we can build a trusted network. Which offers an alternative to certification.”</td>
</tr>
<tr>
<td>Scrum Practitioners</td>
<td>“This is a group for Scrum professionals i.e. those actively practising the Agile Project Management techniques advocated by the Scrum Alliance and Scrum.Org. Open to all levels of experience and certification. This group exists to help support and spread the knowledge and implementation of Scrum and Agile in general. Off topic postings or jobs will be removed. Persistent or egregious offenders risk removal from the group.”</td>
</tr>
<tr>
<td>Agile Project Management Group</td>
<td>“The Agile Group is a project management community for professionals who believe in agile methods to control projects through iteration and incremental approach. The main objectives are a combination of collaboration + cost effectiveness + on-time delivery + meeting business changing needs.”</td>
</tr>
<tr>
<td>Agile</td>
<td>“Share Knowledge, Get Answers, Collaborate with peers. Members can contribute and share their Agile knowledge and Resources. Get answers to their questions and collaborate with peers. Agile Product &amp; Project Management, Agile Software Development, etc...”</td>
</tr>
<tr>
<td>The Project Manager Network</td>
<td>“The largest project manager group on Linkedin. Connect with alumni, friends, and colleagues to discuss PM methodology, classes, PMI PMP certification, PDU classes and training, or to find Project Management jobs. The Project Manager Linkedin group, brought to you by ProjectManagers.net, is a project management forum and group. Members can use the group for discussions about project management, project software, project methodology, project management certification, or just to network locally for pm jobs and project management related business opportunities. Members of the group include project managers, PMO leadership, project consultants, and project management software vendors, authors, and bloggers.”</td>
</tr>
<tr>
<td>Agile &amp; Scrum</td>
<td>“This sub group is for all PM Link members on Linkedin that want to discuss about Agile Project Management, Agile Software Development and SCRUM methodology.”</td>
</tr>
<tr>
<td>Group Name</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>The Agile Project Management Hub</td>
<td>“This group is for the community of Agile adopters. If you’re a developer, product manager, project manager, QA - this is the group for you. If you are interested in Agile software development and want to learn more about how to manage projects using Agile methodologies - this is the group for you. If you teach about Agile adoption, practice Agile, or want to get started - this is the group for you. Here you’ll find relevant information, articles, discussions and resources. Of course, you are all invited to share, evaluate and join the discussions. This group intends be the online Hub for all things Agile, Scrum, Lean and Kanban, and is powered by TargetProcess, Agile Project Management Software, <a href="http://www.targetprocess.com%E2%80%9D">www.targetprocess.com”</a></td>
</tr>
<tr>
<td>PMO - Project Management Office</td>
<td>“PMO - Project Management Office. Participants represent all the key industries, government offices, defence and SMEs, giving the group a broad base of knowledge and experience to draw on. Program, Portfolio, Project Managers looking for best practices, tools, methodology, certifications, Forum, Articles...”</td>
</tr>
<tr>
<td>Scrum Practitioners, Scrum Masters</td>
<td>“Scrum is an iterative incremental process of software development commonly used with agile software development. Those who adhere to the agile methodology (Scrum) in their work are highly enthusiastic invited to share your thoughts, your knowledge and ask questions.”</td>
</tr>
<tr>
<td>Agile Advocates</td>
<td>“This group is for technology professionals who are interested in networking, sharing expertise and job opportunities in the Southeast. Most members of this group are connected to Agile, an Atlanta-based IT resource that speeds time to talent for technology leaders. This group is one of the many innovative ways Agile reduces our clients’ time to talent and delivers superior performers. Join us to discover how Agile can make a difference in your career.”</td>
</tr>
<tr>
<td>PRINCE2 Project Management &amp; MSP Programme Management</td>
<td>“9,000+ Professionals: The definitive PRINCE2 &amp; MSP group. Come and discuss PRINCE 2 Project and Programme Management best practice, jobs, news, exams, documents, templates, training, events etc. Foundation / Practitioner qualifications and Portfolio / Program PMO Management.”</td>
</tr>
<tr>
<td>Agile PMP</td>
<td>“The PMI Agile Community of Practice is the result of a grass-roots initiative between a pioneering group of Agilists and the Project Management Institute (PMI) to create a new Agile Community of Practice within the PMI, with the stated purpose &quot;to equip PMI members with Agile knowledge and skills”. The PMI Agile Agile Community of Practice serves as a connecting body between Agile and PMI groups, facilitating communication, cooperation and collaboration between the Agile and PMI communities.”</td>
</tr>
</tbody>
</table>
Real World Practices

“While you can learn about best practices, Real World Practices focuses specifically on how to apply and use best practices in the real world.

Best practices might include but are not limited to PMBOK, PMP, Prince, Prince2, CMMI, ISO-9001, Agile, Scrum, ScrumMaster, CSM, Kanban, Six Sigma, IEEE, ITIL, Unified Process, UML, RUP…”

Table 11: LinkedIn groups used to approach interview candidates