Agile Transformation for Business Teams within New Zealand Organisations

A thesis presented in partial fulfilment of the requirements for the degree of

Masters of Business Studies

in Management

at Massey University, Albany, New Zealand

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2020

Abstract

Agile leverages long-held business principles such as customer centricity, quality, lean thinking and continuous improvement, and complements these with a new mindset based around innovation, risk-taking, speed, adaptability and iteration. This New Zealand (NZ) based study elaborates emerging theory that agile values and practices, originally the domain of technology, can *scale effectively into non-technical teams leading to positive and transformational business outcomes*. The study determined that exposure to agile is ubiquitous across NZ organisations and many non-technical workers already demonstrate agile values and practices informally, often in response to the failure of traditional ways of working. Very little resistance to agile was identified in business teams and new capability emerges as a natural and logical progression, fundamentally based around the value of people and teams, not technical processes or techniques. The greatest business challenges identified were lack of management support – often due to poor knowledge - and a reluctance by leaders to truly empower teams. Other key challenges were insufficient resourcing of cross functional squads, the time required to adjust to new ways of working, the challenge of shifting organisational culture and mindset, and insufficient training and communication. The single most important success factor is allowing agile to evolve slowly via a tailored and adaptive approach, followed by strong top-down leadership, creating an environment which encourages risk taking and learning from 'failing fast', building an organisational culture based on *agility,* and clarity of overall vision, strategy and objectives. The main benefits are faster delivery of increased customer value, improved product quality, and highly flexible and adaptive teams focused on short-term priorities and goals. Other key benefits include improved communication across the organisation, more effective collaboration between business and technical teams, and significant improvements in worker's engagement and motivation. However, benefits are largely anecdotal and qualitative therefore further empirical and quantitative research is recommended to prove an explicit link between agile and the achievement of organisational strategies and goals.

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1. Background and Introduction

1.1 Background

In my role as a project management consultant I have experienced first-hand the rapid growth of 'agile' software development methodologies across many organisations. As markets are increasingly disrupted, the requirement to build innovative new products quickly in response to constant change has been a key driver for this growth.

At the project level agile ensures customer's requirements are tightly decomposed, defined and prioritised, managed by cross-functional and self-organising teams, and delivered quickly and iteratively via short, time-bound 'sprints' (Kaleshovska, Josimovski, Pulevska-Ivanovska, Postolov, & Janevski, 2015).

Positive outcomes of agile have been widely reported and include increased productivity and product quality, reduced defects, and improved customer satisfaction (Cardozo, Araujo, Barza, Fanca, & da Silva, 2010; Kapitsaki & Christou, 2012; Serrador & Pinto, 2015; Tarhan & Yilmaz, 2014). Additionally, a recent Standish Group Chaos survey reports that agile projects have four times the success rate of traditional, waterfall projects (Standish Group, 2015).

While originally viewed as the domain of small projects, agile methods have matured and are scaling across larger and more complex projects; large-scale often being denoted as 50 or more people or at least six teams (Dikert, Paasivaara, & Lassenius, 2016). At scale new challenges are increasingly reported, for example managing stakeholders, cultural change, and inter-team communication and coordination (Uludag, Kleehaus, Caprano, & Matthes, 2018).

Most recently agile principles are being applied as part of business transformations across whole organisations, including interfacing into non-technical teams such as marketing, sales and finance. This appears to be a rapidly developing area of practice with 22% of respondents from a recent global agile survey claiming that all teams in their organisations are now following agile processes (VersionOne, 2019).

It is the application of scaled agile to the organisation, and specifically to non-technical teams, that forms the focus of this paper. The literature reviewed indicates there is limited research which considers the specific challenges, success factors and outcomes, which may be experienced by these teams during an agile transformation. What impacts do different professional backgrounds and perceptions have on agile adoption, are agile principles and practices relevant for business teams, what specific issues arise, what factors will enable success, and can benefits be realised in this context?

1.2 Introduction

This paper commences with a review of existing literature, the purposes of which were four-fold.

First, in order to better understand the origins of contemporary agile principles, the study investigates possible linkages and learnings from three earlier management theories: Total Quality Management, Six Sigma and Lean. Secondly, to understand other drivers behind the growth of agile such as the failure of traditional software development and project management in the face of rapid market change and turbulence. Thirdly, to provide context to my own research by examining the development of agile theory from its early beginnings as a software methodology, through scaling to larger projects, and eventually to its transformational application at the organisational level. Finally, to critically evaluate existing research, to identify gaps and to help refine research questions which were broadly defined at the commencement of the literature review.

Following the literature review the paper then presents the research methodology and detailed findings and discussion. It then concludes with key conclusions and recommendations, research limitations, and possible areas of future study.

2. Literature Review

2.1 Definitions

Agility is not a new objective for organisations. For example Jack Welch focused on "speed, agility and simplicity" in the 1980s (Tichy & Charan, 1989, p. 1143), while other authors noted the need for agility or the ability to react quickly to changing circumstances in order to be effective (Agnew & Brown, 1982).

Despite this history, in a modern context it is difficult to find a definitive and all-encompassing view of what it means to be 'agile'. In general terms agility has both physical and mental connotations, that is the "ability to move quickly and easily" and the "ability to think and understand quickly" (Lexico, 2019).

In the early 1990s the US government funded workshops at Lehigh University in response to the accelerating pace of business change. From this work agility was broadly defined as "the ability of an organisation to thrive in a continuously changing, unpredictable business environment" (Dove, 1999, p. 19). Agility is also described as being incremental, straightforward, adaptive and requiring a high degree of co-operation between customers and developers (Abrahamsson, Salo, Ronkainen, & Warsta, 2002). Cockburn and Williams (2003) noted the short inspect-and-adapt cycles in order to better manage unpredictable demands, while Boehm (2002) highlighted the involvement of customer participants who are committed, collaborative and empowered.

Others describe agility as a combination of flexibility, "the continual readiness of an entity to rapidly or inherently, proactively or reactively, embrace change…", and leanness, "the maximisation of simplicity, quality and economy" (Conboy & Fitzgerald, 2004, p. 33).

Erickson, Lyytinen, and Siau (2005) noted "the stripping away of heaviness" and the enabling of "…quick response to changing environments, requirements and accelerated project deadlines…" (p. 89), while Serrador and Pinto (2015) defined agile as being iterative and incremental, with an emphasis on continuous design and customer interaction.

So, while no single definition exists, recurring themes from the literature include being customer centric, quality focused, lean, continuously improving, innovative, fast, flexible, iterative and incremental.

2.2 Learnings from the Past, shaping the Future

Thinking about these themes and by looking historically, it is not surprising that many authors view the modern agile movement as nothing new. Miller (2001) regarded agile processes as the evolution of best practice, refined over thirty years. Cohen, Lindvall, and Costa (2004) observed that many agile concepts are based on iterative enhancement techniques first introduced in the 1970s, while Cockburn and Williams (2003) claimed developers have been sporadically using the techniques since the 1960s. Larman and Basili (2003) noted the similarity between past and present iterative approaches which are all unified by their mutual avoidance of document driven, sequential and single-pass processes.

Taking this line of thought more broadly, the next section considers some traditional management models which may have helped shaped contemporary agile thinking. In the interests of brevity this review focuses on Total Quality Management (TQM), Six Sigma and Lean; practices which share agile objectives and concepts, and which were commonly referred to in the agile literature reviewed. Further - like agile – they initially targeted specific business functions but later developed as companywide transformational strategies. All are positioned in the broader field of quality management with common objectives of continuous improvement, minimisation of waste and resources, and the improvement of customer satisfaction (Andersson, Mi Dahlgaard-Park, Eriksson, & Torstensson, 2006). Are there linkages or learnings from the past which have helped shape agile methods of the present?

2.2.1 Total Quality Management (TQM)

TQM origins may be traced to post-war Japan from 1949 (Powell, 1995). However, it is generally accepted that philosophy matured in the mid- 1980s with Edward Deming, Joseph Juran and Kaoru Ishikawa being key proponents (Hackman & Wageman, 1995). TQM developed rapidly from this time

with an Arthur Little study in 1992 reporting that 93% of America's largest 500 firms had adopted elements of TQM (Powell, 1995).

Deming prescribed a set of 14 TQM principles required by organisations to remain competitive in providing goods and services (Rahman, 2004), with four in particular seemingly aligned with contemporary agile thinking:

      Point 2: Adopt the new philosophy.

      Point 8: Drive out fear, so that everyone may work effectively for the company.

      Point 9: Break down barriers between departments.

      Point 13: Institute a vigorous programme of education and self-improvement.

Anderson, Rungtusanatham, and Schroeder (1994) theoretical model of Deming's method identified seven core TQM building blocks: visionary leadership, internal and external cooperation, learning, process management, continuous improvement, employee fulfilment and customer satisfaction.

Juran, like Deming, consulted to Japanese industry in the 1950s and focused on breaking down institutional barriers within organisations (Bisgaard, 2008). Juran's Quality Trilogy is a framework for organising quality, and within it he rejected company non-uniformities which he believed were contributing to a crisis in quality (Juran, 1986). These included multiple functions, hierarchies and product lines each believing themselves to be unique and special which, "… constitute a serious obstacle to unity of direction" (p. 20).

Kaouru Ishikawa was largely responsible for shaping the Japanese model of quality management from the 1960s (Martínez-Lorente, Dewhurst, & Dale, 1998). Like Juran he believed that all parts of the organisation must work together, and he helped shape the term company-wide quality control (CWQC) which was introduced in Japan around 1968. Principal elements of CWQC include participation of employees at all levels, the goal of continuous improvement and attention to customers definition of quality (Garvin, 1988).

Several studies discovered that it is often the tacit, soft components of TQM that are key drivers of organisational performance and competitive advantage. For example, open culture, employee empowerment and executive commitment (Powell, 1995), workforce commitment, shared vision and customer focus (Dow cited inRahman, 2004), and employee empowerment, employee training and employee involvement (Ahire, Golhar, & Waller, 1996).

Many authors also discussed the broader strategic role that TQM can play across the organisation. Anderson et al. (1994) noted that effective quality management can enhance competitive abilities and provide strategic advantages. Quality management is not, "merely about productivity and

quality control; it is a broad vision on the nature of organisations and how organisations should be changed" (Gartner & Naughton, 1988, p. 139).

Harari (1993) claimed only about one fifth of TQM programmes in the United States (US) and Europe achieved tangible improvements in quality, productivity, competitiveness or financial return. He believed TQM focuses attention on internal processes, develops bureaucracy, does not demand radical reform, and drains innovation and entrepreneurship. A more successful model is based around cross-disciplinary, empowered and self-contained teams, with the customer fully involved.

A more credible assessment was provided by Mohammad (2014) who, via examination of 54 TQM empirical studies, concluded that TQM failures are most commonly caused by insufficient education, training and resources, lack of employee involvement, lack of management support and leadership, and resistance to change. Rahman (2004) pointed to TQM failings in environments increasingly characterised by uncertainty and instability. To be competitive he believed a more flexible, modular model is required with a focus on quality via innovation, rather than continuously improving the existing products. Similarly Sitkin, Sutcliffe, and Schroeder (1994) believed the effectiveness of TQM is negatively impacted under uncertain conditions. "That is, while reliance on existing competencies certainly leads to more reliable short-term performance, it does so by underinvesting the development of new competencies for the future" (p. 21).

2.2.2 Six Sigma

Six Sigma originated at Motorola in the mid-1980s and was focused on reducing variation in the production process in order to prevent defects (Sanders & Hild, 2000). Sigma companies include Motorola, General Electric, Honeywell, ABB, Lockheed Martin, Polaroid, Sony, Honda, American Express, Ford, Lear Corporation and Solectron (Klefsjö, Wiklund, & Edgeman, 2001).

Objectives are based around the identification and elimination of variation and defects in business processes, continuous improvement and increasing customer satisfaction (Andersson et al., 2006; Kumar, Antony, Madu, Montgomery, & Park, 2008; Snee, 2004). Other authors noted a focus on the minimisation of waste and resources to improve the bottom line (Klefsjö et al., 2001).

The success of Six Sigma programmes is well documented. Between 1987 and 1997 Motorola increased sales five-fold, with a 20 percent increase in profits and cumulative saving of $US14 billion (Klefsjö et al., 2001). General Electric's 1999 Annual General Report claimed $2 billion of benefits five years into their Six Sigma programme (Banuelas Coronado & Antony, 2002).

A key characteristic of Six Sigma is statistical analysis to identify and reduce process variation (Henderson & Evans, 2000; Montgomery & Woodall, 2008). A Sigma is a statistical measure related to the capability of a process to produce non-defective outputs, referred to as the standard

deviation (Klefsjö et al., 2001). A Six-Sigma process is one which produces products and services with only 3.4 defects per million opportunities (DPMO), this is considered world-class performance (Snee, 2004). Other key characteristics include a focus on process improvement via the Define, Measure, Analyse, Improve and Control (DMAIC) approach (Sanders & Hild, 2000; Snee, 2004; Sreedharan V, Sunder M, & R, 2018; Sunder M, 2016), and a hierarchy of operational roles and rigorous training approach (Montgomery & Woodall, 2008; Sanders & Hild, 2000; Snee, 2004). "Champions provide the business focus for the project….remove barriers, provide resources and keep the project focused on the business need and on schedule" (Snee, 2004, p. 88).

Critical success factors are consistently reported as top management commitment, education and training, organisational infrastructure, cultural change, and linking to customers (Banuelas Coronado & Antony, 2002; Henderson & Evans, 2000; Sreedharan V et al., 2018), and the literature at this time painted a positive outlook for Six Sigma continuing to be an effective management practice. Snee (2004) highlighted the value of linking process improvement into an organisation's overall strategic approach, while Kumar et al. (2008) applauded the focus on knowledge and learning which positions Six Sigma well in the modern, knowledge-based information society.

However, Six Sigma requires intensive investment in infrastructure, training and tools which may be problematic in markets where innovation and speed are more important than quality. Even in companies where quality is a major driver, it's a long haul to realize tangible bottom-line benefits, and some companies put a halt to their Six Sigma projects before reaching that point (Paul as cited in Henderson & Evans, 2000, p. 66). Similarly Antony and Seow (2004) noted the significant investment required which discouraged many enterprises, along with the risk of digressing into a bureaucratic exercise at the expense of bottom line savings.

2.2.3 Lean

Lean is about controlling resources in line with customers' needs to reduce unnecessary waste, eliminating elements not adding value to the process. Lean is particularly appropriate for manufacturing and is based on five basic principles: understanding customer value; value stream analysis; flow; pull; and perfection (Andersson et al., 2006).

Lean was introduced by Japanese car makers post World War Two, a country with few natural resources and where elimination of waste is important (Arnheiter & Maleyeff, 2005). It resulted in very fast development times, expansion of product lines, just in time (JIT) production and continuous improvement in manufacturing efficiency. Challenges included urban and supply chain congestion caused by JIT deliveries, pollution, and shortage of appropriately skilled workers (Cusumano, 1994).

Noori (2015) noted that poor implementation of Lean is common, and that success requires aligned management systems and strategic orientation and commitment. Similarly Achanga, Saad, Shehab, Roy, and Nelder (2006) believed many managers fear the cost and time required to implement Lean practises, and that strong leadership, financial and organisational commitment, and the creation of a supportive culture are critical. Other authors asserted that the focus on waste reduction only achieves short term results, not a true thinking organisation or the achievement of continuous process improvement (CIP). A much broader leadership approach is suggested which combines long-term philosophy, process, people and problem solving (Dombrowski & Mielke, 2014).

Similar to the criticism of TQM and Six Sigma, other authors also noted Lean's inability to cope with highly changeable environments:

> To summarise, Lean requires a stable platform, where scale efficiency can be maximised. Highly dynamic conditions cannot be dealt with, as there is no room for flexibility due to the focus on perfection, which is always a function of particular market conditions at a certain period of time (Andersson et al., 2006, p. 99).

In light of these challenges, the integration of complementary Lean and Six Sigma principles has become popular (Arnheiter & Maleyeff, 2005; Byrne, Lubowe, & Blitz, 2007; Mader, 2008; Salah, Rahim, & Carretero, 2010; Snee, 2010; Sunder, 2013). For example Lean organisations are incorporating data analytics in quality and decision making, while Six Sigma companies are improving customer service by eliminating waste and improving efficiencies (Arnheiter & Maleyeff, 2005). The combination of Lean Six Sigma (LSS) provides a more holistic approach by reducing waste, whilst still focusing on improving process, satisfying customers and financial results (Salah et al., 2010). More broadly Byrne et al. (2007) asserted that LSS promotes a company-wide culture focused on innovation, while other authors pointed to cross-functional and sustainable quality improvements (Sunder, 2013) and faster process improvement cycles, improved quality and organisational learning (Mader, 2008).

2.2.4   Common Themes

Based on the literature reviewed this section summarises the themes, success factors, strategic application and challenges common to TQM, Six Sigma and Lean. It then considers the degree of overlap with agile and the extent to which learnings from the past may have contributed to shaping agile thinking of the future.

Table 1 following summarises the primary theme for each practice, and then presents elements which are common to all three philosophies:

Mgmt. Practice	Primary Themes	Shared and Common Elements			
		Themes	Critical Success Factors	Strategic Application	Challenges
TQM	Company-wide focus on quality control, breaking down organisational barriers	Customer centricity, customer needs central to all decision making	Leadership and top down commitment by executives, total cultural shift	Opportunities to apply across the company vision and strategy	Time and cost commitments, danger of excessive bureaucracy, red tape and bureaucracy
Six Sigma	Quality via elimination of defects and variation in business processes, heavy use of statistical analysis	Working collaboratively across business units	Organisational structure changes, defined roles to manage and champion the process	Embedded principles across the operating model and all processes	Strict application can block innovation, drain entrepreneurship
Lean	Quality via elimination of waste and inefficiency, and control of resources	Focus on continuous learning and improvement	Investment in education and training	Application across all teams and people	Rigidity and lack of flexibility, inability to cope in highly changing and dynamic markets

Table 1: Common Themes, Success Factors and Challenges - TQM, Six Sigma and Lean.

Although limitations exist with this qualitative assessment based on a relatively small sample of literature, some interesting observations are noted by the author. A primary theme for TQM was the shared responsibility for quality and the breaking down of organisational and hierarchal barriers. Six Sigma focused on the delivery of quality via statistical analysis to identify and then eliminate defects and process variations, while the reduction of waste and inefficiency was the primary theme for Lean. Customer centricity was common and recurring throughout all three practices, as was working cross-functionally across business units, and the objectives of continuous learning and improvement.

Critical success factors were also similar, focused on top down management commitment, the need for culture shift, and investment in organisational change including structures, roles, training and education. All approaches were identified as having broader strategic application across organisations, encompassing company vision, values and operating models.

Comparing these themes to those of agile in the previous section, there are clear overlaps around being customer centric, quality focused, lean and continuously improving. However, an important observation is that TQM, Six Sigma and Lean do not share the agile characteristics of being innovative, fast, flexible, iterative and incremental. In fact, the lack of these attributes is identified as core constraints which have limited the effectiveness of these models. The literature points to time and cost commitments, red tape and bureaucracy, and the application of rigid processes which can prevent organisations from quickly responding to new market opportunities. All three theories were

seen to be ineffective in uncertain and dynamic markets, with flexibility, speed and new innovation increasingly seen to be more important than quality.

From this assessment it may be inferred that agile has in fact adopted many core themes from TQM, Six Sigma and Lean, however it has extended the practice by adding new principles based around being innovative, incremental and flexible. The literature further highlights that these values are critical for survival in the face of rapidly changing and disrupted markets.

2.3 Responses to Increasing Market Change and Disruption

This section now examines in more detail the rapid market change that has characterised markets globally since the 1990s, and more specifically, how management practices evolved to deal with unprecedented levels of disruption. It attempts to draw additional learnings and responses which may have influenced agile thinking in the future.

2.3.1 Learning, Flexibility and Agility

In the 1990s there was acknowledgement that the Japanese had reshaped manufacturing and competition via Lean, TQM and so on, and that the pace of change was rapidly increasing (Dove, 1999). Ross (1990) predicted as much change in the next decade as in the previous hundred years.

Marketplaces were facing unprecedented global competition and changing consumer behaviour fuelled by demographic and socioeconomic shifts, and organisations were struggling to survive. A recent Mckinsey (2018) report notes that less than 10 percent of non-financial S&P 500 companies in 1983 remained there in 2013. Further, "over one-half of the Fortune 500 companies restructured during the 1980s" (Cravens & Shipp, 1991, p. 53).

The concepts of knowledge and organisational learning became popular because the ability to learn faster than competitors was increasingly seen to be a source of sustainable competitive advantage in these markets (Dove, 1999; Garvin, 1993; Nonaka, 1991; Senge, 1991; Slater & Narver, 1995). BP's CEO John Browne noted that, "learning is at the heart of a company's ability to adapt to a rapidly changing environment....a company has to learn better than its competitors and apply that knowledge throughout its businesses faster and more widely than they do" (Browne as interviewed by Prokesch, 1997).

Creating knowledge was seen to be a whole of company ambition and something that could potentially re-create the whole organisation. Garvin (1993) asserted that learning organisations are skilled at systematic problem solving, experimentation, learning internally and transferring knowledge quickly and efficiently. Time must be allowed for reflection and analysis, along with the creation of boundaryless cross functional teams with strong links to customers and suppliers.

Communities of practice (CoP) began to gain research and practice attention as a means by which to drive learning, knowledge and innovation within organisations (S. B. Brown & Duguid, 1991; Dove, 1999; Kelly & Caplan, 1993; Prokesch, 1997). CoPs emerge when people who share a common practice informally seek each other for experience sharing and problem solving, often leading to continuous learning (Dove, 1999). S. B. Brown and Duguid (1991) distinguished CoPs from traditional, organised structures, viewing them as fluid groups which cross restrictive organisational boundaries. High performing engineers at Bell Labs rated informal networking as a key strategy for driving productivity (Kelly & Caplan, 1993) and by 1997 the transformation of British Petroleum (BP) was in part credited to informal communities in which people eagerly shared knowledge (Prokesch, 1997).

To better respond to rapidly changing markets, the concepts of integration, flexibility and agility also began to emerge. Harari (1993) asserted the need for highly flexible, cross-disciplinary and empowered teams to drive innovation and entrepreneurship. Similarly Ahmed, Hardaker, and Carpenter (1996) promoted improved internal integration within teams and externally between departments, along with greater organisational flexibility across all inputs, technology, people, structures, systems and processes.

In the US, the Lehigh University forum (1991) and the Agility Forum (1994) identified enterprise agility as a critical competency for competitive viability in turbulent markets. The Agility Forum brought together representatives from industry, the academic community, and government to, "identify an agenda for critical knowledge development necessary for understanding agility in organisations" (Dove, 1999, p. 32).

2.3.2 Failure of Traditional Software Development

Around this time there was also growing frustration with traditional approaches to software development (Boehm, 2002; Highsmith & Cockburn, 2001; Nerur, Mahapatra, & Mangalaraj, 2005).

The very earliest models in the 1950s - code and fix - involved writing code and then thinking about requirements, design, testing and maintenance later. This approach often resulted in poorly structured code which was very expensive to fix, and delivered a low fit with users' requirements (Boehm, 1988). Waterfall, considered to be the first well-defined software development method, developed from the 1960s and focused development in a linear and sequential series of stages with an emphasis on fully elaborated documentation in the early phases (Balaji & Murugaiyan, 2012; Boehm, 1988; Cusumano & Smith, 1995; Davis, Bersoff, & Comer, 1988; Royce, 1970).

Royce (1970) provided one of the first descriptions of waterfall with sequential development progressing from requirements, analysis, design and then into coding, testing and operations, and

with limited iterative interactions confined to successive steps. He noted that software development "is simply impossible without a very high degree of documentation" and that there must be "ruthless enforcement of documentation requirements" (p. 55). Development was built around a rationalised, engineering based approach and involving the assignment of specific tasks, specialist roles and well-defined outcomes (Nerur et al., 2005). Boehm (2002) described these methods as being predictable and based on extensive planning, codified processes and rigorous reuse. Similarly Highsmith and Cockburn (2001) described a process-centric approach focused on up-front planning, documented sets of requirements, and identifying and eliminating variations.

It is generally accepted that software development was dominated by these life cycle-based methods through to the 1990s and were effective for enhancing existing products in stable environments where change could be controlled. However, as markets began to undergo rapid disruption and uncertainty, this approach was considered less suited when changes to requirements and design were inevitable and often desirable (Cusumano & Smith, 1995). Requirements and designs quickly became out of date even within short projects, and changing requirements was identified as one of the most significant problems in software development (Cockburn & Williams, 2003; Highsmith & Cockburn, 2001). Research indicates that 25-50% of requirements in software projects will change during the process of development (Brewer and Dittman as cited in Kaleshovska et al., 2015, p. 182). The heavy emphasis on documentation also often resulted in detailed specifications of poorly understood requirements, and the design and development of unusable code (Boehm, 1988). In addition software was almost "always more expensive and delivered later than expected, to make matters worse, it is often unreliable and fails to meet the ultimate user's needs" (Davis et al., 1988, p. 1454).

In an attempt to address these issues of shortfall, lateness and inappropriateness, more iterative methods developed including rapid throwaway prototyping, incremental development, evolutionary prototyping, reusable software and automated software synthesis (Davis et al., 1988). The spiral model for example, developed as a cyclical approach, which built software through a series of evolving phases, applying different development strategies based on risk and uncertainty (Boehm, 1988). These incremental software development approaches were becoming commonplace in the 1980s, with growth accelerating the 1990s (Larman & Basili, 2003). By the late 90s the then-called 'lightweight' methodologies and practices were developing across three continents: Dynamic Systems Development Method (Europe), Feature-Driven Development (Australia), and Extreme Programming, Crystal, Adaptive Software Development and Scrum in the USA (Cockburn & Williams, 2003).

2.3.3 Project Overruns and Failure

During this time there was also a corresponding growth in the incidence of project overruns and outright failure using traditional project management approaches (Cockburn, 2000; Jaafari, 2003; Koskela & Howell, 2002; Williams, 2005). For example in 1999 a US Department of Defence review of projects determined that from investments of $37billion, 75% of the projects failed or were never used, and only 2% were used without significant modifications (Larman & Basili, 2003).

The CHAOS Report from the Standish Group is widely cited to report success rates for technology projects (Kaleshovska et al., 2015). Dating from 1994, the Report surveys thousands of projects across the world with success and failure rates consolidated into three categories: project success, project challenged, and project impaired. The 1998 Report, based on 23,000 projects, noted that 72% of surveyed projects were *challenged* or *impaired*. This is a staggering result given the many billions of dollars investment that these projects represent. The Report cited that the top reasons for project failure were associated with traditional waterfall software development and project management practices (Larman & Basili, 2003). By 2012 the Report indicated a slight improvement with 'just' 61% of surveyed projects being challenged or impaired (Standish Group as cited in Kaleshovska et al., 2015, p. 180).

In examining this issue, Koskela and Howell (2002) referred to the Project Management Body of Knowledge (PMBOK) guide as a being representative of traditional project management practice. Under this model scope is tightly defined by decomposing activities and tasks via the work breakdown structure (WBS) (Turner as cited in Koskela & Howell, 2002). Similarly Morris (1994) described the traditional role of the WBS in first defining what needs to be done, by who and by when. Project management processes are tightly defined through initiating, planning, execution, controlling and closing phases forming a closed loop; planning provides a plan, which is executed and controlled as changes lead to corrections in execution or future plans (Koskela & Howell, 2002). The final solution is usually not released until the final phase of work (Fernandez & Fernandes, 2008).
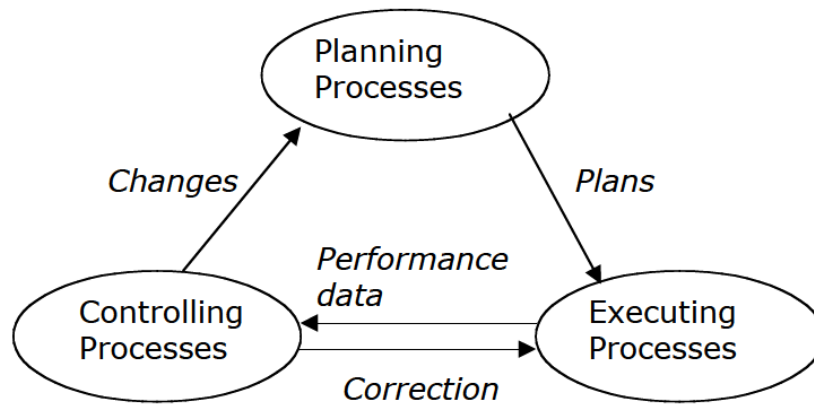
Figure 1: The Closed Loop of Managerial Processes according to PMBOK.

(Reproduced with permission from Koskela & Howell, 2002, p. 55)

Around this time several authors pointed to issues and constraints with this traditional approach, claiming that a paradigm change was long overdue (Fernandez & Fernandes, 2008; Jaafari, 2003; Koskela & Howell, 2002; Williams, 2005). For example Fernandez and Fernandes (2008) believed traditional project management is appropriate for routine and repetitive projects where goals scope and solutions are clear, however these approaches do not manage change well and often do not focus enough on customer value. Williams (2005) also asserted that conventional project management methods are disadvantageous for projects that are uncertain, complex and time-limited. Jaafari (2003) described more complex markets being characterised by open systems, chaos and interdependence and the "limited utility" of classical project management approaches in the "face of accelerated change and increased complexity" (p. 51).

The response of the project management practice to these more complex and changing environments, in many ways mirrors those previously examined across general management and software development. New iterative and adaptive project management methodologies began to emerge based, it would seem, on agile values and principles. Some examples of these are summarised in the following table and are compared to the more traditional approaches:

	Traditional Project Management		New Project Management		
	Linear	Incremental	Iterative	Adaptive	Extreme
Approach	Dependent, sequential phases No feedback loops	Similar to Linear, each phase delivers partial solution	Repeated phases with feedback loops after each	Similar to iterative, each iteration's feedback adjusts the next iteration	Similar to Adaptive, the project goal is also discovered and converged on
Characteristics	Clearly defined goals, and solution Few changes to requirements Routine, repetitive	Similar to Linear, however value must be delivered prior to final phase	Learn by doing strategy Uses intermediate solutions to detail final product	Suited to projects whose solution is partially known Can respond and adjust to constant change	Lack of goal clarity, often high degree of 'chaos' Results may be very different to original intent
Strengths	Entire project is scheduled Resource requirements are known	Value produced earlier Changes can be managed between increments Stronger focus on customer	Customer can review current solution Changes managed between increments Adapts to changing business conditions	No time spent on non-value adding work Maximises business value within time /cost constraints	Options kept open as late as possible Offers early look at a number of partial solutions
Weaknesses	Requires detailed plans Does not manage change well Must follow defined processes Focuses more on the plan, less on customer value	Heavy documentation Difficult to define feature / function dependencies	Needs more active customer Cannot specify final solution at onset	Must have customer involvement throughout Cannot identify exactly what will be delivered	May be looking for solutions in the wrong place No guarantee that business value will be delivered

Table 2: Traditional Project Management Approaches verses Iterative Approaches.

(Adapted from Fernandez & Fernandes, 2008, pp. 11-13)

Under these new approaches project phases and requirements are developed iteratively and regularly, change is expected, processes are flexible and adaptive, and the focus is on delivering business value as opposed to rigid adherence to a plan (Fernandez & Fernandes, 2008; Sanchez, Micaelli, Bonjour, & Monticolo, 2019). Conforto, Amaral, da Silva, Di Felippo, and Kamikawachi (2016) define this new approach as the "ability to change project plan as a response to customer or stakeholder needs, market or technology demands, in order to achieve better project and product performance" (p. 667). The 1998 Standish Chaos report concluded that iterative practices tended to increase project success rates via shorter time-frames and the delivery of smaller software components early and often (Larman & Basili, 2003).

Various models emerged to define project and market characteristics and thus help project managers determine which delivery approach to choose. For example, ambiguity and complexity (Pich, Loch, & Meyer, 2002), group size, system criticality, project prioritisation, team and project risk profile (Cockburn, 2000), and certainty of goals and the solution (Wysocki, 2006).

2.4 Summary of Learnings and Agile Drivers

So, as the 1990s drew to a close, the literature reviewed points to several important forces and responses at play:

1. Global market change, turbulence and disruption increasing at unprecedented speeds.
2. Traditional management models, including TQM, Six Sigma and Lean, being challenged in these markets by being too rigid and bureaucratic and not driving innovation.
3. New management theories emerging based around organisational knowledge, learning, communities of practice, integration and flexibility.
4. Increasing frustration with traditional software development methodologies and a move to more iterative, prototype-based development.
5. An increasing incidence of project overruns and failure, and a similar trend towards more iterative, flexible and adaptive project management practice.

It was broadly felt that a new way of working was required to effectively manage rapid change and that the future required delivery of quality via innovation and new ideas, rather than continuously improving existing products and processes. Given these drivers for change it is perhaps not surprising that a paradigm shift was about to develop in the next decade. This shift, leveraged and linked from historical practice and learnings, is based around principles of customer and people centricity, quality and lean management, short-term and iterative cycles, flexibility and adoption of change, and continuous learning and improvement.

The next chapters examine the evolution of agile from its original application to small software development projects, followed by its rapid adoption at 'scale' across larger and more complex projects. The review then considers the relevance of agile techniques more broadly into non-technical companies and teams, and as a strategic management and transformational framework.

2.5 Early Agile, Core values and Characteristics

It is widely reported that the Agile Manifesto is a key foundation document for the development of the agile movement (Abrahamsson et al., 2002; Boehm, 2002; Cohen et al., 2004; Conboy & Fitzgerald, 2004; Dybå & Dingsøyr, 2008; Erickson et al., 2005; Highsmith & Cockburn, 2001).

A group of software development practitioners, seeking an alternative to the traditional heavyweight processes, explained their approach as follows:

> The Agile movement is not anti-methodology, in fact, many of us want to restore credibility to the word methodology. We want to restore a balance. We embrace modelling, but not in order to file some diagram in a dusty corporate repository. We embrace documentation, but

not hundreds of pages of never maintained and rarely used tomes. We plan but recognize the limits of planning in a turbulent environment.

("Manifesto for Agile Software Development," 2001, p. 55)

The Manifesto agreed on 12 key principles based around four core values:

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

The core characteristics and principles of agile are variously reported across the literature, however Miller (2001) provided a concise and representative summary as follows:

1. Modularity of software development processes.

2. Iterative development over several short cycles enabling fast verification and change.

3. Time-bound goals and activities within each cycle.

4. Parsimony, focus on minimum number of activities to minimise risk and achieve goals.

5. Adaptive to quickly respond to new risks.

6. Incremental to partition development into small steps, progress at different times and rates.

7. Convergent (and incremental) approach minimizes the risks.

8. People-oriented, empowered people over processes and technology.

9. Collaborative and communicative working style.

2.5.1   The Value of People

The value of people interactions, collaboration and open communication is well documented in early agile research (Boehm, 2002; Cockburn & Highsmith, 2001; Cockburn & Williams, 2003; Miller, 2001; Nerur et al., 2005). Many authors believed this value uniquely differentiates agile from previous methodologies, for example Highsmith and Cockburn (2001) asserted that agile practices are not necessarily new however it is the, "…recognition of people as the primary drivers of project success…" which defines the new agile world (p. 122).

Self-managing, highly empowered and accountable teams are fundamental to this value (Cockburn & Highsmith, 2001; Miller, 2001; Nerur et al., 2005). Agile teams comprise diverse sets of stakeholders progressing through thought-action reflection cycles to foster learning and adaption (Nerur et al., 2005). Miller (2001) observed that team members must be empowered to raise their productivity, quality and performance, and that they are usually in the best position in the organisation to make these changes. Cockburn and Highsmith (2001) similarly asserted empowered

teams are based around a common focus, mutual trust, collaborative decision making, and the ability to deal with ambiguity. Because decision-making authority is more widely spread under agile and much of the knowledge is tacit in nature, the power-structures and hierarchies of organisations can be significantly impacted (Cockburn & Williams, 2003; Nerur et al., 2005). Both authors noted that this power shift represents a significant change under agile, with unanswered questions around what knowledge should be codified and what should remain tacit.

2.5.2   The Value of Working Software

The second core agile value emphasises the fast delivery of working software, rather than excessive plans and documentation. Tested and working software is released as frequently as possible, usually bi-monthly or monthly, and with an emphasis on simple but technically advanced code in order to lessen the documentation burden (Abrahamsson et al., 2002).

Boehm (2002) warned against overly pre-specified plans and documentation which can lead to contention, delays and rework even in low-change environments; with a key goal being to maximise the work "not done". Miller (2001) also highlighted parsimony, that is completing the minimum number of activities necessary to mitigate risk whilst achieving goals. Highsmith and Cockburn (2001, p. 121) summed up the intent of this value well in describing the "unforgiving honesty" of working code for showing developers and sponsors what they really have, and for enabling fast feedback and measurement of results.

2.5.3   The Value of the Customer

The third core value promotes close customer partnerships and the involvement of customers, or their direct representatives, within all agile teams (Abrahamsson et al., 2002; Boehm, 2002; Cockburn & Highsmith, 2001; Cockburn & Williams, 2003; Cohen et al., 2004; Miller, 2001). This approach ensures that all players – the sponsor, customer, user and developer – are on the same team, merging their different expertise and experience to quickly respond to changes and to maximise value (Highsmith & Cockburn, 2001).

Boehm (2002) asserted that customers should be empowered, representative, committed, knowledgeable and collaborative through the full development cycle. Given that agile discourages documentation, the input and feedback provided by the customer often becomes tacit in nature, therefore there are inherent challenges in finding customer representatives that can successfully fill this role, especially for complex systems (Nerur et al., 2005).

Lárusdóttir, Cajander, and Gulliksen (2013) examined the key role of user-centred evaluation in order to gather customer feedback regarding software usability. Shortening the feedback loop between customer and developer helps identify flaws quickly so that action can be taken "to extend

the usability and the user experience of the software" (p. 1119). Feedback is often conducted informally as structured evaluation is seen as counter to agile principles, and there is often insufficient time to complete formal reviews during the short duration of sprints.

2.5.4   The Value of Managing Change

The final value focuses on quickly responding to change, over following a plan. The tight definition and constant re-prioritisation of goals, features and tasks (called the 'backlog') is a core principle which supports this value. Highsmith and Cockburn (2001) stressed that the backlog should be focused around defined product features because these are what the customer understands. Delivery of these features is decomposed into a series of single cycles (called an iteration) which are tightly time-bound for between one and six weeks, and activities within each cycle only include those necessary to achieve the goals agreed for each iteration (Miller, 2001). It is the development in short iterations and the focus on interaction and communication, which allows the development team to quickly adapt to changing requirements (Cohen et al., 2004).

Prioritisation is dynamic, meaning that features are reassessed at the end of each cycle, and can be discarded, replaced or continued into the next cycle as agreed (Highsmith & Cockburn, 2001). These periods of reflection and introspection at the end of each cycle are critical in order to deal with unpredictability, and to ensure rapid feedback and change (Nerur et al., 2005).

2.6 Early Empirical Studies

In order to screen out industry reports, company articles, practitioner white papers and the like, searches for this part of the literature review focused around the following key words:

> Agile Software Development AND Empirical Study or Empirical Research AND Systematic Review.

Early agile research was limited to practitioner discussions, case studies and small empirical studies, with results largely being anecdotal based. Abrahamsson et al. (2002) reviewed key methodologies[1] and concluded that no systematic review of agile development had been completed, and that little was known about the benefits to be gained. Cohen et al. (2004) similarly reviewed core methods and predicted they would consolidate and live symbiotically with traditional methods, with users determining the most appropriate process based on factors such as application domain, number of people, criticality and innovativeness. Erickson et al. (2005) focused on XP, noting values of communications, courage, simplicity and feedback, and common characteristics of fast test-driven development and programming in pairs. He also concluded that empirical research for XP is "quite

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[1] Agile methodologies included Extreme Programming (XP), Scrum, Crystal, Feature Driven Development, Rational Unified, Dynamic Systems Development, Adaptive and Open Source Development.

limited", agile modelling is "totally unstudied", and the study of agile methods is "unorganized and, for want of a better word, random" (p. 96).

Later studies attempted to provide a consolidated and empirical view of agile academic research, along with a greater understanding of implementation challenges, success factors and benefits. Chow and Cao (2008) surveyed 109 agile projects across 25 countries, then applied quantitative methods including multiple regression to identify critical success factors. The three most critical factors were to ensure the correct delivery strategy, the proper practice of agile techniques, and ensuring a high-calibre team. Other factors were a good agile project management process, an agile friendly environment, and strong customer involvement.

A large and often cited systematic review was completed by Dybå and Dingsøyr (2008) which identified 1996 studies up until 2005, of which 36 were considered empirical. Research objectives were to understand benefits and limitations, to determine the strength of evidence supporting these findings, and to consider implications for practitioners and researchers. Findings were broad and largely qualitative, and should therefore be treated with caution, however this work does represent one of the most comprehensive agile studies during the early 2000s. Findings included:

- Agile easier to introduce in smaller, less complex organisations, but can thrive in both hierarchical and limited central control organisations.
- Higher job satisfaction and motivation.
- Higher customer satisfaction.
- Changes managed more easily, and business value returned more effectively.
- Some evidence of increased productivity and improved product quality.

The study concluded that the strength of evidence was low and the estimated effect of introducing agile uncertain. It called for an increase in the number and quality of agile studies, including further research across agile project management methods such as Scrum.

Ramesh, Cao, and Baskerville (2007) focused on agile requirements engineering (RE), analysing data from 16 US development organisations. This study observed that traditional approaches to RE are challenged in turbulent and fast evolving markets, reinforcing findings previously reported in this paper. Six key approaches were identified: face-to-face communications over written specifications, iterative and emerging requirements definition, constant re-prioritisation, accommodating change, prototyping, and frequent reviews. Key challenges included difficulty in estimating costs and schedules, neglecting non-functional requirements, achieving enough customer access and participation, and inadequate requirements verification.

Sfetsos and Stamelos (2010) focused on understanding the most significant practices for achieving quality in agile development from 46 studies. They concluded that test-driven development (writing automatically executable test cases prior to writing code) was the most critical practice for improving software quality resulting in defect reduction between 5 and 45%. Pair-programming resulted in design and code quality improvements between 15 and 65%, along with improved quality of teamwork, communications and knowledge transfer.

2.7 More Recent Empirical Research, Scrum Dominance

As the number of empirical studies increased, so too did the focus on more specific domain applications. Tarhan and Yilmaz (2014), for example, compared agile versus iterative and waterfall-based processes across projects in a middle-sized telecommunication company over three months. Combining qualitative and quantitative methods they concluded that agile performed better across productivity (79%), defect density (57%), defect resolution effort (27%), test execution effectiveness (21%) and effort prediction (4%). Other authors considered the 'tailoring' of agile, this being defined as, "the adaption of the method to the aspects, culture, objectives, environment and reality of the organisation adopting it" (Campanelli & Parreiras, 2015, p. 87). The authors observed an interest in tailoring once agile had been implemented and the challenges of adoption appreciated. Most common criteria for tailoring included project type, business goals, complexity, team size, and technology knowledge. The practicality of the research was somewhat limited with 53.6% of papers being non-specific to any particular agile method, and with 33.9% focused on Scrum or XP.

Vallon, da Silva Estácio, Prikladnicki, and Grechenig (2018) focused on agile in a global software development (GSD) domain by reviewing papers from 1999 to 2016, with 82 studies identified in the first ten years and 145 in the last six. Again Scrum (53 cases) and XP/Scrum (14) were observed as the dominant agile methods with the most common techniques being the stand-up meeting, backlogs, sprint iterations, sprint planning and retrospectives.

The growing dominance of Scrum is reported by numerous authors (Cardozo et al., 2010; Hossain, Babar, & Paik, 2009; Kaleshovska et al., 2015; Matharu, Mishra, Singh, & Upadhyay, 2015; Vallon et al., 2018). Prior to 2005 the review conducted by Dybå and Dingsøyr (2008) included just one Scrum case study, however the practice developed rapidly with Abrahamsson and Marchenko (2008) stating that Scrum is, "on the verge of becoming the de-facto standard in the industry…" (p. 11). By the 12th Annual State of Agile Development Survey, 70% of respondents claimed to be using Scrum, ScrumBan or Scum/XP methodologies (VersionOne, 2016).

Scrum is less a software development methodology, but focuses more on how teams should work in unpredictable environments where requirements, time-frames, resources and technology are likely

to change throughout (Abrahamsson et al., 2002). Because of its popularity and given that that this paper focuses on agile in a non-technical context, the next section examines Scrum in more detail. The literature review continues to target empirical studies and is focused on implementation challenges, success factors and outcomes achieved.

2.7.1   Scrum Techniques

Scrum is based around an inspect-and-adapt framework from which small, self-managing teams deliver software incrementally via short, iterative and time-bound 'sprints' which are usually around two to four weeks duration (Abrahamsson et al., 2002; Cohen et al., 2004; Eloranta, Koskimies, & Mikkonen, 2016; Hossain et al., 2009; Moe, Dingsøyr, & Dybå, 2010; Rising & Janoff, 2000).

Sprint techniques are consistently reported from 2000 and commonly include:

1. *Product backlog* – all requirements, features and functions of the final product.
2. *Pre-sprint planning* – agreeing goals of the sprint, prioritising and estimating inclusions.
3. *Sprint backlog* – list of items to be delivered in the sprint, remains stable throughout.
4. *Daily scrum meeting* – tracking progress, resolving issues, agreeing daily priorities.
5. *Sprint reviews* – assessment and inspection of the delivered product.
6. *Sprint retrospectives* – review, reflection, learnings and improvements for the next sprint.

    (Abrahamsson et al., 2002; Cohen et al., 2004; Ozierańska, Skomra, Kuchta, & Rola, 2016; Rising & Janoff, 2000)

The simplified Scrum process is shown in Figure 2 following:
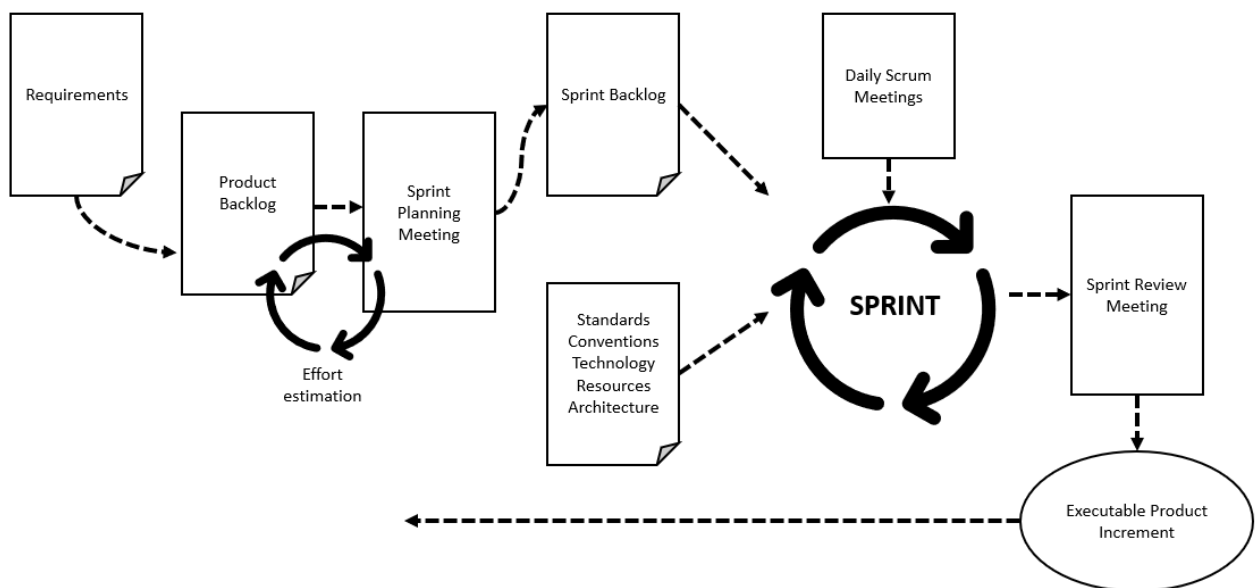
Figure 2: The Scrum Process.

(Adapted from Abrahamsson et al., 2002, p. 34)

Key roles include the product owner who represents the needs of the customer and is responsible for maximising the value of the product and prioritising the product backlog (Eloranta et al., 2016; Kaleshovska et al., 2015; Kautz, Johansen, & Uldahl, 2014). The scrum master ensures development progresses as planned, is aligned with practices and values of Scrum, and for removing impediments (Abrahamsson et al., 2002; Kaleshovska et al., 2015).

2.7.2 Scrum Challenges

Early studies noted practical implementation challenges including merging new lightweight processes with standard practices, conflicting business processes including the need for new approaches for recruitment, contracts and performance measurement, and people conflicts including the need to co-locate teams and general change resistance (Boehm & Turner, 2005).

As discussed earlier, a commonly reported challenge is the broader cultural change required to move from command-and control type hierarchies, to collaborative, cross-functional and self-managing teams where decision making is decentralised and shared (Abrahamsson & Marchenko, 2008; Hajjdiab & Al Shaima, 2011; Moe et al., 2010; Nerur et al., 2005). There is some evidence that these issues are greatest when teams did not build trust, lacked shared mental models regarding product outcomes, and where specialised roles with high individual autonomy had previously existed (Moe et al., 2010). Other implementation challenges included trying to execute without an agile coach and attempting to adopt Scrum too quickly (Hajjdiab & Al Shaima, 2011), while a longitudinal study at Nokia highlighted the basic need for a clear vision and priorities, and persistence and determination to remain focused on continuous improvement at all times (Abrahamsson & Marchenko, 2008).

Kapitsaki and Christou (2012) surveyed agile Scrum practitioners, receiving 233 completed surveys from 126 companies across 44 countries. The most common challenges were lack of customer collaboration (31.9%), lack of top management support (30.5%) and lack of skilled people who can follow Scrum (21.2%). More recently Eloranta et al. (2016) studied the consequences of deviating from text-book Scrum across 11 organisations. Fourteen 'anti-patterns' were identified including slipping back into big-requirements documentation, product owner with insufficient authority and understanding, and insufficient feedback loops, sprint reviews, retrospectives and learnings.

2.7.3 Benefits of Scrum

Improved productivity is a commonly reported benefit of introducing Scrum practices (Cardozo et al., 2010; Dybå & Dingsøyr, 2008; Jakobsen & Sutherland, 2009; Kautz et al., 2014; J. Sutherland & Altman, 2010). The much cited review from Dybå and Dingsøyr (2008) included four comparative studies, which focused on productivity outcomes. Remembering these studies were pre-2005, mixed

results were reported with productivity impacts ranging from 42 to 46% positive, to no change, to 44% negative. Two of the studies reported a significant increase in the perception of productivity improvements.

As Scrum techniques have matured it may be inferred that so too has the realisation of productivity benefits. Scrum at Systematic increased productivity of two projects by 140% and 360% compared to the average, with gains attributed to reduced testing time and the time-to-fix builds (Jakobsen & Sutherland, 2009). Cardozo et al. (2010) observed increased productivity in 14 out of 28 studies reviewed, and two other large empirical studies reported productivity gains of 85% (Kapitsaki & Christou, 2012) and 79% (Tarhan & Yilmaz, 2014) respectively.

An interesting non-technology case study is reported by J. Sutherland and Altman (2010) who claim that OpenView, a venture capital fund, doubled its productive output while working fewer hours following the introduction of Scrum. Productivity was driven by improved definition of priorities, eliminating low value work, fast removal of impediments, and a focus on lean principles, muri (smoothing out the flow), mura (eliminating pressure points), and mudah (removing waste). Similar observations are reported by Kautz et al. (2014) who claim productivity is improved by a reduction in interruptions, the removal of unnecessary work, fewer repeated mistakes, and improved compliance with deadlines.

Authors also point to other Scrum benefits including improved product quality, customer satisfaction and worker motivation (Kapitsaki & Christou, 2012; Lárusdóttir et al., 2013; Linden, 2018; Schmidt, Ganesha Venkatesha, & Heymann, 2014; Serrador & Pinto, 2015; Tarhan & Yilmaz, 2014). Kapitsaki and Christou (2012) surveyed 233 Scrum practitioners from 126 companies across 44 countries. In addition to productivity gains, 85.4% of respondents reported an increase in customer satisfaction, 84.3% stated improved project quality and 48.5% reduced project costs. Tarhan and Yilmaz (2014) compared Scrum to incremental plan driven approaches in a middle-sized telecommunications company employing 65 programmers. Again, productivity gains were supplemented by reduced defect density (57%) and defect resolution effort (26%), and improved test execution and effectiveness (21%) and effort prediction capability (4%).

A major empirical study within SAP surveyed 174 developers and 15 product owners across 74 Scrum teams and five locations worldwide. Respondents perceived they were delivering higher quality software with no decrease in development speed, and reported improved team pride, learning and motivation. Similar results were reported by 859 project practitioners representing 1,386 projects of which 65% had some agile or Scrum component. This study concluded a

statistically significant impact on all three dimensions of project success expressed as efficiency, stakeholder satisfaction, and perception of overall project performance (Serrador & Pinto, 2015).

2.8 Scaled Agile

2.8.1 Early Growth of Scaled Agile

Agile was originally positioned in the domain of small projects. For example Cockburn and Williams (2003) felt the practice was best suited for collocated teams of fewer than 50 people who have easy access to business and user experts. However, as the benefits of agile techniques began to be widely observed, practitioners and researchers soon began to consider application across larger and more complex projects, as well as into other areas of the organisation (Ågerfalk, Fitzgerald, & Slaughter, 2009; Dingsøyr & Moe, 2013; Lindvall et al., 2004; Reifer, Maurer, & Erdogmus, 2003).

As early as 2002 a 'Scaling Agile' workshop in Canada noted the lack of definition and guidelines, along with challenges of communicating across organisations, synchronising the pace of different teams, and securing sufficient customer involvement (Reifer et al., 2003). Lindvall et al. (2004) claimed that agile was equally relevant to large organisations, however also noted new challenges with integrating agile into existing processes, and communication across multiple, often dispersed teams.

The literature reviewed suggests that interest in scaling agile processes grew rapidly from the mid-2000s. For example, Ågerfalk et al. (2009) recommended that agile in new emerging contexts and at the organisational level were high priority research topics, while Dingsøyr and Moe (2013) reported that 'agile and large projects' was voted the top research question at the XP2010 conference.

There is limited but growing evidence of scaled agile success. Vallon et al. (2018) reviewed 22 successful case studies (from 2010-2016) in a global software development (GSD) context, while Olszewska, Heidenberg, Weijola, Mikkonen, and Porres (2016) quantitatively measured the impact of a scaled agile transformation across an international telecommunications organisation. Involving 350 employees at two sites over four years, traditional siloed structures and a plan-driven approach were replaced with cross-functional agile teams using Scrum and Kanban techniques. These changes increased deployed functionality per money spent (+483%) and number of releases in a certain time period (+400%), improved responsiveness to process a customer request (24% decrease in time), and decreased time to develop a feature (64%), code commits (38%) and to tackle problems (31%).

Similar results were reported by a longitudinal study at Nokia which measured the impact of moving from plan-based to scaled-agile projects over five years (Korhonen, 2012). Quantitative analysis showed a decrease in defects and shorter defect closing times, while qualitatively 53.2% of respondents believed motivation had increased, as had flexibility in responding to changes (67%),

visibility of development status (72%), and improved teamwork between locations (54.7%). However, concerns included shared responsibility leading to a lack of overall ownership and responsibility, the lack of longer-term planning, and difficulty in applying agile principles to work not directly related to programming.

Given the growth of scaled agile, Dingsøyr, Faegri, and Itkonen (2014) identified the need for a taxonomy of scale for agile projects in order to facilitate awareness and learning. Considering the co-ordination overhead required to facilitate decision making and communication across teams, they suggest that seven plus or minus two people in a single team is optimal to achieve effective teamwork. Dividing large projects across multiple teams incrementally increases the number of communication lines, and the risk of conflict and co-ordination challenges. Further, this can reintroduce many of the impediments agile was designed to remove, for example pyramid structures which increases the distance between top and bottom, and distorted information and knowledge silos. Based on this thinking they developed the following taxonomy which is widely cited in the literature:

Level	Number of Teams	Co-ordination Approaches
Small-scale	1	Co-ordination via agile practices such as daily meetings, common planning, review and retrospective meetings.
Large-scale	2-9	Co-ordination of teams via a new forum such as a Scrum of Scrum forum.
Very large-scale	10+	Several forums are needed for co-ordination such as multiple Scrum of Scrums.

Table 3: A Taxonomy of Scale for Agile Software Development Projects.

(Adapted from Adapted from Dingsøyr et al., 2014, p. 275)

2.8.2   More recent Scaled Empirical Studies and Frameworks

Following these earlier studies, the underlying theme from more recent research is that scaled agile transformations involve significant challenges which make successful execution difficult. These challenges and corresponding success factors are consistently reported, as is demonstrated and summarised in Table 4 following:

Author, Year	Dikert et al. (2016)	VersionOne (2016)	Kalenda, Hyna, and Rossi (2018)	Conboy and Carroll (2019)
Approach	• Large-scale = 50+ people or at least 6 agile teams • Systematic review across 52 publications, 42 cases	• 2016 State of Agile Survey • 62% of 4,000 respondents from large companies • 43% of these, over half teams are agile	• Literature review of 12 qualifying studies	• Review of 13 agile transformation cases over 15 years
Challenges	Agile difficult to implement (mentioned in 48% of cases) Lack of guidance from literature (21%) *	Lack of skills and experience with agile methods (41%) Insufficient training and education (35%)	Lack of knowledge, coaching and training (reported in 10 papers)	Overemphasis on framework adherence over value Defining concepts and terms
	Integrating non-development teams (43%)	Company culture at odds with agile values (53%)	Integration with non-agile parts of the business (4)	Balancing organisational structure and frameworks
	Resistance to change (38%) Functions unwilling to change (31%) *	Organisational resistance to change (46%)	Resistance to change (8)	Readiness and appetite for change
	Difficulties with requirements engineering (38%)	Inadequate management support and sponsorship (42%)	Communications across distributed environments (6)	Top-down vs bottom-up implementation
			Maintaining quality assurance (5)	
Success Factors (SF)	Adopting agile values and mindset (40%)	Consistent practices and processes across teams	United view of values and practises (6)	Reflect and define what is meant by *agile* and *scale*
	Choosing and customising the approach (50%)	Common tools across teams	Appropriate tools and infrastructure (5)	Develop common vocabulary Small number of metrics
	Management support, commitment, leadership (40%) Management support (29%) *	Executive sponsorship	Teamwork support (7) Executive sponsorship (5)	Clear balance between enabling top-down and bottom-up transformation
	Invest in training and coaching (38%) Coach teams as they learn by doing (29%) *	External agile coaches or trainers Internal agile coaches	Increase level of knowledge and expertise (11)	Continuous education and training at all staff levels
			Slow and careful transformation (6)	Sustainable pace, transformation small wins
Individually these were the most commonly mentioned challenges or success factors				

Table 4: A Summary of Scaled Agile Challenges and Success Factors.

(Adapted from Conboy & Carroll, 2019; Dikert et al., 2016; Kalenda et al., 2018; VersionOne, 2016)

These findings clearly reveal that scaling agile across the organisation requires a level of culture change and value alignment, supported by strong executive leadership, a unified and consistent method, and a commitment to training and coaching. Above all, there needs to be a significant driver and willingness for change across the organisation. A large New Zealand organisation, currently on a scaled agile transformation journey, described this driver as a realisation that without immediate change the organisation would quickly become a very small player, with no point of difference, selling a commodity product (personal interview, 4 April, 2019).

In order to effectively navigate through a complex agile transformation, many organisations have turned to large-scale agile frameworks which provide defined workflows, routines and tools (Conboy & Carroll, 2019). Frameworks include Scaled Agile Framework (SAFe), Large-Scale Scrum (Less), Disciplined Agile Delivery (DAD), Nexus, and Recipes for Agile Governance in the Enterprise (RAGE) (Kalenda et al., 2018), however according to the latest State of Agile Report, SAFe is the most popular (VersionOne, 2019).

SAFe combines lean product development with agile techniques such as Scrum of Scrums (SoS), COPs, scaled sprint planning, demos and retrospectives, and definition of "done". The framework encompasses a multi-layered architecture, summarised as follows:

Portfolio layer — Guides enterprise mission and core strategic decisions that create value.

Program layer — Manages and synchronises multiple agile teams to create the solutions.

Team layer — Describes how agile teams work using Scrum, Kanban and XP techniques.

Value stream layer — Ensures that multiple teams remain aligned.

Foundation layer — SAFe values, mindset and principles that support the organisation.

(Adapted from Kalenda et al., 2018)

SAFe specifies scrum teams of five to nine members, scaling to programs of between five to twelve teams and 50-125 individuals. New program roles include the system architect, and the product manager who prioritises the program backlog and directs the work of all product owners. The release train engineer or "chief scrum master" facilitates program execution, manages risks and drives continuous improvement, while program portfolio management provide overall portfolio vision, investment and governance (Alqudah & Razali, 2016).

Motivations for implementing scaled-agile frameworks are demonstrated by two SAFe case studies at Comptel Nokia and NAPA (Ebert & Paasivaara, 2017). Both organisations used agile at the team level however were lacking, "agility in other parts of the organisation, and they especially lacked support structure in the organisational layers above the team level" (p. 100). Both companies also hoped to improve the portfolio level prioritisation and the management of dependencies. Again,

very similar challenges to the previously reported studies were observed, including change resistance, poor communication, and lack of training and support. Success factors focused on training, involving change agents and experienced external consultants, customising the frameworks, and quickly reacting to feedback to continuously improve.

Turetken, Stojanov, and Trienekens (2017) in reviewing SAFe case studies reported benefits including 20-30% faster time to market, 40-50% decrease in post-release defects, and 20-50% increase in productivity. However, they also acknowledged the significant challenges of scaled-agile transformations and the lack of a structured roadmap or implementation strategy to guide enterprises. In order to meet this gap, they developed a maturity model (MM) based on an existing model (Sidky Agile Measurement Index, SAMI) and refined using the Delphi technique to elicit expert opinion from several industry experts. Consisting of 62 practises grouped under five key principles, the MM defines five levels of maturity and provides a useful guide for organisations considering agile transformation.

2.9 Adopting Agile in Non-Development Teams

To this point this thesis has traced the rapid growth of agile through the last two decades. Driven from the inability of traditional management and development processes to cope with changing and unpredictable environments, practices such as Scrum have gained rapid adoption as a means by which teams can successfully interact and operate in such environments. Originally the domain of small software projects, new scaled-agile frameworks are helping to derive benefits across larger projects and more broadly across organisations in a transformational context.

However, the literature reviewed has highlighted that with scale comes numerous new challenges which impact all areas of the organisation, technology and business teams alike. In considering how best to meet these challenges Rolland, Dingsoyr, Fitzgerald, and Stol (2016) believe it is not sufficient to merely extend small scale agile thinking within larger projects. Rather the complexities of knowledge boundaries or the, "transferring, translating and transforming knowledge across different actors" must be considered, along with the complex socio-technical interdependencies, which exist across all levels of communication (p. 22). Large scale agile is a function of these interactions not only within the project, but also across the many actors, systems and technologies which exist outside or on the periphery of each project. Dikert et al. (2016) similarly conclude that with the growth of scaled agile, an increasing number of non-technical teams will be exposed to agile, potentially becoming a constraint to success:

> With increasing organization size, organizational functions beyond development get
> involved, and they need to interface with development. Such functions range from

marketing and sales to user experience and human resources. If these functions are not aligned with the transformation, that might cause serious limitations for the agile implementation and thus the full potential of the agile cannot be realized (p. 104).

Managers of these business unit managers are often less knowledgeable and supportive of agile methods, the dilemma here being that being knowledgeable is often a key condition for support (Hobbs & Petit, 2017).

In order to examine this dilemma further, this thesis next considers the transferability of agile techniques within *non-technical, business* teams and organisations. If these teams are inevitably going to be involved with agile, how difficult will it be for them to understand and adapt to a new way of working? This section aims to draw informal propositions before more formal research questions are constructed.

2.9.1   Existing Research, Agile in Non-Technical Teams

A limited but emerging body of research already exists which indicates sizable potential for utilising agile values and practices in non-technical domains. Owen, Koskela, Henrich, and Codinhoto (2006) for example concluded that agile project management (APM) offered considerable potential in the construction industry particularly in the pre-design and design phases, while a Brazilian exploratory study across 19 mining, steel, auto, energy and engineering organisations observed APM practices already in action, including minimal description of project scope upfront, project plans created collaboratively, iterative planning, and shared responsibility (Conforto, Salum, Amaral, da Silva, & de Almeida, 2014). These findings reinforce the earlier discussion that many agile principles are nothing new but are rather based on iterative and common-sense ways of working that have been around for several decades.

Other studies report agile trials across industries as diverse as venture capital (J. Sutherland & Altman, 2010), academic libraries (Niemi-Grundstrom, 2014), technical and professional communications (Pope-Ruark, 2014), hospitals (Tolf, Nyström, Tishelman, Brommels, & Hansson, 2015), universities (Linden, 2018), and even churches (A. C. Sutherland, Sutherland, & Hegarty, 2009). The approaches undertaken are often similar, characterised by the avoidance of agile jargon and prescription, but more an experimental and often hybrid attitude to iteratively improve working practices and learning.

A good example of this flexible approach is provided by OpenView, a venture capital firm, who matured its Scrum techniques through three phases of trial and error and iterative improvement. With a 'take-no-prisoners' attitude towards removing impediments and low-value activity, the firm claims to have doubled its productive output while improving quality and team morale (J. Sutherland

& Altman, 2010). The industrial new product development community provides a hybrid example where traditional stage-gate processes were merged with Scrum techniques such as Kanban boards, product backlogs and burn-down charts (Sommer, Hedegaard, Dukovska-Popovska, & Steger-Jensen, 2015). Quantified quality and productivity benefits were recorded, along with perceived advantages of improved flexibility, communication and better fit between process and tools.

The implementation of Scrum across churches in Massachusetts, Connecticut, Florida and Delaware is particularly interesting for this study, these being non-profit and non-technical, but highly political environments staffed largely by volunteers with little experience with project teams. Scrum was instrumental in breaking down knowledge silos and in improving transparency, collaboration, prioritisation, morale and velocity throughout the organisation (A. C. Sutherland et al., 2009). The attitudinal shift of thinking from identifying problems to actively seeking impediments was particularly pivotal in moving from, "blaming and shaming to naming and claiming responsibility" (p. 332). Implementation required significant tailoring and adaption to overcome challenges with vocabulary, part-time workers, regular emergencies, and technology limitations, however the authors concluded:

> Scrum can be far more than a process for technical change and development. Practicing Scrum can lead to genuine adaptive change so that the organization is continually evolving and transcending the restrictions and limitations of any particular worldview. Room can be created in which diverse multicultural perspectives add to the whole (p. 332).

Similar conclusions were reached at the academic library at the Tampere University of Technology who fulfilled, via agile principles, a simple need, "to understand and be better aware of what we are actually doing and why" (Niemi-Grundstrom, 2014, p. 482). Most relevant changes included appreciating the needs of customers, simple work processes to eliminate waste, leadership to build trust and empower the team, and the ability to make fast decisions and continually improve. Similarly Tolf et al. (2015) found that the complementary relationship between agile and lean thinking provided considerable potential for hospital management in unpredictable and changing environments.

Many of these examples are included in a systematic literature review completed by Gustavsson (2016) who believes there is vast interest in using agile in a non-development context. This work reviewed 21 case studies from 2006 and mapped experiences, benefits and challenges across a wide range of industries. This appears to be the only such consolidated study undertaken and therefore represents foundation research for this paper. The studies included are summarised in Table 5 below:

Authors / Year Published	Context	Summary of Agile Techniques Implemented
Andersson et al. (2006)	Supply chain management / manufacturing	Sprints, daily stand-ups, PO team
Denning, S. (2015)	Top-level management, strategic work	Customer value focus, self-organising teams, sprints, visual transparency
Edin Grimheden, M. (20130	Education, course development project	Not described
Gangjun et al. (2009)	Industrial design	Iterative planning, evaluation and tracking
Gangjun et al. (2010)	Industrial design, product development projects	Demand management, iterative planning, evaluation and tracking
Molhanec, M. (2008)	Product design, packaging and electronics	Iterations and reviews
Molhanec, M. (2009)	Product design, packaging and electronics	Iterations and reviews
Niemi-Grundstrom, M. (2014)	Library management	Not described
Pope-Ruark, R. (2015)	Higher education, course development project	Sprints, scrum-board, stand-ups, sprint planning, review and retrospectives
Quaglia et al. (2011)	Simulation modelling in electronics factory	Defined backlog, sprint planning, sprints, customer reviews
Sommer et al. (2015)	Manufacturing, pharmaceuticals	Scrum boards, burn-down chart, daily scrum product backlog, value-chain model
Sommer et al. (2015)	Manufacturing, toys	Scrum boards, burn-down chart, daily scrum, product backlog, work packages
Sommer et al. (2015)	Manufacturing, electronics	Scrum boards, burn-down chart, daily scrum, product backlog
Sommer et al. (2015)	Manufacturing, windows	Scrum boards, burn-down chart, weekly scrum, product backlog, value-chain model
Sommer et al. (2015)	Manufacturing, power cables	Scrum board, burn-down chart, daily scrum, product backlog, work packages
Sutherland, Altman (2009)	Management strategy, in-house consultancy	Scrum principles, one-week sprints
Sutherland, Altman (2009)	Management strategy, in-house consultancy	Scrum principles, one-week sprints
Sutherland et al. (2009)	Non-profit, internal change project	Scrum principles
Tolf et al. (2015)	Health care, hospital management	Not described
Van Ruler, B. (2014)	Public relations	Scrum principles
Wainer, M. (2006)	Higher education, course development project	Scrum roles, short sprints, review, retrospective

Table 5: Agile Techniques in a Non-development Context.

The most commonly reported benefits and challenges from these studies are summarised in Table 6:

Rank	Top Reported Benefits (# of occurrences)	Rank	Top Reported Challenges (# of occurrences)
1	Better collaboration in the team (11)	1	Changing mindset to allow flexibility (3)
2	Increased customer interaction (9)	2	Lack of process visibility (3)
3	Increased productivity and speed (8)	3	Buy-in from managers (2)
4	Increased flexibility, coping with change (7)	4	Difficult to see benefits early in project (2)
5	Better understanding of goals, tasks, requirements (6)	5	Inadequate knowledge sharing (2)
6	Increased transparency and visibility (6)	6	Individual work, lack of communication (2)
7	Increased quality (5)	7	Long-term planning (2)
8	Customer-centred value-add priority process (5)	8	Lack of stakeholder engagement (1)
9	Increased knowledge sharing (4)	9	Scope creep (1)
10	Increased cross-organisational collaboration (3)	10	Insufficient resource allocation (1)

Table 6: Agile Benefits and Challenges in a Non-development Context.

(Adapted from Gustavsson, 2016)

There are several key observations from Gustavsson's study which further reinforce the premise that agile can be successfully practiced in non-technical environments. The range of industries is broad - from churches and education to manufacturing and professional services - with some evidence that agile has been positively adopted by a diverse set of people spanning many different professional, educational and personal backgrounds. The benefits described are similar to those achieved in technology-oriented case studies, indicating that general business outcomes such as improved collaboration, customer interactions, productivity and flexibility are universally available. And the highest number of reported benefits relate to the first value of the agile Manifesto, that is 'Individuals and interactions over processes and tools', followed by 'Customer collaboration over contract negotiation'. These are common-sense values and ways of working that are relevant to any type of workforce.

A complementary angle is provided by Gren, Knauss, and Stettina (2018) who examined 13 non-technical individual skills as important agile success factors (leadership, communication, team-work, collaboration etc.). They believed these individual skills would provide predictive power regarding agile usage and maturity in software organisations, however this proved not to be the case. The study concluded that while all individuals should develop these non-technical skills, a more relevant analysis of predictive power and capability should be conducted at the team and preferably the organisational level. Collective intelligence is the property of the team itself and that, "team skills are key to implementing and using agile practices" (p. 18). This work also supports the premise of this study in that it highlights that many of the 'soft' skills required to implement agile are accessible

to all workers and suggests that effective agile transformation must focus on collaboration, teamwork and commitment across *all areas* of the organisation.

2.10   Identifying the Research Problem

The previous section indicates strong interest regarding the application of agile into non- technical teams and the potential for numerous business benefits. The literature suggests that agile techniques can be easily adopted by non-technically minded people, aided by a tailored, flexible and experimental approach. In fact, many business teams may already be adopting agile-like practices without necessarily formalising this approach, particularly where agile is already entrenched within that organisation's technology teams.

However, the examination of existing studies also highlights a lack of research in this area with only one systematic literature review discovered. Several authors also note the lack of quality studies which would more formally substantiate the propositions raised by this paper. Gustavsson (2016) observes the scarcity of quality agile research in a non-development context, while Hobbs and Petit (2017) calls for further research into the evolving relationships between agile projects and other business units, and how this will fundamentally change portfolios and the overall organisation. Research should be directed across the organisation in which projects are conducted, "… how will the use of agile methods for systems development effect the entire organization, with redefinitions of the roles of other departments and the relationships with customers, in what might become "agile end-to-end?" (p. 17).

Dikert (2016) also identifies the need for more research as there is growing demand to integrate non-development functions into agile transformation, and significant challenges if other functions cannot adapt or are unwilling to change:

> Thus, for ensuring the success of the whole transformation, it seems to be important that other organizational functions support and adopt agile. It would be interesting to study how these other functions can best be included in and support an agile transformation at the enterprise scale (p. 106).

In order to better define this research gap or problem, and to help develop the research method best suited to finding answers, Walliman (2011) suggests that the research problem:

1. Can be stated clearly and concisely.
2. Is significant, not trivial or a repeat of previous work.
3. Is delineated, scope can be practically managed.
4. Can obtain information to explore the problem.
5. Is possible to draw conclusions and answers.

Additionally, she recommends initially formulating a hypothesis, or alternatively, a less rigorously defined research proposition. So, for this study the proposition is based around the premise that:

> *Agile values, principles and working practices can be successfully adopted by non-technical teams leading to positive and transformational business outcomes.*

Regarding Walliman's second point, the literature review indicates a clear need to create new research, while the third point is a useful reminder that the chosen approach must be manageable given time and resource constraints. Due to the growing popularity of agile across NZ organisations there appears to be considerable opportunity to collect data (Point Four), and a well-constructed research method will result in answers and conclusions (Point Five).

Walliman (2011) further notes that "probably the simplest way to set up a research problem is to ask a question…they demand answers…" (p. 47). This view is shared by Yin (2016) who also asserts that a good set of research questions will guide the field-work and data collection methods, whilst also helping establish the study's prospective niche or positioning in the wider literature.

In view of this analysis, the research problem for this paper has been defined via three research questions which are presented as follows:

ID	Question
RQ01	What common Agile pre-perceptions, observations and expectations exist amongst non-technical teams, prior to being exposed to Agile working practices?
RQ02	What common challenges and success factors are reported by non-technical teams when adopting to agile working practices across the organisation?
RQ03	What perceived benefits of adopting Agile work practices are commonly reported by non-technical teams?

Table 7: Agile Research Questions.

The following sections now detail the research approach and methodology undertaken to find answers to these questions.

3. Research Method

3.1 Introduction to Qualitative Research

Qualitative research is suitable for understanding emerging or new paradigms and where existing theories offer insufficient understanding of the new areas of interest (Bluhm, Harman, Lee, & Mitchell, 2011; Fawcett & Waller, 2014; Lee, Mitchell, & Sablynski, 1999; Yadav, 2010). Bluhm et al. (2011) for example notes that qualitative examination is appropriate when seeking to understand new phenomena or to test perceptions and causal mechanisms, "qualitative research is essential for uncovering deeper processes in individuals, teams and organisations and understanding how these processes unfold over time" (p. 1870). Similarly Yadav (2010) believes that conceptual research is associated with discovery and introducing new theory and understanding how constructs can be conceptualise or operationalised.

The purpose of qualitative research is commonly described as being to *generate, elaborate* or *test* theory (Bluhm et al., 2011; Doz, 2011; Lee et al., 1999). Theory generation occurs when the research produces formal and testable research propositions, while theory elaboration occurs when existing preliminary concepts or ideas drive the study's design. Theory testing occurs when formally constructed hypothesis determines the study's design (Lee et al., 1999). Doz (2011) also discusses the critical role that qualitative research plays in theory building in management and believes it is uniquely positioned for understanding organisational processes and individual and collective actions.

Walliman (2011) points out, as many authors do, that qualitative research methods should not be viewed as less valuable than quantitative data. Rather she believes it is the descriptive nature of qualitative data which provides great insights into human activities, ideas and beliefs.

Yin (2016) provides a summary of five features of qualitative research which differentiates it from other forms of research:

1. Studying people's lives, in their real-world roles.
2. Representing the views and perspectives of people.
3. Accounting for real-world contextual conditions.
4. Contributing insights which may help explain behaviours and thinking, and
5. Acknowledging the relevant of multiple sources of evidence.
   (p. 9)

Linkages between qualitative research approaches and philosophy are considered by Walliman (2011), for example assumptions of what exists (metaphysics) and different methods of acquiring knowledge (epistemology). Positivism, a form of metaphysics, is based around a 'real' world, discrete and observable events, while relativism experiences the world variously through people's

perceptions, beliefs, and values. Basic approaches for gaining knowledge including empiricism (knowledge gained by sensory experience using inductive reasoning) and rationalism (knowledge gained by using deductive reasoning).

3.2 Positioning this Research Study

Given the scarcity of existing theory regarding the adoption of agile by non-technical teams, a qualitative approach seems suitable for this paper. The literature review emphasised that agile is based on people's values, attitudes and collective interactions, and these characteristics also support a qualitative methodology. Consideration has also been given to the specific variant of qualitative research that will be adopted. In reviewing the types described by Yin (2016) it has been decided to position this work as a more generalised qualitative and field-based study. He further notes that, "strong, if not exemplary…" research is commonly undertaken as such, regularly appearing in top academic journals and university presses (p. 98).

Metaphysically this study will take a more relativist approach, appreciating that the agile world will be construed and interpreted differently across a range of people. Qualitative analysis of language and meaning will seek relationships, interactions and consequences. The research purpose is broadly positioned to *elaborate* agile theory given the existence of emerging propositions regarding agile in non-technical teams. This study will attempt to extend current thinking such that future research may be better informed to move into *testing* theory, potentially via more quantitative methods.

Finally, this study will aim to provide a relevant and actionable body of work that will be accessible to academics, organisations and agile practitioners alike. Denyer, Cassell, and Tranfield (2006) discuss the current disconnect in this area and note the need for processes which bring research evidence together systematically and to apply it in practice. They believe qualitative research synthesis is well positioned to provide actionable knowledge because it is:

1. User led   - Practitioners and users can frame specific questions together.
2. Inclusive   - Can integrate evidence gathered from a range of sources.
3. Flexible and transparent   - Leading to new perspectives and deeper understanding.
4. Identifies variables   - Themes and ideas which can be compared and contrasted.
5. Accessible   - Presented in a usable form in the real world of practice.

3.3 Finalising the Research Methodology

Yin (2016) provides research characteristics which have been used to finalise the research methodology. The first is to ensure a high degree of *transparency* by clearly describing and documenting the research procedures and by ensuring all data is available for scrutiny. Secondly, research must be conducted with *methodic-ness* by following an orderly and planned approach to

reduce bias or distortion of results, while also being flexible to allow for discovery and responding to unanticipated events. The third objective is to ensure research outcomes and conclusions are grounded on, "an explicit body of evidence" (p. 14). Where the research involves participants describing thought processes, this evidence consists of language and the context of that language (Van Maanen, 1990, and Willig, 2009, as cited inYin, 2016). Lee et al. (1999) also described features of effective qualitative research which are useful to note because they apply specifically to a management environment. The research should occur in the *natural setting* of the organisation; data should derive from the *participants' perspective* and the researcher should not influence a particular bias; and the approach should be *flexible or reflexive* such that data gathering and analysis may change as the research situation unfolds.

A warning against introducing researcher bias is raised by a number of other authors (Bluhm et al., 2011; Fawcett & Waller, 2014; Yin, 2016). Bluhm et al. (2011) notes that it can be particularly difficult to, "remove oneself completely"(p. 1871) from qualitative research, while Yin (2016) advises careful self-examination to ensure the researcher understands the predilections which may affect inquiry and potential findings. Fawcett and Waller (2014) point to the need for methodological transparency regarding data collection such that findings are believed to be truthful, applicable and unbiased.

Triangulation is also noted as an important part of qualitative data collection, this being the collection of data from multiple sources to strengthen and challenge the inferences made from those sources (Leech & Onwuegbuzie, 2007; Walliman, 2011; Yin, 2016). Triangulation improves the credibility of a study by determining whether data from two or more sources converge or lead to the same conclusion (Yin, 2016).

To summarise, the previous sections have considered the broad positioning, purpose and characteristics of effective qualitative research, and the key points are summarised here to provide a succinct 'trail guide' as this study heads into the execution phases:

1. Theory elaboration with a focus on people's values, perceptions, beliefs and interactions.
2. Generalised field study, relativist approach, inductive and deductive reasoning.
3. Well defined and transparent method executed in the natural setting, highly flexible.
4. Evidence based, reconstituting large amount of data into meaningful themes and patterns.
5. Minimise bias via piloting, transparency and triangulation of data collection and analysis.

3.4 Preparing to Gather Data

Six research questions were drafted and following peer review, these were reduced to the three questions noted in the previous section. In thinking about field work and data collection, the four main methods were considered: interviewing, observing, collecting and examining materials, and feeling (Yin, 2016). Interviewing was subsequently determined to be the most effective method given its flexibility, repeatability and a known source of willing participants.

The mode of interviewing was structured to some extent given that a standardised set of interview questions were prepared, however was more broadly positioned as qualitative, semi-structured and open-ended. Brenner (2006) notes that this approach provides for comparability across informants, whilst allowing follow-up questions to build on initial responses. She further discusses the opportunity to extend and clarify responses through probing (detail, encouragement, clarification, silence) although warns these should be used judiciously so as to not to introduce bias. Qualitative and open-ended interviewing aims at understanding participants "on their own terms and how they make meaning of their own lives, experiences, and cognitive processes"(p. 357).

A pilot interview was conducted to test and refine the interviewing approach (Walliman, 2011; Yin, 2016). There were no significant changes to the questions however feedback was provided regarding more effective probing techniques. This interview was subsequently retained as part of the data set.

3.5 Gathering Data

Organisations were approached to participate in this research, and after initial discussions and screening, interviewees were selected so as to ensure a wide range of backgrounds, skills and experiences were included. A total of twenty interviews were conducted across eight organisations representing the media, health insurance, banking, energy, telecommunications, and office equipment industries. Due to the confidentiality conditions agreed with participants, the names of these organisations are not disclosed.

The first four interviews were conducted onsite and face to face, however due to the COVID-19 lock-down the remaining 16 were held via Microsoft Teams video conferencing. Interviews lasted one-hour and were recorded using a digital voice recorder, and the audio was later transcribed verbatim by the author. Observations and learnings were recorded in a personal reflective journal.

Interviewees represented a wide range of agile experience with the least having less than one-year, while the most experienced had over 20 years. The average number of years exposure to agile was 5.9; see details in Figure 3 following:
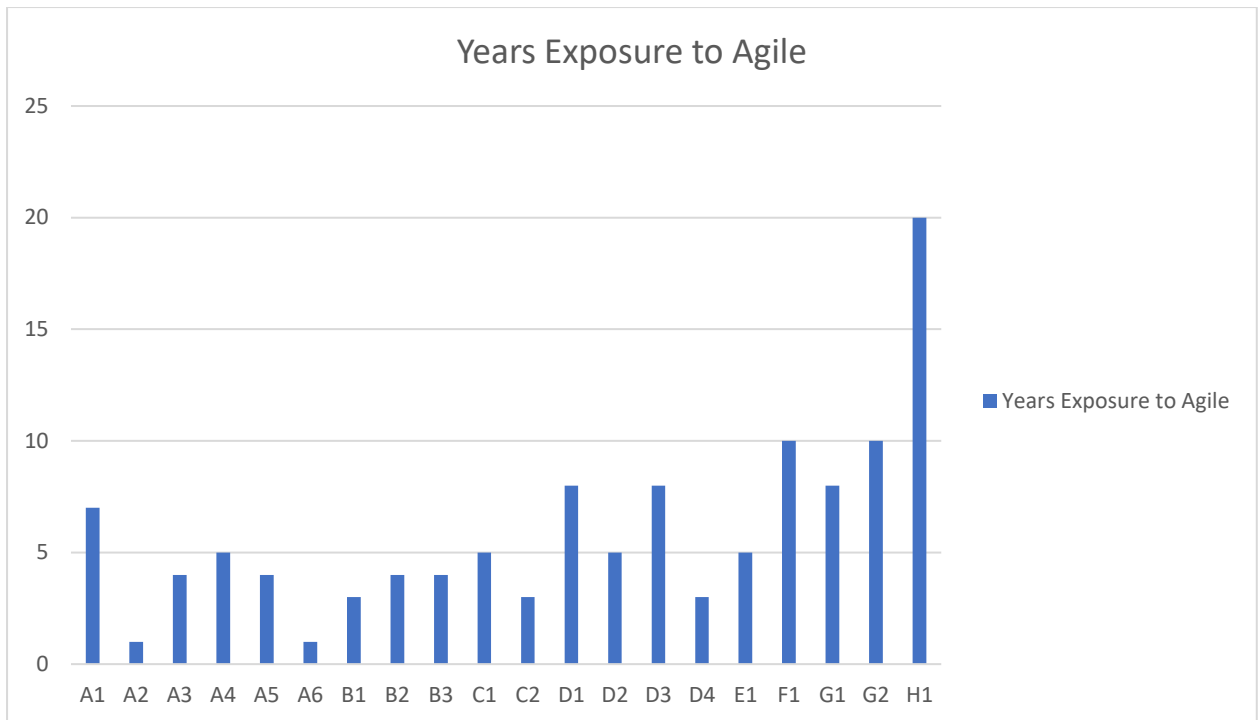
Figure 3: Years Exposure to Agile Values and Practices.

Participants ranged in seniority, spanning executive managerial positions at one end, to junior business analysts and marketing roles at the other. Over a third (35%) were directly employed in agile roles (e.g. coaches, scrum masters) while the balance held positions within marketing, communications, sales, operations, finance, customer services, design and product development teams. Interviewee's roles, seniority and industry experience are summarised in Table 8 following:

ID	Role Title	Role Category	%	Mgmt. Level	Current and recent previous industry experience
A1	Agile Coach	Agile	35%	Middle	Media, Telecommunications
C1	Agile Coach			Middle	Banking, Information Technology,
E1	Agile Coach			Middle	Banking, Energy, Health
D1	Scrum Master			Middle	Energy, Oil and Gas,
D4	Scrum Master			Middle	Energy, Local Government
D3	Tribe Lead			Senior	Energy, National Government (Health)
H1	Head of Agile			Executive	Telecommunications, Energy, Professional Consultancy Services
D2	Senior Marketing Manager	Marketing	15%	Senior	Energy
A2	Marketing Campaign Manager			Team	Media
A5	Head of Marketing			Executive	Media, Banking
F1	PMO Manager	Management	15%	Senior	Printing and Copying, FMCG, National Government
B1	Transformation Manager (Sales)			Senior	Insurance, Professional Legal Services
B3	Head of Transformation			Senior	Insurance
C2	Social and Content Lead	Communications	5%	Team	Banking, Energy
A6	Finance Manager	Finance	5%	Middle	Media, Mobile Phones, Telecommunications
G1	GM Digital	Digital Product Development	5%	Senior	Media, Telecommunications,
B2	Customer Services Operations Manager	Customer Services	5%	Middle	Insurance
G2	Sales Operations Manager	Sales Operations	5%	Middle	Media
A4	Design Director	Design	5%	Senior	Media, Web/Digital Development
A3	Business Analyst	Business Analysis	5%	Te am	Media, Insurance, Local Government (Transport)
	TOTAL		**100%**		

Table 8: Respondents Roles, Seniority and Industries.

3.6 Coding and Analysing Data

Interviews generated a significant amount of data - over 200 pages and 100,000 words - so the analysis process sought to reduce and reconstitute this data such that patterns and themes could be identified (Auerbach & Silverstein, 2003; Bluhm et al., 2011; Bryman & Burgess, 2002; Walliman, 2011; Yin, 2016). Five phases of analysis were broadly followed in a non-linear fashion, as recommended by Yin (2016):

1. Compiling   - Methodic organising of data.

2. Disassembling   - Formal coding.

3. Reassembling   - Identifying emerging patterns.

4. Interpreting   - Creating new narrative and analysis.

5. Concluding   - Drawing conclusions.

Coding data is a key step in this process as it, "… provides the link between data and conceptualization" (Bryman & Burgess, 2002, p. 20). A starting list of codes was initially developed (deductive, a priori) and as data was analysed, additional codes were added as new concepts were

identified (inductive, grounded theory) (Walliman, 2011). Examples of text were also captured in order to aid with contextual understanding (Auerbach & Silverstein, 2003).

As coding progressed the researcher also focused on listening carefully to what interviewees were saying, rather than forcing data into answering the original research concerns. This approach allows new ideas and themes to emerge and is a sign that the process is going well (Auerbach & Silverstein, 2003), and is depicted in Figure 4 following:

RESEARCH CONCERNS & PROPOSITION
?
RAW TEXT
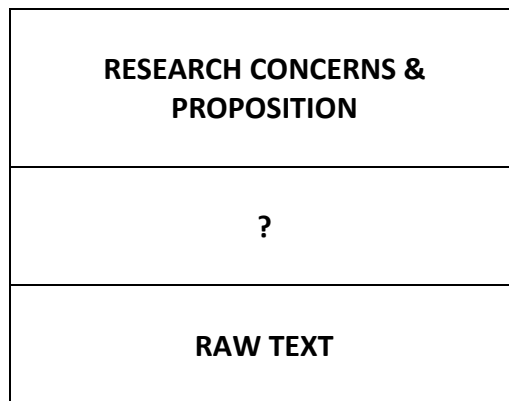
Figure 4: Coding Raw Text Data.

(Adapted from Auerbach & Silverstein, 2003, p. 47)

In order to identify and find these themes within the data, thematic analysis was used (Cruzes & Dyba, 2011; Thomas & Harden, 2008). Both authors discuss thematic synthesis, or the process of free coding data which is then organised into 'descriptive' themes, and then again into higher level 'analytical' themes.

This approach is depicted in Figure 5 below:

Initial reading of data / text	Identify specific segments of text	Label the segments of text	Reduce overlap and translate codes into themes	Create a model of higher-order themes
Many pages of text	Many segments of text	30-40 codes	15-20 themes	5-7 themes
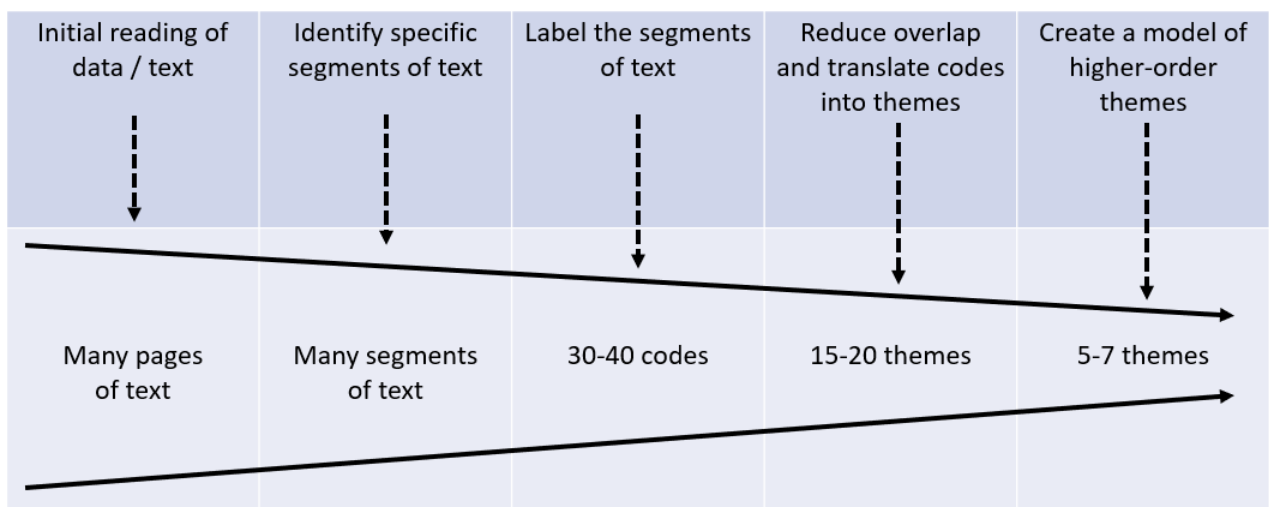
Figure 5: Thematic Synthesis Process.

(Adapted from Cruzes & Dyba, 2011, p. 2)

4. Research Findings

4.1 Research Question 01

RQ01: What common agile pre-perceptions, observations and expectations exist amongst non-technical teams, prior to being exposed to agile working practices?

In order to examine the first Research Question, interviewees were asked to recount their very first exposure and experiences with agile ways of working.

4.1.1 Participant's Knowledge and First Impressions

The majority of interviewees (15) reported having 'nil' agile understanding or knowledge when they first observed agile in action, with four having 'low' understanding, and just two having 'some'. Over half (12) noted that agile was initially observed in technical teams, however five reported that agile was emerging within other business areas such as content, marketing, and product management. For the majority agile was being led by technology executives (45%) or scrum masters/coaches (40%) however, five people reported that the executive team was driving agile ways of working. One respondent positively described this leadership:

> I think because it was being led from the top and demonstrably led by some leaders who were quite new to our business, CEO, who were very passionate about it themselves and who were actually truly prepared to live it as it were, then that gave you a lot more confidence (D2).

Over a third of interviewees believed they had already been practising 'agile' well before they more formally understood the methodology. One interviewee noted that they had been, "… developing things that we could pivot and change rapidly…well before it was labelled agile" (H1). Another felt they were already inherently acting out agile values:

> What was interesting was before knowing what those values were, we actually started seeking those out…very much around openness and transparency, courage to push forward, we were probably living those values without even knowing that they were formal things (D3).

'Agile-like' practices mentioned included trying things quickly (4 instances), daily meetings (2), iterative development (2), debriefs or retros (2), openness and transparency (2), focus on innovation and continuous improvement (2) and treating each other with respect (1).

One senior executive simply described a strong need to try something new and to move away from more traditional ways of working:

We just knew we needed to go into new territory, didn't know where to go, we were making it up as we went along, the only principle was we don't want to do it that way – moving away rather than towards something (H1).

In a similar fashion another noted that agile was being introduced to move away from the old culture and towards a nimbler and more customer focused future:

But the culture was a bit slow and like a big sort of slow moving freighter ship that was quite hard to change direction and tack very quickly, desire by the leadership to turn us in to a market orientated customer oriented business, and I think that's one of the key reasons (D2).

In fact, without prompting, a half of interviewees pointed out that traditional waterfall models were not working. It was generally agreed that these approaches were too slow and rigid, with long cycles of planning, requirement gathering and development which ultimately did not deliver the outcomes required.

Passion and excitement to change

Once initially exposed to agile half (10) of the participants reported excitement with the prospect of moving to a new way of working, along with a strong desire to learn more. Examples of some of the drivers behind this response are summarised in Table 9 following:

Drivers of interest in Agile	Example	Source
1. Desire to keep learning	"I wasn't learning any more so actually coming into (organisation) and this new thing and learning so I was really positive about it because of the opportunity to learn something new."	B1
	"So, I always love to learn and optimize and change."	C2
2. Could see positive results	"People were interested and wanted to learn more, team A could see that team B was doing something different, they were really enjoying it and they were challenged and excited by a new way of working, they were getting results really quickly and we used that groundswell to move us forward."	B3
	"Didn't do formal stand-ups, basic form of agile, but quickly saw benefits to that and became strong advocate of that within both that bit of the organisation and a bit wider as well."	D3
3. Important for professional development	"I just wanted to learn what it was and how it worked, I have no doubt that as a PM or campaign manager, I will work in an Agile environment, so I've got a pretty open mind."	A2
4. Keen to try something new	"I'm always willing to learn and to experience new things… thought was something that I was prepared to have a go at."	D2
5. Enjoying a new way of working	"Virtually had zero experience but walked out 18 months later absolutely loving it."	F1

Table 9: Drivers of Interest in Agile.

Conversely just two interviewees expressed doubt or cynicism when they were first exposed to agile ways of working. One finance manager described his initial reaction as follows:

> I came into the Agile environment with pre-conceptions of what agile meant and honestly thought it was a bit of a joke. Tribal leaders, squads, scrum masters etc. was a bit wankerish to me and a bit of a corporate fad that everyone would be in to for a while until the next big thing came along and everyone jumped on to that (A6).

Another participant observed significant time being spent in agile ceremonies and noted, "I saw the teams spending so much time in ceremonies, you know I was thinking when do you actually work?" (A3).

4.1.2 Early Observations

Questioning then probed general observations of agile during these early years. Participants were encouraged to talk broadly and 142[2] observations were noted. Raw data (L1) was mapped to second level (L2) descriptive themes using Miller's model of agile characteristics (2001), and then consolidated into third level (L3) themes based on the four agile values.

The highest number of observations mapped to the L3 'Value of People' (45.07%). Common L1 observations included 'Collaboration or Sharing' (10 instances), 'Trialling or Experimenting' (9), and practices such as 'Stand-ups' (14), 'Product or Business Owners' (7), 'Scrum' (7), 'Cross-Functional Teams' (5) and 'Retrospectives' (5). One senior executive, in recalling his earliest exposure to agile, noted:

> Treating each other with respect and understanding where you are coming from, there was a lot of that psychological, liberal thinking that seeped into some of these principles, that really resonated with me as well (H1).

The primary L2 characteristics within this value group were 'People Oriented' (16.90%), 'Collaborative and Communicative' (16.90%) and 'Convergent and Incremental' (11.27%).

With over half of interviewees recalling that agile was initially driven by technology, it's not surprising that 38% of early observations mapped to the 'Value of Working Software'. Common L1 observations included 'Regular Delivery' (10), 'Delivery in Iterations' (9), 'Time Boxed Delivery' (7), and practices such as 'Physical Kanban Board' (9), 'Estimating User Stories' (6) and 'Showcases or Demos' (5). The main L2 characteristics here were 'Iterative Development' (14.08%), 'Incremental to Partition Development' (12.68%) and 'Time-Bound Goals and Activities' (11.97%), with several

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[2] Observations were only recorded once per respondent, even if they mentioned it several times. This approach was consistently applied during all phases of interviewing.

respondents describing the benefits of producing working prototypes as quickly as possible. One senior marketing executive for example, noted, "… business requirements, we didn't really know what they are…people imagine what they are asking for, however until you actually show them something, they don't actually know" (A5).

However, 20% of interviewees also mentioned the challenges of delivering minimum viable products (MVP) during their early experiences with agile:

> MVP minimum viable product was a term that surfaced in our business really early… involved in quite a lot of education around MVP and what it actually meant as opposed to the waterfall when you get the whole lot (B1).

> I think it got misinterpreted on reflection, agile was almost used as an excuse for not delivering something to its full effect (B2).

Just 8.45% of early observations mapped to the 'Value of Managing Change', and the L2 characteristic of 'Adaptive to Quickly Respond to Change'. Common observations were 'Agreeing Priorities or Reprioritising Regularly' (5), 'Regular Planning Meetings' (4) and 'Continuous Improvement' (2).

Even fewer observations were linked to the 'Value of the Customer' (6.34%) and there were just nine L1 mentions of 'Customer Centricity' or 'Fast Feedback Loops'. However, one interviewee noted, "…we didn't suddenly deliver twice as quickly, but we were much more involved with our customer, and what they got in the end was much closer to what they wanted" (D1).

Finally, there were two observations which couldn't be mapped to Miller's model, both relating to 'Scaled Agile', a concept that developed after his original model was published (Ågerfalk et al., 2009; Dingsøyr & Moe, 2013; Lindvall et al., 2004; Reifer et al., 2003).

Table 10 following summarises the individual observations captured during this phase of interviewing, and how they mapped to Miller's agile characteristics and the core agile values:

Level 1			Level 2 Descriptive Themes		Level 3 Analytical Themes	
Raw Code	Observation	#[1]	Agile Characteristics (Miller, 2001)	%[2]	Agile Values (Manifesto, 2001)	%[3]
RQ01.43	Daily stand-ups, updates	14	People oriented, empowered people	16.90%	Value of People	45.07%
RQ01.44	Product or business owners	7				
RQ01.45	Co-location of teams	3				
RQ01.47	Collaboration, sharing	10	Collaborative and communicative working style	16.90%		
RQ01.46	Cross-functional teams, squads	5				
RQ01.50	Retrospectives, reviews	5				
RQ01.48	Agile ceremonies	2				
RQ01.49	Openness, trust, respect	2				
RQ01.42	Trialled, experimented, dabbled	9	Convergent and incremental approach	11.27%		
RQ01.41	Scrum	7				
RQ01.58	Delivery in iterations, chunked down	9	Iterative development	14.08%	Value of Working Software	38.73%
RQ01.59	Demos, showcases, see the product as quickly as possible	5				
RQ01.57	Minimum viable product (MVP)	4				
RQ01.60	Defining done, acceptance criteria	2				
RQ01.51	Physical Kanban board	9	Incremental to partition development	12.68%		
RQ01.54	Estimating user stories, points	6				
RQ01.53	Grooming, refining stories	2				
RQ01.52	Digital Kanban board	1				
RQ01.55	Regular releases, via sprints	10	Time bound goals and activities	11.97%		
RQ01.56	Time-boxed delivery	7				
RQ01.63	Agreeing priorities, reprioritising regularly	5	Adaptive to quickly respond to risks	8.45%	Value of Managing Change	8.45%
RQ01.62	Regular planning meetings	4				
RQ01.61	Continuous improvement	2				
RQ01.64	Way of managing risk	1				
RQ01.66	Customer centricity or focused, fast feedback loop	9	N/A[4]	6.34%	Value of the Customer	6.34%
RQ01.65	Scaled agile, SAFE, expanding delivery across teams	2	NEW – scalable across teams and organisations[5]	1.41%	NEW – Value of Scale	1.41%
	TOTAL	142		100%		100%

Table 10: Early Observations of Agile, Characteristics and Values.

Notes: [1] Number of times this observation was mentioned by respondents. [2] Number of mentions mapping to this agile characteristic, expressed as a % of all mentions. [3] Number of mentions mapping to this agile value, expressed as a % of all mentions. [4] Miller did not include any customer-related characteristics, a surprising omission given the principle of customer-centricity within agile teams. [5] Scaled agile was not a common characteristic of agile when Miller's model was developed in 2001.

4.1.3 Early Challenges

There were a few challenges discussed as interviewees continued to recount their early experiences with agile. Several (4) observed that 'Insufficient training / being new into their roles' was a challenge, often noting that team members were given new agile roles with limited preparation or understanding:

> We started seeing Product Owners pop up around the business, I think we didn't set those people up for success…we turned our PMs into Scrum Masters…they had new titles but we didn't see anything that was different…wasn't clearly given roles and responsibilities (B2).

> We put enterprise experts into the role of product owner and we weren't fast enough wrapping around development and capability uplift of that particular set of individuals, which then created challenges as you established delivery teams requiring skilled product owners… (B1).

Three participants had observed conflict between old and new ways of working, often driven by a lack of scale,"…there was a bit of a challenge to bed these new ways of working with old ways as it was done in pockets around the business, it wasn't widespread around what we do" (B2). And one interviewee had experienced the over selling of agile without sufficient explanation or preparation to meet the challenges that would be encountered:

> I think we had higher expectations, we were sold this new way of working was going to deliver fantastic results, our whole world was going to be different… from a change management perspective it focused on the positives without exploring some the challenges that might be faced (B2).

4.1.4 Early Benefit Expectations

This first phase of interviewing concluded with a discussion around benefits that interviewees perceived or observed when they were first exposed to agile. A total of 53 mentions were recorded.

The top ranked benefit, 'Delivering features quickly, helping the team move quickly', was mentioned by 50% of participants, reflecting that for many, agile was first experienced in a technology context.

The remaining top ranked outcomes all related to increased personal accountability and motivation, and improvements to the way that teams were operating. 'Improving visibility and transparency between teams' was the second most mentioned benefit (8) with one interviewee remarking that agile, "…enabled us to have really strong relationships with one another, making work pretty visible to one another" (E1). Four respondents specifically mentioned improved transparency between

business and technology teams, with an operations manager remarking, "… certainly, improved initially understanding between the business the technical teams regarding what was going on" (B2).

'Adjusting and pivoting to change faster' and a 'Focus on delivering value to customers' were noted six times each, while 25% of interviewees felt that being 'Able to trial things and fail fast' was a key benefit. One interviewee expressed this has follows, "…you are able to learn…testing things and they may not work…we failed fast and learned fast as well" (C2).

Increased accountability, another benefit mentioned, was also confronting for several people with one scrum master recalling, "[it] was exposure to accountability, you talk about something and walking away with that. It was a bit of a revelation for that first exposure, that sort of accountability…" (A1).

All benefits observed are presented in Table 11 following, ranked by frequency:

Rank	Top Reported Benefits (# of occurrences) when first Exposed to Agile
1	Deliver features quickly, helps team move quickly (10)
2	Increased visibility and transparency between teams (8)
3	Move, pivot adjust to change faster (6)
4	Increased focus on delivering value to customer (6)
5	Trial quickly, fail fast, move ahead (5)
6	Improved focus and prioritisation (4)
7	Helps build trust across the teams (3)
8	Improved motivation and engagement, builds great teams (3)
9	Increased ownership and accountability (3)
10	Improved management of cross-dependencies between teams (2)
11	Helps set clear objectives and goals (2)
	TOTAL BENEFITS

Table 11: Benefits Observed when first Exposed to Agile

4.2 Research Question Two

RQ02: What common challenges and success factors are reported by non-technical teams when adopting to agile working practices across the organisation?

Respondents were then asked to discuss their more recent experiences with agile and were encouraged to focus on a general business (or non-technical) context.

4.2.1 Agile Values in a Business Context

This phase of interviewing commenced by probing into agile principles and values. This approach was designed to understand how respondent's understanding had changed from early observations, and also to help transition into questions around challenges and success factors.

A total of 166 statements relating to principles or values were recorded. For this phase of analysis, raw data was compiled into second level sub-themes (principles, developed by this study) and then mapped again to the same four core agile values used in RQ01. Table 12 provides the summarised findings.

The Value of People

Similar to early observations, over half of all L1 value statements mapped to the 'Value of People' (L3). Within this, the largest number of individual statements linked to the (L2) sub- theme of 'Teams which can evolve, try things, learn, adapt and focus on doing things better' (18%). Many participants saw this value being reflected in cultures where people were not criticised or blamed, and where there was no fear of failure. One manager noted, "…it's more about clarity of success or failure, and having people say it's OK, we failed to do that…..we're failing but that doesn't make us failures" (A5).

Over half (60%) of respondents mentioned principles around starting with simple concepts and letting agile evolve flexibly within teams, respecting the needs of team members. A tribe lead described this as having, "… the freedom to say we'll start with the basics and fundamentals, but it's then OK to flex that model, because that model then works for you rather than just some model that we took off a shelf …"(D3).

A similar view was expressed by another interviewee:

> I think that we are slowly starting to bring down some of the misconceptions around agile, it's not just for technical teams…you don't have to do every single little thing exactly what's written down in order to give it a go …pick and choose the bits that do work for them (E1).

Another key principle was 'Cross functional, empowered teams with full delivery autonomy and ownership' (14% of all value mentions) with one respondent saying it was important, "to understand that the team needed to be fully functional and have representation for all those groups within it…" (G1).

Value of the Customer

Appreciation of the customer's role in agile increased significantly, with 25% of all value statements mapping to the 'Value of the Customer', compared to just 6% of the early observations. Almost all

participants discussed the core principle of 'Having the customer in your heart and mind always' and many organisations had structured their agile squads around this:

> Basically, any team that is building a product that is customer facing is an agile team, so it's not just software teams, its marketing, product management, product development… customer research teams, basically anybody that's building something customer facing, works in an agile way (D1).

As an extension of this thinking, 65% of people also discussed the principle of value-chains or value-streams, believing that just being 'customer focused' was not enough to be successful:

> "So, the shift for us is not about being customer-centric, because everything we do is organized around that, it's about having the validation and visibility of the customer value at the centre of everything we do" (B3).

Value-streams or value-chains were a difficult concept for many to explain, and there were various levels of understanding and execution. Some organisations had started trying to structure their teams around 'value', for example:

> By apportioning that investment of effort and budget into different value streams then each of those can be autonomous in their own right, so in theory its funded and resourced autonomously and so it can go and deliver the outcome (B3).

> Try to align the delivery of work with a values stream rather than arbitrarily a sector because Residential doesn't make a lot of sense…here is a team that can flex slightly in its make-up and can deliver a whole value stream than having to hand off to other teams (D3).

Most respondents shared the principle of delivering value faster to customers, for example, "…tribes shifting to a more value-stream model…if we put a marketing and development team together…make it faster, reduce the handoffs and decrease the time to deliver a product" (D3).

Value of Managing Change

A low percentage (11%) of all value statements mapped to the 'Value of Managing Change', similar to respondent's initial agile observations as recorded in RQ01. However individually, over half of the respondents discussed the principle of setting short-term goals and working in shorter time frames. Other L2 sub-themes identified included 'Expect issues, seek them out and clear them quickly' and 'Expect change, don't fight it, be flexible and adaptable'.

Value of Working Software

As respondents discussed their more recent agile experiences, only 11% of value statements mapped to the 'Value of Working Software', however during RQ01 questioning almost half (40%) of

all early observations linked to this value. This is significant as it suggests respondents are using agile less in a technology context and more in a business one.

Two sub-themes were 'Chunk it down and deliver iteratively' and 'Be lean and stop unnecessary work', with these principles being discussed in both business and technical settings. For example, two marketing managers described their agile approach to supporting the delivery of new software:

> At the very least let's work at trying to achieve a certain outcome at the end, you know, what is it that we are trying to achieve as a team…at the end of this sprint we will have some [marketing] concepts…we'll have designs completed (C1).

> I will split into sprints at a high level so that I know within each sprint what I have to had delivered in order to deliver this, will create features and stories and try to make sure my stories are sprint bound so can be delivered in a sprint (D2).

The summarised set of principles and values from this phase of interviewing are represented in Table 12 following:

Level 1			Level 2 Descriptive Themes		Level 3 Analytical Themes	
Raw Code	Value Statements (and # of mentions)	#[1]	Agile Principles	%[2]	Agile Values	%[3]
RQ02.01	Start with simple concepts, be fluid, let it evolve	12	Teams which can evolve, try things, learn, adapt and focus on doing things better	18%	**Value of People**	**52.41%**
RQ02.06	Trial things, test and move on, Ok to fail, pace over perfection	9				
RQ02.05	Focus on continuous improvement, learn and adapt and optimise	9				
RQ02.10	Self-organising, self-managing teams, pushing decisions down, empowerment	12	Cross functional, empowered teams with full delivery autonomy and ownership	14%		
RQ02.11	Cross-functional teams, can manage full delivery cycle	12				
RQ02.02	Clear priorities, focus on priorities, focus on what is adding value	8	Teams unified by clear goals, priorities and conditions for success	9%		
RQ02.01	Unified teams, common or collective goals, achieving together	6				
RQ02.03	Being clear about conditions for success	1				
RQ02.08	Working based on trust, having trust in each other	4	Collaborative teams built on trust, openness, and honesty	8%		
RQ02.09	Open and honest communication, face to face, collaboration	10				

Level 1			Level 2 Descriptive Themes		Level 3 Analytical Themes	
Raw Code	Value Statements (and # of mentions)	#[1]	Agile Principles	%[2]	Agile Values	%[3]
RQ02.04	Individuals and interactions over processes and tools	4	People and teams over processes and tools	2%		
RQ02.15	Customer centricity, focus on the customer, customer at heart of what you do	17	Have the customer in your heart and mind always	10%	Value of the Customer	25.30%
RQ02.16	Be clear what is delivering value to the customer, value chains, value streams	13	Define what delivers customer value, then build your approach around that	8%		
RQ02.17	Deliver as fast as possible, delivering fast to customers	9	Deliver value to your customers as early as possible	5%		
RQ02.18	Focus on the product, better featured products than competitors	3	Deliver more value than your competitors	2%		
RQ02.12	Shorter cycles, shorter term approach, short term goals, adaptive planning	10	Set short-term goals and work within timeboxed and shorter timeframes	6%	Value of Managing Change	11.45%
RQ02.13	Solving issues or problems quickly, clearing impediments immediately	5	Expect issues, seek them out and clear them quickly	3%		
RQ02.14	Responding to change, managing change over following plan, being flexible, adaptive and responsive	4	Expect change, don't fight it, be flexible and responsive	2%		
RQ02.20	Deliver in iterations, chuck it down, doesn't have to be perfect up front	12	Chunk it down and deliver iteratively	7%	Value of Working Software	10.84%
RQ02.19	Lean thinking, minimising unnecessary work, minimising WIP	6	Be lean and stop unnecessary work	4%		
	TOTAL	166		100%		100%

Table 12: Agile Principles and Values.

Notes: [1.] Number of times this principle or value was mentioned by respondents. [2.] Number of mentions mapping to this principle, expressed as a % of all mentions. [3.] Number of mentions mapping to this agile value, expressed as a % of all mentions.

4.2.2 Agile Working Practices

During this phase of interviewing respondents also discussed agile practices being applied in a business context. A total of 190 instances were recorded, with most respondents demonstrating a very good understanding of agile ceremonies and techniques.

Scrum was most commonly mentioned with 13 participants noting the use of Scrum, or Scrum variants such as Scrum-ban. Frequently mentioned Scrum practices included daily stand-ups (18 mentions), retrospectives (16), formal sprint cycles (12), regular re-prioritisation (11), demos or showcases (10), and having a backlog of work (10). The use of physical Kanban boards was also noted by 14 participants, with 11 also mentioning digital Kanban boards.

The emergence of scaled agile was mentioned by six participants who touched on the use of 'Meta-Scrum', or 'Scrum of Scrum' practices to manage cross dependencies and inter-team communications. "Where we have teams with cross-dependencies for example, marketing campaign that touches on the website, we'll run meta-scrums where appropriate" (D3).

Over a third of people also discussed the use of centres of excellence (COE) or practice leads operating horizontally across agile tribes and squads, this being consistent with the Communities of Practice (COP) concept discussed in the literature review (S. B. Brown & Duguid, 1991; Dove, 1999; Kelly & Caplan, 1993; Prokesch, 1997). Many COEs were also adopting agile practices within their own functional team, for example a social and content marketing team member noted, "We get to score each other's ones [user stories] which I really like...we kind of hold each other to account...how much effort is involved in each story" (C2).

Agile working practices discussed are summarised in Figure 6 below:
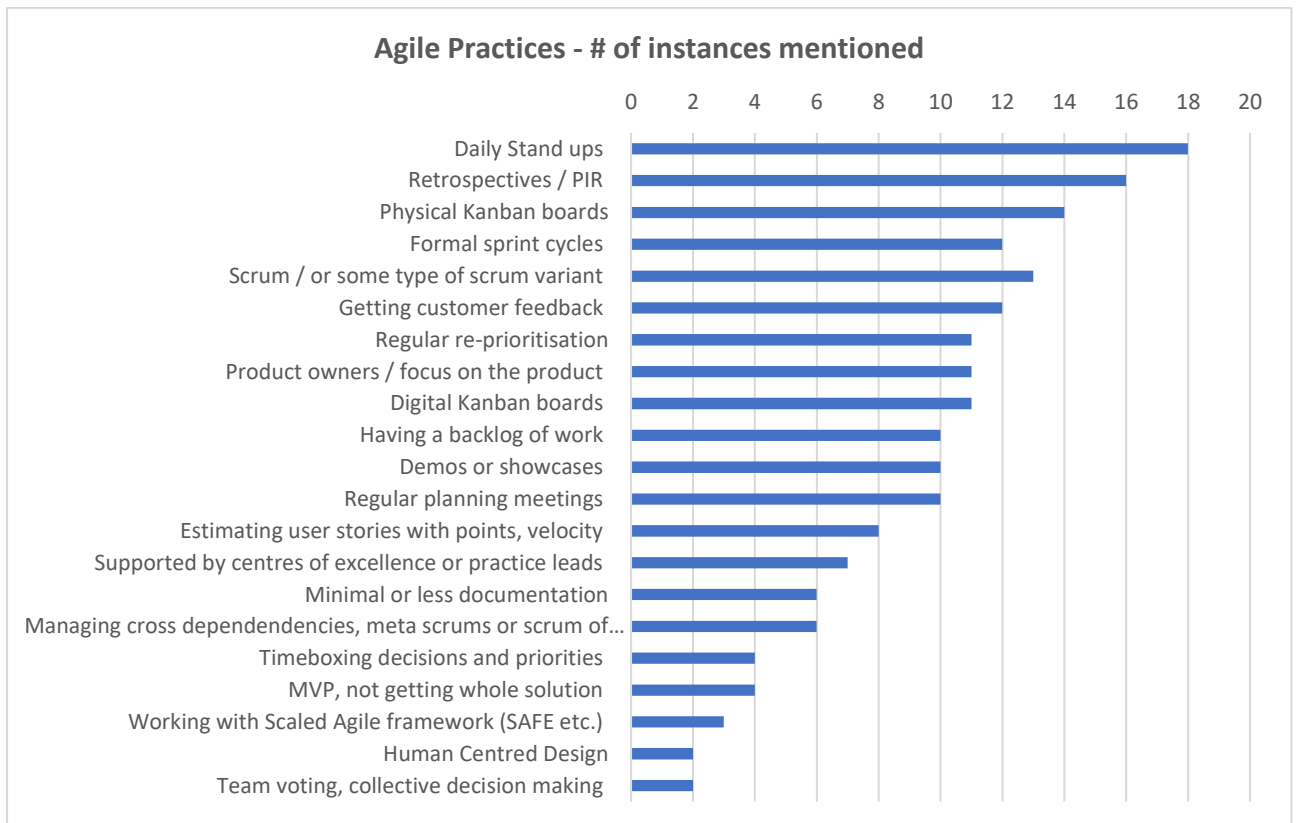
Figure 6: Common Agile Practices in Business Teams.

4.2.3 Agile Challenges for Business Teams

Interviewing then transitioned into key challenges, and 170 mentions of challenges were recorded. For this phase of analysis, L1 raw data was mapped to Level 2 descriptive sub-themes and Level 3

analytical themes, with all themes being developed by this study. Five major (L3) groupings of challenges were identified as depicted in the following Figure 7:
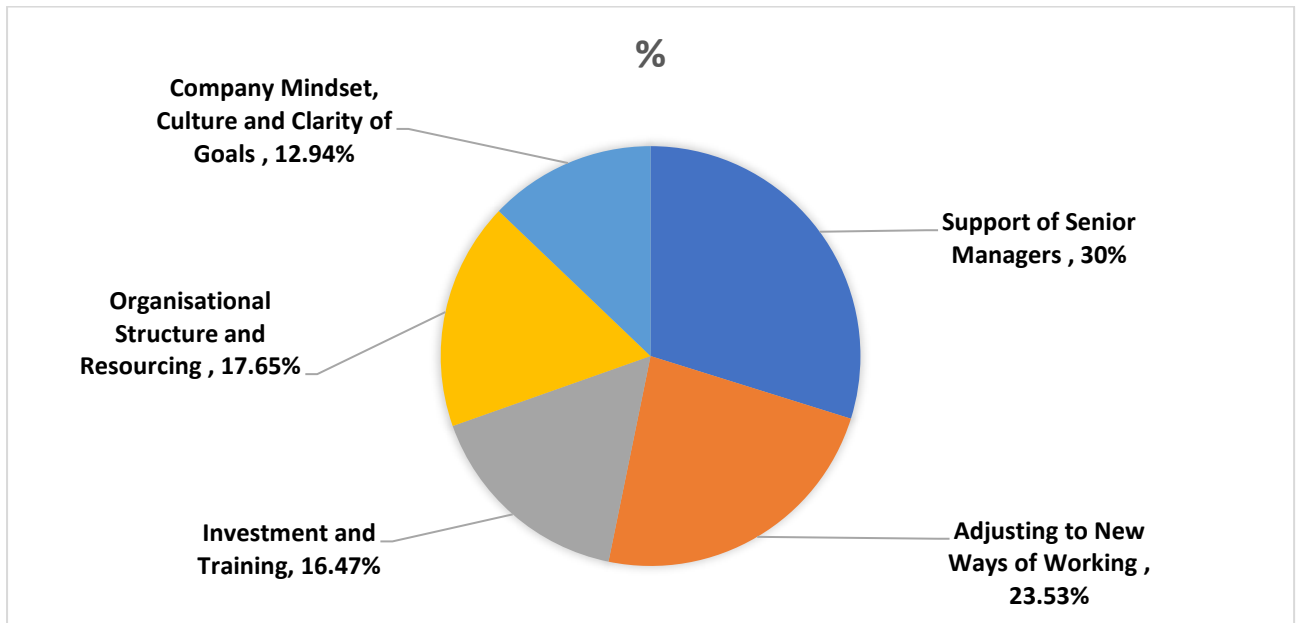
Figure 7: Agile Challenges (Level 3 Analytical Themes).

Support of Senior Managers (30%)

Lack of senior management acceptance, understanding and support represented the largest group of challenges identified by this study. 'Executives and managers unwilling to let go' was viewed as the greatest L2 challenge with 15% of individual challenges linking to this sub-theme. This was the source of frustration for many:

> They aren't able to make the decisions they need to, to be able to work in an agile way. So, they still have to go to the Steering to get decisions, right to the top and decide we want to do this, we want to change this…and this just slows everything down (A3).

> We're still not quite getting this way of working correct, there are still sign offs that take a while… haven't fully empowered those teams … not fully cross functional, self-sufficient teams, somewhat cross functional, somewhat fully functional (B2).

The challenges of moving away from a hierarchical, command and control management structure was individually raised by over half of respondents (12), while 40% also discussed issues with executives not divesting accountability far enough down. One interviewee described agile squads working well bottom up, however being challenged by the, "… awkward middle management layer…very command and control…had people shoulder tapping and changing priorities here" (E1).

While some respondents were quite critical, "… you still get the dinosaurs sitting on top…" (C1) others could appreciate the accountabilities faced by executive and the pressures to ensure

commercially prudent decisions were being made. One manager noted, "They want ultimate sign-off because ultimately, they need to represent all of this to the Board and to our shareholders, and they are working in a commercially challenged environment" (G1).

Closely related to this challenge was the second ranked L2 sub-theme in this group, 'Exec fear of losing control or position of seniority'. Again this was frustrating for many respondents who were trying to establish new ways of working, and they commonly described executives who, "… climb the ladder in a hierarchy…..they find it hard to empty the cup and learn more" (A1), while another manager noted, "… that's how they know how to survive" (C1).

The third ranked sub-theme was 'Lack of executive understanding, time and support' with 12 mentions. These discussions reflect that significant effort is required to ensure executives understand agile values and practices, for example, "…we've had to convince and cajole and try to persuade the people with the money and power that this is a good way to work" (D3).

Once that understanding is established it is then challenging for leaders to actively participate in agile ceremonies to the extent expected by squads. Many members felt that executives, "… needed to be part of that group as well if they wanted to be moving as quickly as possible, making decisions as part the journey rather than another layer up…" (G1), however realistically many also appreciated, "… that they are time poor, can't expect them to attend every stand-up" (G1).

The raw data and Level 2 sub-themes linked to 'Support of Senior Managers' are summarised Table 13 following:

	Level 1		#[1]	Level 2 Descriptive Themes	
Raw Code	Challenges (and # of mentions)			Sub-Themes	%[2]
RQ02.42	Hierarchical command and control, decisions still made at top, exec want final sign off		12	Executives and managers unwilling to let go	14.71%
RQ02.45	Not divesting power down enough, insufficient accountability		8		
RQ02.43	Exec still want clarity of delivery		2		
RQ02.46	Traditional project managers losing control, not having traditional schedule		2		
RQ02.44	Blame culture, too busy looking at what others are doing		1		
RQ02.54	Exec fear of failing, hero mentality, fear of losing seniority		8	Exec fear of losing control or position of seniority	8.24%
RQ02.53	Climbed the ladder, been successful this way, survived working this way		6		
RQ02.57	Exec don't understand the concepts, don't understand what it means to be agile, still shoulder tapping		6	Lack of Executive understanding, time and support	7.06%
RQ02.56	Still think it's a tech thing, believe principles can't be applied to business teams		3		
RQ02.55	Exec too busy, need to be more involved, more engaged in method, is time consuming		3		
	SUPPORT OF SENIOR MANAGERS (L3) TOTAL		**51**		**30.0%**

Table 13: Agile Challenge (L3) 'Support of Senior Managers': Raw Data and (L2) Sub-Themes.

Notes: [1.] Number of times this challenge was mentioned by respondents. [2.] Number of mentions mapping to this sub-theme, expressed as a % of all mentions.

Adjusting to New Ways of Working (23.53%)

This represented the second largest L3 group of challenges, and within this, 'Adjusting to transparency, visibility and trust' was the most common L2 sub-theme. See Table 14 below for details. However, respondents generally did not resist transparency, in fact most welcomed it because they often felt teams had previously been working in silos with minimal collaboration:

> People were [previously] working independently and in isolation across things…it was an experiment basically to try and work together and get the dependencies exposed a bit more… to get visibility and transparency of what people were doing on a regular basis (A1).

For many, starting to work in an agile way was challenging because immediately the team's work was visible and discussed on a daily basis, "I think it does put some of the pressure on the teams, keeps people pretty honest during this phase, very transparent when everything is on a board and you can see all the details" (G1). One scrum master described the efforts she went to help her squad understand the benefits of this approach:

"Why transparency was good, why collaborating face to face was good, why the whole squad needed to understand what we were doing, everyone's input rather than just the marketing person saying I know what I'm doing, I don't need your input" (D4).

Opening up and sharing ideas cross-functionally was also a challenge for several respondents with one marketing manager describing this as, "…a learning curve for a marketing person to understand a pricing or product manager could have input…or vice versa" (D4). Another remarking, "… I still don't always remember to always share the latest bit of advertising with the pricing guy in the squad, but yeah, I'm getting better at it" (D2).

Throughout these discussions the challenge of building the levels of trust required for agile to be successful was regularly mentioned. A senior executive noted that agile is, "… a hard process, do they really have the level of trust inherent between key individuals and individuals in their organisation, because if they don't have trust between people then agile isn't going to do anything" (A5). Another manager simply stated, "Trust, from everyone really, trusting that that person can do their job right, and having the mechanism in there to help support them if it's not going right (A4).

There were just eight individual challenges directly related to 'General resistance to change', and three relating to the challenges of 'Delivering a marketing process iteratively', with a senior marketing manager noting:

> As a marketer and running marketing campaigns business campaigns, unlike IT developments were you can be very iterative and very minimum viable product sort of thing, I can't deliver a minimum viable TVC which I can then tweak the next week or the week after because it costs me several thousand dollars when I film one" (D2).

A few scrum masters discussed this challenge from their point of view, noting that many marketing people, "…like working as what they perceive is an ordered way, look back to traditional waterfall very gated, move from one thing to another, whereas agile can be seen as a little bit slapdash" (D3).

Level 1			Level 2 Descriptive Themes	
Raw Code	Challenges (and # of mentions)	#[1]	Sub-Themes	%[2]
RQ02.49	New levels of transparency, see what others are doing, being pressure to complete work quickly	7	Resistance to transparency, visibility and trust	11.76%
RQ02.47	Difficult to build trust, being open with each other, remembering to share	6		
RQ02.48	Hard to accept other people's point of view, other people's opinions, accepting we were wrong	4		
RQ02.50	Difficult to remove walls and silos from teams	3		
RQ02.51	Breaking down old habits, old ways of working, not mature enough	9	General resistance to change	10%
RQ02.52	Resistance to change, generally adverse to change, resistant to new ideas	8		
RQ02.72	Difficult to deliver a MVP marketing campaign, breaking the marketing process down iteratively	3	Delivering a marketing process iteratively	1.76%
	ADJUSTING TO A NEW WAY OF WORKING (L3) TOTAL	40		23.53%

Table 14: Agile Challenge (L3) 'Adjusting to a New Ways of Working': Raw Data and (L2) Sub-Themes.

Notes: [1.] Number of times this challenge was mentioned by respondents. [2.] Number of mentions mapping to this sub-theme, expressed as a % of all mentions.

Organisational Structure and Resourcing (17.65%)

Within this third group of challenges, 60% of respondents discussed issues arising when 'Teams are not truly cross-functional'. A scrum master stated, "… to make this team truly cross-functional you want a person from marketing, legal, risk, change management etc…" (C1). There were many examples where organisations were struggling to provide this level of resourcing and it was felt this was negating the effectiveness of agile, for example another scrum master noted:

> We'd get to the end of the sprint and they'd say we weren't able to do that because its sitting with that external…weren't necessarily set up for success because not really living that, the ability for the squad to be independent (E1).

However, interviewees also appreciated the financial and practical constraints around providing cross-functional resources for all squads, therefore the challenge evolved to finding the optimal balance between cost of participation and effective delivery. For example, one marketing manager noted that external agencies were not permanently part of squads, "…because the agency contributions are only a very small part of the whole thing…it's often a waste of time for them being there" (D2). A tribe lead captured this challenge well in stating:

> No matter what you do, you are always going to have dependencies, it's the nature of a large company, challenge is how do you manage that, accept that you have dependencies, how to limit the handoff, so can be as quick as delivery as humanly possible (D3).

'Conflict with other areas not working agile' was also individually raised as a key challenge by 35% of respondents, with one manager describing this situation, "Because they don't have visibility and don't work in agile framework, we feel like we are butting heads…" (C2). Another finance manager noted that without, "… getting everyone working together, a common project or goal will be a lot more difficult" (A6). Legal, Risk and Audit departments were often identified as a source of frustration and delay:

> Quite bureaucratic or at least in that sort of mindset and they tend to be the blockers of the teams and you always hear about it…legal department, they are always blockers, conduct and risk… they are trying, but I think it's not enough (C1).

A few respondents (20%) discussed the challenge of finding the optimal organisational structure and reporting lines particularly where squad members would, "…report to the chapter lead but then be dotted across cross-functional teams" (D1). Scrum masters and tribe leads often felt squad members should report directly to them, while those representing business functions generally felt they were best served reporting to their practice or COP lead. There was no consensus here however the challenge was well represented by one manager who stated:

> You've got teams that are trying to meet two different expectations, often our product owners reported directly to that middle layer…on one side they were trying to meet that expectation because they're the person who is going to be doing their performance review…while also trying to practice what their scrum masters are trying to encourage….all of a sudden straddling these two worlds and trying to do the best they can (E1).

Finally, in this group only one respondent noted that there were parts of their organisation where waterfall was regarded a more suitable methodology. This business, "…dealt with big intensive projects…in those parts the way of operating is very plan driven, so therefore working in waterfall makes more sense" (H1).

Level 1 raw data and Level 2 sub-themes are summarised in Table 15 below:

	Level 1			Level 2 Descriptive Themes	
Raw Code	Challenges (and # of mentions)	#[1]		Sub-Themes	%[2]
RQ02.58	Not having truly cross-functional teams, insufficient resources to be autonomous, external resource dependencies	12		Teams are not truly cross-functional	7.06%
RQ02.63	Difficult when some teams are using it, others are not	7		Conflict with other areas not working agile	6.47%
RQ02.64	Legals, contracts, compliance and obligations slowing things down	4			
RQ02.70	Reporting to line managers, or to the squad, what is the priority, teams straddling two different worlds	4		Structure and reporting lines	2.35%
RQ02.74	Team moves on too quickly, product or service not fully handed over to BAU	2		Teams move on too quickly	1.18%
RQ02.77	Parts of business still very plan driven, large capital investment, risk adverse, waterfall still makes sense	1		Waterfall still makes sense in some areas of the business	0.59%
	ORGANISATIONAL STRUCTURES AND REPORTING (L3) TOTAL	30			17.65%

Table 15: Agile Challenge (L3) 'Organisational Structures and Reporting': Raw Data and (L2) Sub-Themes.

Notes: [1.] Number of times this challenge was mentioned by respondents. [2.] Number of mentions mapping to this sub-theme, expressed as a % of all mentions.

Investment and Training (16.47%)

The dominant L2 sub-theme challenge here was the 'Investment and discipline required to build and maintain capability' with a total of 12 mentions. The investment of time was mentioned by a third of respondents, with one finance manager criticising the stand-ups initially established in his area:

> They just see it as a bit of a joke…looking at these guys talking about the same stuff as they did yesterday, with nothing getting sorted…justifying their job as opposed to working proactively on, you know getting something resolved (A6).

Many interviewees also discussed the time required for agile practices to develop and that organisations should not expect instant change. An operations manager remarked that initially there was, "…lots of time spent on the ceremonies, still weren't getting the final outcomes any faster…a little bit frustrating" (B2). One social marketing lead noted it "…takes a little while to understand the framework …you have no idea how you're going to apply that every day, then you reflect a year later you realize you are doing all of these things (C2).

Discipline was also regularly discussed with one respondent remarking that you need "…to be incredibly disciplined in the ceremonies and if you don't, things fall over quickly" (C2), while an experienced scrum master stated "It's easy for things to get lost and misinterpreted, so that discipline of writing really good user stories has helped" (D4).

There were also several comments regarding the effort required to maintain agile maturity across a team following the arrival of new, less experienced members:

> Agile is so new to so many people when you do get those incoming team members it can be quite hard, it almost feels like you are starting from scratch, build so much momentum you run as a team, feels like second nature, then you need to slow down again which can be hard when you're working at pace (C2).

'Insufficient training and poor communication' collectively recorded ten mentions with discussions often highlighting confusion if these are executed poorly. One senior sales manager said, "I don't feel like there was a comprehensive communication or education programme for them … and if they did it was probably was confused because everyone was confused" (B1). Comments also related to poor agile role definition or low understanding of new roles, for example, "We didn't have a Product Ownership practice so that was a problem, so we had no-one advocating for a strong product owner capability" (E1).

Four interviewees also discussed that agile language can be confusing with a sales operations manager recounting that there was, "…no easy literature, it all just seems like catch words and phrases…I guess there is just no easy peasy paint by numbers" (G2).

See Table 16 following for the raw data and sub-themes within this group of challenges:

Level 1			Level 2 Descriptive Themes	
Raw Code	Challenges (and # of mentions)	#[1]	Sub-Themes	%[2]
RQ02.62	The time it takes, time consuming, ceremonies take time, need to be disciplined	7	Investment and discipline required to build and maintain capability	7.06%
RQ02.61	Maturity of teams can go up and down quickly, need to rebuild often	2		
RQ02.60	Decisions by consensus, repeating the same stuff	2		
RQ02.59	Managing individual performance, people management	1		
RQ02.66	Insufficient training or communications, product owners not understanding the role	8	Insufficient training and poor communications	5.88%
RQ02.65	Not delivering the MVP, agile becoming a dirty word	2		
RQ02.71	Don't understand the language, language is confusing	4	Don't understand the language, is confusing	2.35%
RQ02.75	Higher expectations to deliver more for less, faster, smaller budgets	2	Expectations to deliver more for less	1.18%
	INVESTMENT AND TRAINING (L3) TOTAL	**28**		**16.47%**

Table 16: Agile Challenge (L3) 'Investment and Training': Raw Data and (L2) Sub-Themes.

Notes: [1.] Number of times this challenge was mentioned by respondents. [2.] Number of mentions mapping to this sub-theme, expressed as a % of all mentions.

Company Mindset, Culture and Clarity of Goals (12.35%)

Challenges in this final group were mentioned 21 times, the most significant sub-theme being that 'Agility is not part of the mindset or culture' which was raised by 50% of interviewees.

One agile coach did not believe an agile culture existed in his current organisation and reflected that, "…the answer is no, when I was talking about direction setting and culture expectations it makes me think, no they're not really committed to this way yet" (A1). This made his role untenable and he soon after exited that company.

It was commonly discussed that an agile mindset or culture was much more important than having, "…to do your ceremonies this way or this is a process you have to follow" (B2). A tribe lead recounted a previous employee that were, "…playing at being agile, but when it came to the culture shift of actually getting stuff out the door really quickly…. that was less a key mindset" (D3). The same manager went on to note:

> That's a really key thing across my career…making sure that when you do this, you do it for the right reasons, not just because you want to follow the latest fad…have to go into it with the right mindset (D3).

Challenges linked to 'Too many priorities or conflicting plans' were mentioned eight times with several respondents simply struggling to find sufficient time to complete agile squad work alongside 'business as usual' commitments. An operations manager felt, "The balancing of resources has become a lot harder…we can't really say no to business projects, because they've become business priorities generally" (B2). Another operations manager was finding it increasingly difficult to, "…find a smart way to be able to deliver this massive BAU load…yet ringfence off time to do these mini-projects" (G2).

This final group of challenges are summarised in Table 17 below:

Level 1				Level 2 Descriptive Themes	
Raw Code	Challenges (and # of mentions)	#[1]		Sub-Themes	%[2]
RQ02.67	Needing to change mindset, Agile not part of the culture or mindset	10		Agile is not part of the mindset or culture	5.88%
RQ02.69	Too busy, bogged down with BAU, balance of agile and BAU work	5		Too many priorities or conflicting plans	4.71%
RQ02.68	Having too many priorities, too much activity happening at the same time, output capacity is constrained	3			
RQ02.73	Don't lose sight of the overall marketing strategy, what the chapter is trying to achieve	2		Losing linkage to overall company strategy and goals	1.18%
RQ02.76	No compelling reason to change, we're doing OK, stay the way we are	1		No compelling reason to change	0.59%
	COMPANY MINDSET, CULTURE AND CLARITY OF GOALS (L3) TOTAL	21			12.35%

Table 17: Agile Challenge (L3) 'Company Mindset, Culture and Clarity of Goals': Raw Data and (L2) Sub-Themes.

Notes: [1] Number of times this challenge was mentioned by respondents. [2] Number of mentions mapping to this sub-theme, expressed as a % of all mentions.

4.2.4 Agile Critical Success Factors for Business Teams

Interviewing then progressed onto critical success factors (CSFs) and 166 mentions were recorded. Raw data mapping to Level 2 and Level 3 themes[3] resulted in six major groups being identified. These are depicted in Figure 8 below:

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[3] As per the Challenges, L2 and L3 Success Factor themes were developed by this study.
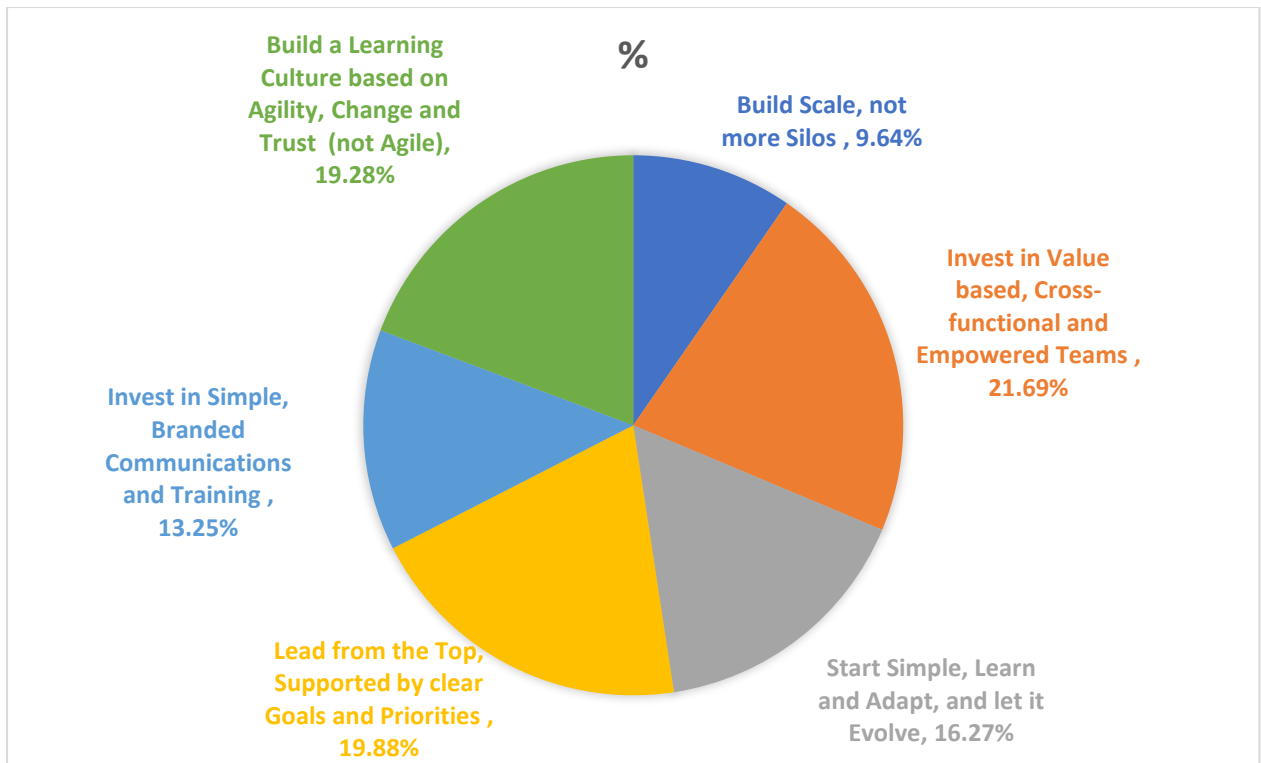
Figure 8: Agile Critical Success Factors (Level 3 Analytical Themes).

Invest in Value based, Cross-functional and Empowered Teams (21.69%)

The highest percentage of success factors related to organisations investing to build truly cross-functional teams, empowered and accountable to deliver value to customers. The two predominant sub-themes were 'Build empowered teams with clear roles and full accountability' and 'Build cross-functional teams, including agile advocates', with over 16% of all mentions mapped to these.

The majority of respondents believed that agile squads, containing a range of skills, entrusted to make key decisions, and able to deliver autonomously, would be successful. One tribe lead noted, "That's the best type of team, don't have to rely on one person to do a job…"(D3) and a marketing manager summed this up well in stating, "I am constantly seeing the way of agile, it's definitely the team, the team is the biggest thing, we all buy in and believe…" (C2).

A quarter of interviewees highlighted the importance of organising teams around customer value, and this learning is reflected in the third sub-theme, 'Understand value and build squads that can deliver it'. A transformation programme manager discussed the impact of this understanding:

> How we organise ourselves differently to deliver to customer outcomes and values, as opposed to our current traditional structures, so in the beginning of the next wave…could mean quite significant change across our entire business (B1).

And a similar view was expressed by a senior agile executive:

We looked to bring together all the end to end capabilities required, business operations as well as technical IT ops, digital development – to be able to operate and support the key capability that values streams required (H1).

Raw data and SF sub-themes relating to investment in people, are presented in Table 18:

Level 1			Level 2 Descriptive Themes	
Raw Code	Success Factors (and # of mentions)	#[1]	Sub-Themes	%[2]
RQ02.88	Giving people means to be successful, can achieve, ensuring teams are truly empowered to deliver	7	Build empowered teams with clear roles and full accountability	9.04%
RQ02.96	Give people accountability, ability to make decisions, divest control, empower people	4		
RQ02.97	Building longer lived teams, keep teams together	2		
RQ02.98	Being clear what is expected of each other, having clear role	2		
RQ02.79	Building cross functional teams	8	Build cross-functional teams, including agile advocates	7.23%
RQ02.100	Having experienced agile people in the squad, advocate who support the approach, getting buy in across the team	4		
RQ02.99	Organising teams around customer value, value streams, value chains, customer proposition	5	Understand value and build squads that can deliver it	5.42%
RQ02.101	Demonstrating value, showing the value, doing it not just talking	4		
	INVEST IN VALUE BASED CROSS FUNCTIONAL AND EMPOWERED TEAMS (L3) TOTAL	36		21.69%

Table 18: Agile Success Factors (L3) 'Invest in Value Based Cross Functional and Empowered Teams': Raw Data and (L2) Sub-Themes.

Notes: [1.] Number of times this success factor was mentioned by respondents. [2.] Number of mentions mapping to this sub-theme, expressed as a % of all mentions.

Lead from the Top Supported by Clear Goals and Priorities (19.88%)

Two thirds (70%) of respondents discussed the criticality of 'Top down leadership', and this was the second highest ranking individual success factor. There were many strong statements regarding leadership and a selection of these are presented in the following table:

Leadership as a Critical Success Factor for Agile Transformation	Source
"…we're talking about leadership, meant to be as flat as possible, but you need leaders, leaders need to be singing your song, praising and supporting whatever you are talking about."	C1
"… it has really helped having strong leadership throughout who really believe in it, and that has really helped because they have stayed the course."	D2
"…who is our exec, yeah I think without him it could have easily fallen over, an experiment that went no-where, however he was 100% behind it and driving it…"	D4
"… so, we now have 8 ELT members who are leading this piece of work which is pretty cool…"	E1
"…if you get the Exec and clear leadership for change and then you have bottom up support for people wanting that change…you create a pincer movement with strong leadership from above and bottom up support for change, you squeeze out that middle layer which makes them very uncomfortable…"	H1

Table 19: Leadership as a Critical Success Factor.

'Clear view of overall goals and priorities' was another important sub-theme here with 40% of respondents discussing the critical role that executives must continue to play in setting overall company strategies, objectives and KPIs in an agile transformation. One executive remarked, "You need a clear call to action and a clear destination and heading from senior leadership, and it needs to be consistent" (H1). Another senior executive noted that agile couldn't become, "…an excuse for anything just happening, you still need to have those top level KPIs agreed" and further, "…certainly got a pretty good understanding now that we are better off focusing on less things and doing them well" (G1).

While 'An urgency to change' was only mentioned by a few respondents, the interviews established that agile transformations were typically forging ahead on the understanding that 'not to change' wasn't an option. A senior transformation executive described the realisation that, "…it was really apparent that if we continued doing what we were doing, we'd continue to have ambers and reds across the board…" (B3).

Success factors relating to leadership are presented in Table 20:

Level 1			Level 2 Descriptive Themes	
Raw Code	**Success Factors** (and # of mentions)	**#[4]**	**Sub-Themes**	**%[5]**
RQ02.86	Need someone leading vision, broader plan, clear priorities from exec, don't lose sight of the bigger strategy and objectives, still have KPIs in place, overarching purpose or mission	8	Clear view of overall goals and priorities	9.64%
RQ02.87	Short term tangible objectives, being ruthless about priorities, focus on less things and do them well	4		
RQ02.104	Breaking goals down into manageable chunks, being clear what our velocity or capacity is	4		
RQ02.81	Drive from the top, lead from the top, continued exec support	14	Top down leadership	8.43%
RQ02.105	Motivated by needing to achieve a strategic outcome, realised that wouldn't reach targets, urgency to change	3	An urgency to change	1.81%
	LEAD FROM THE TOP SUPPORTED BY CLEAR GOALS AND PRIORITIES (L3) TOTAL	**33**		**19.88%**

Table 20: Agile Success Factors (L3) 'Lead from the Top supported by clear Goals and Priorities': Raw Data and (L2) Sub-Themes.

Notes: [1.] Number of times this success factor was mentioned by respondents. [2.] Number of mentions mapping to this sub-theme, expressed as a % of all mentions.

Build a Learning Culture based on Agility, Change and Trust (not Agile) (19.28%)

This group, based around culture and mindset change, included several of the most commonly mentioned individual success factors. Nine interviewees discussed the importance that, "…it's ok to experiment, the ability to take risks…if you fail you fail quickly and you fail on a very small level" (D3), and most identified the need for, "A shift in our collective mindset…learning to fail fast…learning and moving on" (B1). One marketing manager noted that at a recent company-wide conference, the CEO told them, "I don't want to just hear your success stories, tell me how you failed, and I'll reward you" (D2).

The need to build 'An agile culture and mindset aligned with company values' was mentioned by eight respondents, basically the closer this alignment the greater the chances of success:

> I think [agile] is really aligned to our culture …3 or 4 years ago when we took it to the executive team, I remember the CEO saying I don't really understand what this agile thing is, however the principles you've described are like our values, so go for it (B3).

Similarly, a scrum master noted that, "You could do the practices without the culture…I don't think you would have been as successful" (D1). This organisation was running an agility cultural transformation in parallel to introducing agile practices and there were several discussions around

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[4] Number of times this success factor was mentioned by interviewees
[5] Number of mentions mapping to this sub-theme, expressed as a % of all mentions

the need to 'Promote and seek agility with a small a'; that is, distinguishing between *being agile* as opposed to merely *doing agile.*

A programme manager in another organisation recounted a company-wide exercise to identify, "…all the things that help us with our own agility and being agile". A large list was identified and they, "…did not recognise some of the practices they were starting to adapt, were actually agile practices" (B1). Another manager in the same organisation noted that, "We've been quite careful internally to talk about agility rather than agile…it's not a framework or methodology, it's how we want to be as an organisation (B3).

An operations manager summed up this success factor well by discussing the importance of:

> Understanding the difference between agile as a methodology and agility…leadership…
> understanding value…brave conversations …are far more important than having a scrum
> team or Kanban board (B2).

Twenty five percent of interviewees also discussed the need to 'Build a culture based around trust', and additionally there were some strong opinions that organisations must provide a working environment aligned to the way young millennials think and act. "The young ones and the newbies tend to be a lot more open minded, let's try it, whatever works, let's try it" (C1). A senior executive warned that if organisations didn't provide new agile ways of working, then younger people, "…have little compunction in just abandoning and walking out." (H1).

Success factors based on culture are presented in Table 21:

Level 1			Level 2 Descriptive Themes	
Raw Code	Success Factors (and # of mentions)	#[1]	Sub-Themes	%[2]
RQ02.89	It's OK to trial and error, can fail fast, can learn, move on	9	It's OK to fail fast, learn from it	5.42%
RQ02.94	Supported by culture and mindset shift, already aligned to company values	8	An agile culture and mindset aligned with company values	4.82%
RQ02.95	Running agility programme at same time, be clear what agility means, don't focus on the method, agility with small a capital A	7	Promote and seek agility with a small a	4.22%
RQ02.108	Building trust with each other, an environment that supports trust	5	Build a culture based around trust	3.01%
RQ02.109	Driven by younger generation, younger people think this way already	3	Listen to your future stars. It's what they want	1.81%
	BUILD A LEARNING CULTURE BASED ON AGILITY, CHANGE AND TRUST (L3) TOTAL	**32**		**19.28%**

Table 21: Agile Success Factors (L3) 'Build a Learning Culture based on Agility, Change and Trust': Raw Data and (L2) Sub-Themes.

Notes: [1.] Number of times this success factor was mentioned by respondents. [2.] Number of mentions mapping to this sub-theme, expressed as a % of all mentions.

Start Simple, Learn and Adapt, let it Evolve (16.27%)

This group included the single most mentioned success factor - that agile should be allowed to evolve flexibly and should be tailored to fit the organisation (80% of respondents). A finance manager, initially rather sceptical, responded well to the fact that his agile coach, "…gave us a bit of space to do things how we thought things should work…rather than trying to push them down our throats" (A6), and a senior agile executive summarised this approach well in saying:

> Biggest learning has been really being pragmatic, listen to where people are, start from where people are, and pace the change so that different parts of the organisation are all starting in different places, their end position will probably be different and the pace that they can move will probably be different, and it may be more complicated and it seems to take longer, but time and again I've seen if I take the time to allow that to play out, then the change sticks and its more successful (H1).

In a similar manner a third of interviewees also felt it was important not to push change too quickly, "If you push change too quickly it really affects people motivation…it's taken three years and we've done it step by step" (D1), while an operations manager discussed the benefits if, "…you could break it down, adopt this one principle first, now you are ready for principle 2" (G2).

One respondent discussed the success they were having by, "…going out and talking to other people rather than just working in your own organisation…how does agile work for you…can we share some of successes and failures?" (B1). And a senior scrum master felt agile needed a holistic approach with

her organisation incorporating Lean Six Sigma and Human Centred Design principles, "…they believe in order to have the agility and competitive advantage, then we need to draw on lots of different practices" (E1).

Level 1			Level 2 Descriptive Themes	
Raw Code	Success Factors (and # of mentions)	#[1]	Sub-Themes	%[2]
RQ02.90	Let things evolve, flexible approach, don't prescribe the approach, tailor the approach to fit the organisation	16	Let the process evolve tailored to the organisation	13.86%
RQ02.91	Don't try to change too quickly, don't push change too fast	6		
RQ02.107	Having an agile lite, lite methodology for teams	1		
RQ02.103	Give people time to step back, look more broadly, see opportunities for change	2	Take a holistic and learning based approach	2.41%
RQ02.80	Having a more holistic approach to being agile, using different practises	1		
RQ02.106	Go and talk to other organisations, share ideas, learnings	1		
	START SIMPLE, LEARN AND ADAPT, AND LET IT EVOLVE (L3) TOTAL	27		16.27%

Table 22: Agile Success Factors (L3) 'Start Simple, Learn and Adapt, and let it Evolve': Raw Data and (L2) Sub-Themes.

Notes: [1.] Number of times this success factor was mentioned by respondents. [2.] Number of mentions mapping to this sub-theme, expressed as a % of all mentions.

Invest in Simple, Branded Communications and Training (13.25%)

The need for ongoing investment in training and coaching, while perhaps an obvious success factor, was emphasised by several people including one content lead who remarked that, "…the penny dropped that day in training, I felt really equipped to alter my way of working" (C2). While some organisations were investing and appreciating the, "…need to establish space in your organisation to keep feeding and growing it" (B3), other participants noted that, "…having stuff hidden on [the intranet] is not necessarily empowering people to knowing what they are doing" (G2).

Describing agile roles, values and way of working in a language that made sense to people was also deemed more important than using strict agile terminology. A common view was that, "Provided they see the value out of it, who cares what it's called" (B1), while a scrum master noted that for his team, "It's just the way they work, they don't think of it as agile"(D1).

Level 1			Level 2 Descriptive Themes	
Raw Code	Success Factors (and # of mentions)	#[1]	Sub-Themes	%[2]
RQ02.82	Provide formal education and training, investing in capability, invest in PO role	8	Provide formal education, training and coaching	7.23%
RQ02.84	Coaching, 1-1 coaching or mentoring, good tribe leads	4		
RQ02.83	Use different language, put your own company language or branding on it	7	Use your own branding	4.22%
RQ02.85	Consistent and clear messaging from all layers, all teams involved	3	Consistent and clear communications	1.81%
	INVEST IN SIMPLE, BRANDED COMMUNICATIONS AND TRAINING (L3) TOTAL	22		13.25%

Table 23: Agile Success Factors (L3) 'Invest in Simple Branded Communications and Training': Raw Data and (L2) Sub-Themes.

Notes: [1] Number of times this success factor was mentioned by respondents. [2] Number of mentions mapping to this sub-theme, expressed as a % of all mentions.

Build Scale, not more Silos (9.64%)

Although 'Building scale' is the sixth ranked L3 group of success factors, individually almost half of the respondents discussed this as being critical. Many described growing momentum and increased effectiveness as agile is practiced across more and more teams, for example, "We have 25 teams, probably getting on for a quarter of the organisation, just that groundswell, enough people to build momentum…" (D1). Several people also described the way agile practices began to spread, once a core capability was established:

> As we've got our agile machine or engine running effectively, the boundaries which we interface with other teams around the organization has become the point at which we do most of our work, we are finding more and more of those teams are starting to pick up agile practices, even now we are starting to support teams, for example our corporate relations team who are probably least close to where agile came out of, have started running Kanban (D1).

Reaching this scaling or 'tipping' point seems to be critical, the stage at which agile is supported across the organisation, slowly but steadily building within most teams. A senior executive noted that it, "Became obvious to me that the best chance of success was when you had a business appetite or demand for it…. business, support and technical teams that had an appetite as well, that combination really, really helped" (H1).

Further to this line of discussion 20% of interviewees also felt that as more teams became agile, it was important that they 'Work to the same cadence'. This generally involved all teams adopting the

same sprint cycles as this, "…makes the business easy to understand, when one team says Sprint 4, it means the same thing, it's this day" (D1). One senior executive noted that, "The exec team are using it, the dev teams, the digital leadership teams are using it, so keeping that alignment…" (G1).

Success factors based around scale are summarised in Table 24:

Level 1				Level 2 Descriptive Themes	
Raw Code	Success Factors (and # of mentions)	#[1]		Sub-Themes	%[2]
RQ02.78	Using Scaled agile framework to roll back into projects or non-technical teams, have a broader framework	5		Build to scale across as many teams as possible	7.23%
RQ02.92	Getting to scale, building more agile teams, increasing the momentum, alignment between business and technical teams	5			
RQ02.102	Access to people, being able to connect, being engaged	2			
RQ02.93	Have same cadence across teams, have the same sprint cycle across multiple teams	4		Work to the same cadence	2.41%
	BUILD SCALE, NOT MORE SILOS (L3) TOTAL	**16**			**9.64%**

Table 24: Agile Success Factors (L3) 'Build Scale, not more Silos': Raw Data and (L2) Sub-Themes.

Notes: [1.] Number of times this success factor was mentioned by respondents. [2.] Number of mentions mapping to this sub-theme, expressed as a % of all mentions.

4.3 Research Question 03

RQ03: What perceived benefits of adopting Agile work practices are commonly reported by non-technical teams?

The final phase of questioning related to the benefits and outcomes that had been achieved from implementing agile across business teams, and the extent to which these benefits had been measured.

4.3.1 Agile Benefits

There were 150 instances of benefit mentions, and raw data mapping to Level 2 and Level 3 themes[6] resulted in five major groups being identified. These are represented in Figure 9 following:
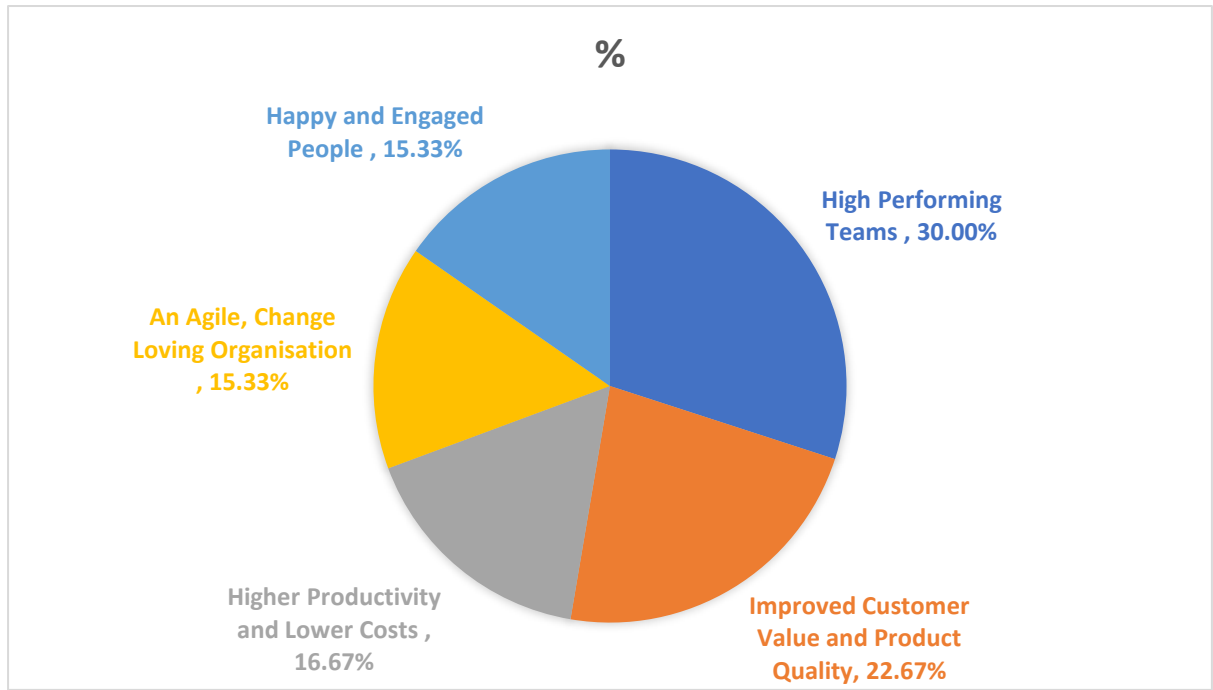
Figure 9: Agile Benefits (L3 Analytical Themes).

High Performing Teams (30%)

This was the largest L3 benefit group overall and within this, 12% of all benefits mentioned mapped to the L2 sub-theme of 'Improved collaboration, communication and trust'. One social marketing manager felt that her squad had, "…really strong sense of team, I can lean on them…they feel free to lean on me as well…" (C2).

A large number of benefits also mapped to an 'Improved focus on priorities and goals', with one marketing manager noting an improved, "…focus on our customers and what they after, our churn is lot better, our EBITA is many times better…" (D2). Linked to this benefit agile was providing many, "…with the power to say no to thing…this is the priority…if your request if more important then you need to have a discussion with your product owner" (C2).

And several respondents (10) commented on 'Improved alignment and understanding across teams', particularly as agile was scaled across multiple squads and tribes:

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[6] As per the Challenges and Success Factors, L2 and L3 Benefit themes were developed by this study.

I think it helped in breaking down the silos within the organisation as well, and so as the customer tribe was set up…the rest of the organisation was looking at this part of the business that was doing stuff differently, lots of the different business units were saying I want to do that, or how do I get involved in that (E1).

The summarised results are presented in Table 25:

Level 1			Level 2 Descriptive Themes	
Raw Code	Benefits (and # of mentions)	#[1]	Sub-Themes	%[2]
RQ03.01	People more open, sharing ideas, better feedback, improved communications	7	Improved collaboration, communication and trust	12.00%
RQ03.22	Improved communications about what is going on	6		
RQ03.03	Being able to depend on each other, building better trust	3		
RQ03.11	Business is a lot less political	2		
RQ03.13	Focusing or moving on priorities faster, focused shorter-term goals, improved focus on goals	9	Improved focus on priorities and goals	8.00%
RQ03.09	Achieving strategic outcomes	3		
RQ03.07	Breaking down silos, being more collaborative across teams	6	Improved alignment and understanding across teams	6.67%
RQ03.23	Improved alignment across teams	2		
RQ03.05	Broaden understanding across the business, more knowledge across other areas of the business	2		
RQ03.12	Solving problems faster, problem solving tool, removing impediments quickly	4	Solving problems and making decisions together	3.33%
RQ03.10	Consensus decisions, able to move on, less reiteration or changing previous decisions	1		
	HIGH PERFORMING TEAMS (L3) TOTAL	45		30%

Table 25: Benefits (L3) 'High Performing Teams': Raw Data and (L2) Sub-Themes.

Notes: [1.] Number of times this benefit was mentioned by respondents. [2.] Number of mentions mapping to this sub-theme, expressed as a % of all mentions.

Improved Customer Value and Product Quality (22.67%)

The second ranked benefit group combines L2 sub-themes of 'Delivering more value to the customer' and 'A better-quality product'. The delivery of customer value was the single largest sub-theme (15.33%) with many respondents stressing that, "…it's not about the volume, it's about producing something that is relevant" (C1). A tribe lead similarly noted that agile was enabling them to become, "…faster at delivering the right thing, more outcome based…trying to get products that are really successful" (D1). Improved product quality was individually mentioned by 40% of respondents with several noting this was the result of better sharing and collaboration across cross-

functional teams. One scrum master noted this started with people. "…writing stories with multiple hats on…thinking about another squad who needs to understand this work" (D4), while a business analyst summed this up well in saying:

> So, I think effectiveness is having a whole lot of people from different parts, with different backgrounds, technical people, businesspeople, leaders, everyone working together to build a single solution, that's where you get the quality, the openness and the good discussions going (A3).

Level 1			Level 2 Descriptive Themes	
Raw Code	Benefits (and # of mentions)	#[1]	Sub-Themes	%[2]
RQ03.14	Being more customer focused, delivering what the customer wants, better fit with what customer wants	11	Delivering more value to the customer	15.33%
RQ03.15	Identifying and delivering value, valuable outcomes, not just doing it faster	7		
RQ03.16	Improved feedback, Net Promoter Score (NPS) from customers	4		
RQ03.18	Can demonstrate the value that's been delivered, being very transparent about what's been delivered	1		
RQ03.19	Improved quality of the final product	8	A better-quality product	7.33%
RQ03.20	Input from all team, getting different perspectives into final product	3		
	IMPROVED CUSTOMER VALUE AND PRODUCT QUALITY (L3) TOTAL	34		22.67%

Table 26: Benefits (L3) 'Improved Customer Value and Product Quality': Raw Data and (L2) Sub-Themes.

Notes: [1.] Number of times this benefit was mentioned by respondents. [2.] Number of mentions mapping to this sub-theme, expressed as a % of all mentions.

Higher Productivity and Lower Costs (16.67%)

A half of respondents (10) individually noted faster delivery was a key benefit of agile; this being driven by quicker decision making, shorter planning and delivery cycles, and cross-functional autonomous teams. A tribe lead noted that by embedding a development team alongside a marketing team, "…we found on average about one and a half times faster [delivery] than if you had separated that out" (D3). The same respondent also noted that, "…through retrospectives and sprint reviews you identify what is slowing the squads down…less about increasing productivity but more about removing impediments" (D3).

Just over a quarter of respondents (6) had a general perception that productivity had increased under agile, while a senior executive felt strongly that agile must answer these questions, "…can you deliver it with better quality, can they deliver more in the same time, or it's cheaper…and it's sustainable so we don't burn people out" (H1). A number of respondents (4) also discussed

productivity gains and cost savings by 'Closing down low value work', aligned with Lean principles. This benefit was related to the fact that, "…we are working in smaller deliverable chunks…put it in front of users and know what you are getting a win with and what you are not" (D3). This benefit group is summarised in Table 27 following:

Level 1			Level 2 Descriptive Themes	
Raw Code	Benefits (and # of mentions)	#[1]	Sub-Themes	%[2]
RQ03.17	Getting things delivered faster, quick results, not planning to the nth degree, breaking delivering down faster	10	Faster decisions and delivery	9.33%
RQ03.24	Delivering things every 2 to 4 weeks	3		
RQ03.02	Faster decision making, divested decision making	1		
RQ03.25	Improved efficiency, or productivity (perceived)	6	Higher productivity at lower cost	4.67%
RQ03.06	Delivering at lower cost	1		
RQ03.21	Can stop doing the wrong thing quicker, identify and shut work down	4	Closing down low value work	2.67%
	HIGHER PRODUCTIVITY AND LOWER COSTS (L3) TOTAL	25		16.67%

Table 27: Benefits (L3) 'Higher Productivity and Lower Costs': Raw Data and (L2) Sub-Themes.

Notes: [1.] Number of times this benefit was mentioned by respondents. [2.] Number of mentions mapping to this sub-theme, expressed as a % of all mentions.

An Agile, Change Loving Organisation (15.33%)

There were 14 benefit mentions which linked to 'A more flexible and robust workforce' and further nine mapping to 'Teams which adapt to change quickly'. See Table 29 below for details. Interviewing was conducted mainly during Level 4 lockdown, and several respondents believed that agile was key to enabling them to quickly transition to this change. COVID was an unprecedented and unexpected scenario so these results are examined further in Table 28 following:

Agile Benefits – Agility during COVID Lockdown	Source
Agile helped with this whole COVID thing, we are used to working in small self-directed teams and I actually think it has helped.	D2
I think the COVID world has been an incredible way for us to understand what the benefits of being agile have been able to enable us to do…we were able to make some really quick changes…we could do that in a couple of days and typically that would have taken weeks…	E1
What has been really good during this phase, when we all suddenly left the office…set up with digital Kanban boards and sprint boards…people have really enjoyed the structure of the 2 week sprints…you're working at home but you know where you are with the sprint and that has really helped people during this time.	G1
…it's proven that people working out of sight can be trusted…people can be productive, these agile ways of working like daily stand ups, what are we committing to over next two weeks…you get an increased cadence of planning and review and daily check in, makes hand free and remote stuff work so much better, it's going to accelerate.	H1

Table 28: Agile Benefits - Agility during COVID Lockdown.

Responding to change faster was one of the most commonly mentioned individual benefits with 45% (9) of interviewees raising this. A transformation manager discussed this in the context of a sales team, "…if something changes in the quarter then no-one is too wedded…so part of the value is creating a much more adaptive sales leadership group" (B1), while a digital executive discussed her team's ability to change, "…even with reduced teams…we were able to respond quickly and reforecast delivery timelines (G1).

Level 1			Level 2 Descriptive Themes	
Raw Code	Benefits (and # of mentions)	#[1]	Sub-Themes	%[2]
RQ03.08	Agile has built more resilient and robust teams, able to continue working through lockdown	6	A more flexible and robust workforce	9.33%
RQ03.04	Being able to move people around, broader roles, new development or professional development opportunities, becoming flexible in roles	5		
RQ03.26	Able to estimate and plan capacity much more effectively, helping each other out, sharing workloads, resource planning	3		
RQ03.27	Responding to change faster, move or change faster, being more adaptive as things change, not locked into things	9	Teams which adapt to change quickly	6.00%
	AN AGILE, CHANGE LOVING ORGANISATION (L3) TOTAL	23		15.33%

Table 29: Benefits (L3) 'An Agile, Change Loving Organisation': Raw Data and (L2) Sub-Themes.

Notes: [1.] Number of times this benefit was mentioned by respondents. [2.] Number of mentions mapping to this sub-theme, expressed as a % of all mentions.

Happy and Engaged People (15.33%)

Finally, there were 23 individual mentions relating to improved morale and engagement as a result of agile values and practices, see Table 30. This was often the result of people feeling they were part of a focused and autonomous team that was trusted, accountable and free to try new things. Engagement was deemed important because, "…by having a highly engaged team you also have a

highly productive and successful team" (B3). A senior executive summed up well the wider benefits of happy people:

> If you have people that share the mission, having fun doing what they are doing, that feel rewarded enough – don't have to pay stupid money – they feel rewarded, they feel pleasure in what they are doing, and they share the mission and purpose of what they are doing – then they're going to contribute ideas, that's going to make the product and service get better and better (H1).

Level 1			Level 2 Descriptive Themes	
Raw Code	Benefits (and # of mentions)	#[1]	Sub-Themes	%[2]
RQ03.28	Improved morale/engagement - being part of a team, being actively involved, listened to	5	Being part of a successful team	6.67%
RQ03.32	Improved morale/engagement - seeing the benefits and outcomes, delivering results, celebrating success, getting good feedback from customers	5		
RQ03.31	Improved morale/engagement - greater sense of ownership, control / empowerment	5	Being part of an autonomous and empowered team	6.00%
RQ03.29	Improved morale/engagement - part of autonomous team that can deliver, can be successful	4		
RQ03.30	Improved morale/engagement - less stressed because don't have to be perfect from the start, can try things out	3	Being part of a team that can try new things	2.67%
RQ03.33	Improved morale/engagement - by taking the bits of agile that work the best for them	1		
	HAPPY AND ENGAGED PEOPLE (L3) TOTAL	**23**		**15.33%**

Table 30: Benefits (L3) 'Happy and Engaged People': Raw Data and (L2) Sub-Themes.

Notes: [1] Number of times this benefit was mentioned by respondents. [2] Number of mentions mapping to this sub-theme, expressed as a % of all mentions.

4.3.2 Measuring Agile Benefits

Interviewing concluded with a discussion around the extent to which agile benefits had been quantified or measured, and a total of just 32 instances were recorded. Because of the small amount of raw data, instances were mapped to level 2 themes only as summarised in Table 31.

Over a half of respondents (13) noted that it was difficult to quantify benefits or they were only anecdotally measured, with a tribe lead providing a typical response, "…it's pretty hard to measure, we actually a spend a lot of time thinking about are we getting better or worse at agile, I would say we haven't come up with a quantitative way of measuring it" (D1).

A quarter discussed agile contributing to the achievement of higher-level departmental or company goals, however again respondents struggled to describe any specific evidence of this contribution,

for example, "…each area will have KPIs or SLAs…if it gets better after implementing new ways of working, then there is some evidence" (H1).

For several, the measurement of benefits related to the visibility and prioritisation of epics and user stories on the backlog of work. A tribe lead discussed the assigning of, "a strategic score based on ranking system…so hopefully we are working on the most beneficial things for our strategy" (D3), while a scrum master described an improved, "…discipline of understanding our work better, what the outcome and endpoint is for our customer" (D4).

For a few respondents benefit measurement concerned the transparency of completing user story points with one social marketing manager describing this as the, "…feeling of saying I was able to complete that full 8[7]…a real success measure…because you have numbers attached to things" (C2).

Finally, a senior agile executive warned of an unintended consequence of introducing very transparent agile metrics:

> It can actually look and feel like things are getting worse, but all that you are doing is making transparent the systemic problems that are already there, and when you start to make changes because people can see what's going on, you can measure are we making improvements? (H1).

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[7] This refers to the number of story points that would have been estimated for the specific task referred to.

Level 1			Level 2 Descriptive Themes	
Raw Code	Measurement of Benefits (and # of mentions)	#[1]	Sub-Themes	%[2]
RQ03.37	Difficult to quantify benefits, haven't measured benefits directly	11	Haven't measured benefits directly, or anecdotally only	40.63%
RQ03.40	Benefits largely measured anecdotally	2		
RQ03.42	Measurement via velocity, how many points delivered each sprint	2	Benefits measured by effectiveness of agile practices	18.75%
RQ03.45	Board of what is measured, Epics to Features to Stories and Tasks, criteria to get through stages	2		
RQ03.43	Measuring output by writing features that can be closed, can show the endpoint and outcome for customers	1		
RQ03.46	Programme level prioritisation, understand value of work on the portfolio backlog	1		
RQ03.38	Benefits measured at more programme or business level, overall strategy KPIs etc.	5	Benefits measured at higher company level	15.63%
RQ03.34	Key measurements (produce more, faster or for lower cost, improve quality, have fun)	1	General comment	12.50%
RQ03.35	Can't measure benefits via the team introducing the change	1		
RQ03.36	Should be measuring the effectiveness of coaches, so can understand they are delivering something with value	1		
RQ03.39	Performance likely to look worse to start, making systemic problems more transparent	1		
RQ03.41	Measured benefits directly from customer feedback, ratings, NPS, website stats, grew customer reach	3	Benefits measured from customer feedback	9.38%
RQ03.44	Measurement is about productive hours, chargeable hours to customer	1	Chargeable hours to customer	3.13%
	MEASUREMENT OF BENEFITS – RAW DATA AND L2 THEMES	32		100%

Table 31: Measurement of Benefits, Raw Data and L2 Themes.

Notes: [1.] Number of times this benefit measurement was mentioned by respondents. [2.] Number of mentions mapping to this sub-theme, expressed as a % of all mentions.

5. Discussion

This section discusses the key findings against each research questions and the extent to which the general hypothesis of this study is supported, this being that:

Agile values, principles and working practices can be successfully adopted by non-technical teams leading to positive business outcomes.

5.1 RQ01: Agile Pre-Perceptions, Observations and Expectations (at first exposure)

On average respondents were first exposed to agile six years ago, with one third already demonstrating agile-like values and practices at this time. These findings are consistent with many authors who believe agile ways of working have been around for many decades (Cockburn & Williams, 2003; Cohen et al., 2004; Larman & Basili, 2003; Miller, 2001), and Conforto et al. (2014) who similarly identified pre-existing agile practices within 19 Brazilian 'non-agile' organisations. These results support the study's hypothesis given that for many, some agile practices appear to be a natural and logical extension of existing values and behaviour.

The majority of respondents discussed the need to move away from traditional ways of working, towards 'something new'. The literature similarly discussed this need due to failings with traditional software development (Boehm, 2002), project management (Cockburn, 2000), and management strategies such as TQM (Mohammad, 2014), Lean (Andersson et al., 2006), and Six Sigma (Antony & Seow, 2004). This study, two decades on, reinforces the constant and increasingly urgent need for change and for some organisations agile is emerging 'bottom up' in response to this need across technical *and* business teams. Additionally, as agile practices become the norm in technology teams, most non-technical workers have been exposed to agile somewhere in their career. All interviewees bought agile principles into their current employer based on some previous experience, so it seems inevitable that new ways of working will develop whether or not this is a deliberate management strategy.

When first exposed to agile most interviewees also reported excitement and willingness to adopt new practices, and low levels of resistance or cynicism. These learnings are important and are somewhat contradictory to studies which commonly identified resistance to change as an agile impediment (Conboy & Carroll, 2019; Dikert et al., 2016; Kalenda et al., 2018). This willingness to adopt agile by a cross-section of non-technical people certainly supports this study's hypothesis, and further, is there a suggestion here that resistance to change is declining within NZ organisations? This question is identified as a future area of study, see later for further discussion regarding this.

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The majority of respondent's early agile observations mapped to the 'Value of People' and this is consistent with the literature which highlighted that agile is fundamentally based around people interactions, collaboration, and open communication (Boehm, 2002; Cockburn & Highsmith, 2001; Cockburn & Williams, 2003; Miller, 2001; Nerur et al., 2005). Many of these observations concerned simple behaviour changes such as shorter and more regular planning cycles, daily stand ups, and retrospectives to review team performance. These results also support this study's hypothesis given these are basic business changes that do not require extensive organisational restructuring or specialised training.

In terms of benefits initially observed, increased speed of software delivery was most commonly mentioned, however beyond that, they consistently highlighted improved accountability, motivation and overall performance across individuals and teams alike. Several respondents specifically mentioned improved transparency between business and technology teams, another important finding which further highlights agile's potential to speak a 'common language' and to close the gap between technical and non-technical teams.

The final discussion from this phase of questioning considers respondent's relatively poor appreciation of agile's role in managing change (Cohen et al., 2004; Nerur et al., 2005), or the central function played by the customer (Abrahamsson et al., 2002). Remembering that interviewees were recalling their very first experiences, typically led by technology, this result perhaps reflects their inexperience with agile principles and methods early on. Responses focused on more obvious observations, the faster delivery of software and seeing predominantly technical teams working better together. These findings highlight that while agile could be considered easy to implement from a business perspective, considerable investment is required to achieve deeper levels of understanding and effective execution, a point highlighted by several authors (Abrahamsson & Marchenko, 2008; Hajjdiab & Al Shaima, 2011; Kapitsaki & Christou, 2012).

5.2 RQ02: Common Agile Challenges and Critical Success Factors

During this phase of interviewing recall that respondents focused on their most recent agile experiences with a specific focus on business teams in a non-technical context.

Respondents generally demonstrated a broader and growing understanding of the core agile values during these discussions. The 'Value of Working Software' was referred to less, evidence they were thinking more about agile in a business - not technology - context. The 'Value of People' dominated again, further verification that agile can enable effective people action and interaction, regardless of specific background, training or professional skills. It was also interesting that the 'Value of the Customer' was increasingly recognised as interviewees gained agile experience. Understanding the

customer is unquestionably core to the *entire* organisation, and agile seems to propel this understanding by uniquely positioning the customer at the core of tribes and squads. This simple yet effective approach provides further support for the adoption of agile by business teams.

Related to this line of thinking were the concepts of customer 'value-chains' or 'value-streams' which surfaced regularly and interchangeably during this interviewing. The impression was that organisations have high intent to build structure around these ideas, but many were struggling to operationalise or leverage them within an agile framework. Establishing a best practice model in this domain may be useful to drive understanding and more effective execution. G. Brown (2009) summarises Michael Porter's original value-chain concept as, "the disaggregating of a firm into its strategically relevant activities" (p. 4) for the purposes of understanding cost and competitive advantage, as opposed to value-streams which operate at a lower level by defining, "…an end-to-end set of activities that is collectively valuable to a customer" (p. 6). Although both concepts are relevant in an agile context, because optimal team size is generally agreed as seven people, plus or minus two (Dingsøyr et al., 2014), structuring small agile squads around lower level value-streams seems most appropriate. Truly understanding customer value-streams, and then building autonomous agile squads to deliver very specific and well-defined outcomes, emerges as a key opportunity for organisations. This also represents another path for further research along with the publishing of guidelines for practitioners and organisations alike.

Regarding agile practices all interviewees demonstrated good understanding of techniques and ceremonies with Scrum being the dominant methodology, this being consistent with findings from the literature review (Cardozo et al., 2010; Hossain et al., 2009; Kaleshovska et al., 2015; Matharu et al., 2015; Vallon et al., 2018). Even the most inexperienced people appeared to grasp and apply Scrum practices easily, often supported by training and agile coaching. These learnings support the literature which highlighted that Scrum is less a software development methodology, but is more simply focused around how teams should work, particularly in unpredictable and changing environments (Abrahamsson et al., 2002).

Moving onto the most recent challenges identified in a business context. The most common individual challenges are ranked below, along with the L3 group to which they were mapped to. This approach is taken so that the *most* critical challenges are clearly identified from within the L3 groups previously defined. These challenges are discussed with reference to the systematic literature review conducted by Gustavsson (2016)[8] and other earlier agile studies.

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[8] Gustavsson provides the most comprehensive consolidated study into agile in non-technical teams, however limitations with this comparison are also noted given the different structure and size of the data sets. Gustavsson identified 19 occurrences of challenges across 21 non-technical case studies, whereas this study identified 170 instances across 20 individual respondents.

Rank	Top Reported Challenges (# of occurrences) - Gustavsson	Rank	Top Reported L1 Challenges (# of occurrences) – Blewden	L3 Group & (Ranking)
1	Changing mindset to allow flexibility (3)	1	Decisions still made at the top (12)	Mgm Support (1)
2	Lack of process visibility (3)	2	Teams not truly cross-functional (12)	Org Structure (3)
3	Buy-in from managers (2)	3	Not part of the culture or mindset (10)	Culture (5)
4	Difficult to see benefits early in project (2)	4	Breaking down old habits (9)	New Working (2)
5	Inadequate knowledge sharing (2)	5	Not divesting power down enough (8)	Mgm Support (1)
6	Individual work, lack of communication (2)	6	Fear of losing control or seniority (8)	Mgm Support (1)
7	Long-term planning (2)	7	Insufficient training, communication (8)	Investment (4)
8	Lack of stakeholder engagement (1)	8	Resistance to change (8)	New Working (2)
9	Scope creep (1)	9	Process is time consuming (7)	Investment (4)
10	Insufficient resource allocation (1)	10	Difficult when only some teams using (7)	Org Structure (3)

Table 32: Top Reported Individual Agile Challenges, Non-Technical Teams.

This study determined that lack of senior management support is the greatest challenge to an effective agile business transformation; this challenge was also ranked third by Gustavsson. This study identified a cluster of contributing challenges including executives retaining top down decision making, the reluctance to divest power to lower level teams, and the fear of losing control or seniority. These results are consistent with several Scrum studies which identified the challenges of moving from command-and control type hierarchies, to self-managing teams where decision making is decentralised (Abrahamsson & Marchenko, 2008; Hajjdiab & Al Shaima, 2011; Moe et al., 2010; Nerur et al., 2005). For any organisation considering an agile transformation, these results reinforce that complete buy-in across the executive team is a critical pre-requisites before any such undertaking can be considered. Although not explicitly stated, it may also be inferred that a lack of trust may sit behind these findings. What changes do leaders need to make in order to hold this level of trust within their teams? As stated earlier by a senior executive, "…do they really have the level of trust inherent between key individuals and individuals in their organisation, because if they don't have trust between people then agile isn't going to do anything" (A5).

Cross-functional teams is a key characteristic of agile (Cockburn & Highsmith, 2001; Miller, 2001; Nerur et al., 2005), however the inability to sufficiently resource teams was identified as the second greatest individual challenge, this being part of the 'Organisational Structure and Resourcing' L3 group (ranked third). This challenge concerns the time and cost impacts of resourcing teams which can minimise hand-off points and enable autonomous delivery. The comparable challenge in Gustavsson's study was ranked 10th and it was not highlighted at all in any of the Scrum or early scaled Agile studies reviewed. This result suggests that as companywide transformations create more and more agile squads demanding representation from across the business, then difficult

trade-offs - between squad size, cost, time, and skills required to self-sufficiently deliver – will become ever more prevalent. Before embarking on large scale agile transformation, executives must be fully aware of these trade-offs and be committed to new roles and the reassembling of teams across their organisation. This may require considerable upfront investment to achieve the optimal organisational structure, well before tangible benefits are achieved.

Challenges around changing the organisational mindset and culture required to support agile transformation was individually ranked third by this study (fifth L3 group) and first by Gustavsson, however was not commonly identified in the earlier Scrum or scaled agile studies reviewed. This result intimates as agile becomes more widespread, then the supporting culture across the *entire* organisational becomes extremely important. This realisation was being addressed by several organisations in this study who were prioritising 'agility' cultural change programmes, alongside the more basic introduction of agile practices. These top three challenges also appear to be inextricably linked as without senior management support and the investment in new structures and resources, it seems unlikely that a cultural shift across the organisation will be achieved. This reinforces the holistic view that leaders must take in contemplating an agile transformation, there are numerous complex and intertwined challenges which must be considered.

'Breaking down old habits' was individually ranked fourth, 'Resistance to Change' was eighth, and these were combined under 'Adjusting to a new way of working' (second ranked L3 group). The Gustavsson review did not directly rank *change resistance* although this was key challenge identified in some earlier scrum (Boehm & Turner, 2005) and scaled agile studies (Conboy & Carroll, 2019; Dikert et al., 2016; Kalenda et al., 2018; VersionOne, 2016). Some resistance of new ways of working should always be anticipated, however as previously discussed, this study generally noted positive responses to agile methods, often based around a natural extension of existing behaviour and a desire to keeping learning and changing. Adjusting to change does take time however and leaders should carefully consider their level of commitment to a long-term programme which slowly modifies behaviours. This consideration leads into other highly ranked individual challenges including insufficient training and communications (seventh) and the time investment required (ninth), issues that were consistently reported in numerous earlier studies (Dikert et al., 2016; Ebert & Paasivaara, 2017; Kapitsaki & Christou, 2012; Rolland et al., 2016). Understanding the challenge of providing effective communications across increasing numbers of cross-dependent teams is particularly important, and again serve to remind leaders that insufficient investment here will likely lead to sub-optimal results. From Rolland et al. (2016) we can recall the complexities of, "transferring, translating and transforming knowledge across different actors", along with the complex socio-technical interdependencies which exist across all levels of communication (p. 22).

Leaders must also be highly aware that agile practices and ceremonies can be overly time-consuming, and resource hungry, therefore experienced coaches are required to ensure the principles of speed, lean thinking and parsimony are applied at all times. The red tape and bureaucracy which undermined TQM, Lean and Six Sigma cannot be allowed to propagate in an agile environment.

The other highly ranked challenge which requires discussion is managing increasing frustration as agile squads expand their sphere of influence, encountering teams which are operating more traditionally. Surprisingly this was not identified by Gustavsson's review, however was noted by several other studies (Boehm & Turner, 2005; Dikert et al., 2016; Ebert & Paasivaara, 2017; Kalenda et al., 2018). This is an inevitable challenge with scaled agile transformations and represents another important consideration for leaders. How broadly and quickly should agile be scaled across business teams, which teams should be prioritised ahead of others, and what is the critical scaling point such that agile practices are ensuring the business is operating at optimal efficiency? While there are no simple answers here, the key learning is that *some* agile understanding is important across all teams, even if the depth and breadth of adoption vary between teams. This study highlighted considerable frustration where peripheral teams (such as legal, risk and compliance) had little agile understanding, and less conflict where these teams had some basic understanding of agile principles and ways of working.

This discussion leads into an examination of the critical success factors for agile transformation across business teams. The top reported individual success factors mapped to L3 groups are ranked in Table 33, and discussed with reference to earlier studies. Similar to challenges, this approach has been taken to ensure the single *most* important success factors are clearly identified from this study.

Allowing agile to evolve slowly via a tailored approach was the highest ranked single success factor (within the fourth ranked L3 group). This approach was emphasised in earlier agile studies including Campanelli and Parreiras (2015, p. 87) who defined tailoring as, "the adaption of the method to the aspects, culture, objectives, environment and reality of the organisation adopting it". Many of the non-technical studies also identified a flexible, experimental approach which avoided agile jargon, to iteratively improve working practices (Niemi-Grundstrom, 2014; Pope-Ruark, 2014; J. Sutherland & Altman, 2010; Tolf et al., 2015). Recalling the OpenView venture capital firm case study, they gradually trialled and matured their Scrum techniques through three iterations, eventually doubling productive output while increasing quality and morale (J. Sutherland & Altman, 2010). They key learning here is that the *implementation* of agile programmes should be based on the very agile values and principles being introduced, for example flexibility, reflection, learning and adaption. All leaders should be highly aware of this and must resist the belief that an agile transformation

approach must be fully prescribed or defined at the onset. Further the level of agile adoption and style of execution will vary between teams and executive should allow these variations to develop naturally over time.

Leading agile transformations 'from the top' is identified as the second single most critical success factor (second L3 group), mirroring that lack of management support was identified as the greatest challenge. This result is consistent with several earlier studies (Conboy & Carroll, 2019; Dikert et al., 2016; Gustavsson, 2016; Kalenda et al., 2018), with a key consideration being whether such transformations will ever succeed without this leadership? Further, the dilemma - as noted by Hobbs and Petit (2017) – is that leaders often lack agile knowledge which is a key condition for support. This dilemma must be addressed. Perhaps there is an expectation that if left alone, agile will slowly and successfully emerge 'bottom up'? Based on the evidence from this study, this author believes this will not be the case, and while pockets of behaviour change may develop, organisations must be prepared to invest in agile education and coaching first at the executive level. A knowledgeable, motivated and committed executive, all 'singing from the same hymn sheet' is critical before any change across the organisation can truly succeed.

While leaders must lead, they must also allow teams the freedom to trial and 'fail fast', which was the third highest ranked individual success factor. While this principle has long been at the core of rapid, iterative software delivery, there is limited discourse of this in the recent scaled or non-technical agile studies. Respondents in this study discussed this newfound freedom at length and for many, it seemed to represent a critical enabler which completely shifted their attitude and motivation. The previously reported US church study did identify a positive shift from, "blaming and shaming, to naming and claiming responsibility" (A. C. Sutherland et al., 2009), and it seems a similar result has been identified in this study. Leaders should consider how they can stop the blame-game in the event of failure, and the extent to which they are prepared to let teams take risks and to quickly explore new opportunities with limited pre-examination or interrogation.

This change in thinking, indeed a complete cultural and mindset shift based around agility, has been discussed throughout this study and not surprisingly has emerged as a critical success factor (individually ranked fourth, third L3 group). Although respondents often found it difficult to describe their company's existing culture, throughout the interviewing they clearly articulated essential qualities of a truly agile company, for example freedom, risk-taking, trust, openness, empowerment, accountability and customer centricity. The all-encompassing cultural shift necessary to enable successful agile transformation is a long-term but achievable goal particularly if these traits are already inherent in an organisation's genetics. Leaders should therefore honestly examine the existing culture and understand the size of the gap between the current and intended future state.

Several organisations, having accepted the challenge of closing this gap, were running change programmes focusing on building agility per se and on *being* agile, rather than merely introducing agile methods and ceremonies. Thinking about agile with a small 'a', was a top ten critical success factor (ranked nineth).

The fifth ranked success factor highlights another critical role leaders must play as agile scales through the organisation; they must continue to articulate a clear organisational vision and strategy underpinned with specific priorities, objectives and KPIs. Without this there is a real danger that agile will *create* knowledge silos and self-contained teams working independently with a lack of overall ownership and long-term planning, a risk also highlighted by several authors (Abrahamsson & Marchenko, 2008; Dingsøyr & Moe, 2014; Korhonen, 2012). The dichotomy here is that leaders must at the same time be prepared to let go and to divest decision making and power down through their teams (ranked eight), and we know from examining challenges that many managers find this process difficult.

The final set of highly ranked success factors highlight that significant investment is required to enable successful agile transformation, again mirroring a key challenge identified previously. This includes investment in the people required to resource cross functional teams (ranked sixth) along with investment in the training and communication programmes required to build capability across the organisation (ranked seventh). Similar findings were consistently reported through several earlier studies (Conboy & Carroll, 2019; Dikert et al., 2016; Ebert & Paasivaara, 2017; Kalenda et al., 2018). While the development of individual agile skills is somewhat important, the key point here is that capability development should focus on building the *team* and indeed the *organisation* as a whole; a view supported in the study conducted by Gren et al. (2018). In it he determined that collective teams skills are key to implementing agile, and that measuring capability at the organisational level provides much more accurate predictive measure of agile usuage and maturity.

Rank	Top Reported L1 Success Factors (# of occurrences) – Blewden	L3 Group & (Ranking)
1	Let things evolve, flexible approach, don't prescribe the approach, tailor the approach to fit the organisation, the culture (16)	Learn, Adapt, Evolve (4)
2	Drive from the top, lead from the top, continued exec support (14)	Top Down Leadership (2)
3	It's OK to trial and error, can fail fast, can learn and move on (9)	Agility, Change, Trust Culture (3)
4	Supported by culture and mindset shift, already aligned to company values (8)	Agility, Change, Trust Culture (3)
5	Lead by broader vision, strategy and objectives, purpose and mission (8)	Top Down Leadership (2)
6	Building cross functional teams (8)	Cross Functional Empowered Teams (1)
7	Provide formal education and training, investing in capability, invest in PO role (8)	Invest, Comms, Training (5)
8	Giving people means to be successful, can achieve, ensuring teams are truly empowered to deliver (7)	Cross Functional Empowered Teams (1)
9	Running agility programme at same time, be clear what agility means, don't focus on the method, agility with small a not capital A (7)	Agility, Change, Trust Culture (3)
10	Use different language, put your own company language or branding on it (7)	Invest, Comms, Training (5)

Table 33: Top Reported Individual Agile Success Factors, Non-Technical Teams.

5.3 RQ02: Common Agile Benefits and Outcomes

The top reported individual benefits mapped to L3 groupings are ranked in Table 34, and again are discussed with reference to Gustavsson and other agile studies.

The key finding from this area of the study is that while respondents were able to describe benefits generally, few could provide quantified or measured evidence of specific outcomes. While this was a qualitive study which did not directly seek to collect quantitative data, organisations did not appear to have benefit measurement frameworks in place which could directly link agile ways of working to the achievement of departmental or companywide objectives. Given the investment required to commit to agile at scale, this gap represents a significant constraint which should be addressed if agile is to be broadly accepted as a proven transformation strategy across organisations. Prudent leaders will demand evidence of success before embarking on such strategies, or to continue investing in existing programmes. Further research is required in this area such that this link can be established and understood for academics, practitioners and organisation alike.

In terms of the benefits that were highlighted, an improved focus on what the customer wants was the highest ranked individual benefit of agile across non-technical teams, comparable to Gustavsson's findings (ranked second and eight) and most of the earlier agile studies, including Kapitsaki and Christou (2012) and Serrador and Pinto (2015). This benefit is also related to providing customers with improved product quality (ranked fifth) and delivering more value to customers (seventh) – the overall sense being that all respondents had a heightened awareness and focus on the customer and all felt that the customer was being served better following the introduction of

agile. This is a key finding from this study and does provide a compelling (albeit qualitative) benefit of agile and one which is highly relevant to all teams, across all organisations.

Faster delivery was the second highest ranked benefit. However, it is interesting that perceived improvements to productivity or efficiency were relatively lowly ranked (tenth). This differs to many of the technical oriented studies which commonly reported lower costs and higher productivity benefits across software development teams (Cardozo et al., 2010; Dybå & Dingsøyr, 2008; Jakobsen & Sutherland, 2009; Kautz et al., 2014; J. Sutherland & Altman, 2010). These results reflect that lowering the cost of technical delivery continues to be a focus for many organisations, and further, that technical outputs are relatively easy to quantify (e.g. lines of code, number of defects, reduced testing time). However, in a more recent business context many organisations are still in the phase of *increasing* investment in agile, with the immediate focus more on improved quality, innovation and creating customer value. As this investment matures however it does seem inevitable that increased business productivity and reduced operating costs will become a priority and it will be interesting to see at what point it does.

Improved adaptability and responding to change faster were highly ranked benefits (third), comparable to Gustavsson's review (fourth) and as consistently reported in most of the earlier studies. This outcome will be desirable to technical and business teams alike given the increasing levels of change and disruption prevalent in most markets today. The ease by which many of the surveyed organisations were able to quickly respond to COVID-19 and seamlessly continue operations provides evidence of this benefit; there was some correlation between those already practicing agile and the ease of this change response. A complementary benefit here is the increased focus on much shorter-term priorities and goals (ranked fourth) as organisations appreciate that long term or rigid planning does not make sense in changeable environments.

The final bundle of top ten benefits revolve around improved sharing and communication within teams (sixth), and increased communications and collaboration (eighth and ninth respectively) across teams. These results are particularly important given the challenges previously discussed with inter-team communication as agile scales across the organisation (Ebert & Paasivaara, 2017; Lindvall et al., 2004; Reifer et al., 2003). Leaders should be highly aware that effective communications is one of the most important success factors during any organisational change programme, and additionally, the high rates of failure of many such programmes (Allen, Jimmieson, Bordia, & Irmer, 2007; Husain, 2013; Johansson & Heide, 2008). The results of this study strongly intimate that agile is enabling improved communication across all teams within organisations, and this provides further support to the core proposition.

Although improved morale and engagement individually did not rank in the top ten benefits, it is worthy of mention here given there were a total of 23 mentions of this outcome separated across six different drivers; for example, from being given greater ownership and control, to being part of a successful team. This result is again highly relevant to leaders of all teams, as engaged and happy teams are generally more effective and productive for the organisation as a whole.

Rank	Top Reported Benefits (# of occurrences) - Gustavsson	Rank	Top Reported L1 Benefits (# of occurrences) – Blewden	L3 Group & (Ranking)
1	Better collaboration in the team (11)	1	Increased customer focus, delivering what the customer wants (11)	Improved Customer Value, Product Quality (2)
2	Increase customer interaction (9)	2	Faster delivery, quick results (10)	Higher Productivity, Lower Costs (3)
3	Increased productivity and speed (8)	3	Improved adaptability, responding to change faster (9)	Agile, Change Loving Organisation (4)
4	Increased flexibility, coping with change (7)	4	Increased focus on priorities, short-term goals (9)	High Performing Teams (1)
5	Better understanding of goals, tasks, requirements (6)	5	Improved product quality (8)	Improved Customer Value, Product Quality (2)
6	Increased transparency and visibility (6)	6	Improved openness, sharing, feedback and communications (7)	High Performing Teams (1)
7	Increased quality (5)	7	Identifying and delivering value, valuable outcomes (7)	Improved Customer Value, Product Quality (2)
8	Customer-centred value-add priority process (5)	8	Improved communications about what is going on (6)	High Performing Teams (1)
9	Increased knowledge sharing (4)	9	Improved collaboration across teams, breaking down silos (6)	High Performing Teams (1)
10	Increased cross-organisational collaboration (3)	10	Improved productivity or efficiency (6)	Higher Productivity, Lower Costs (3)

Table 34: Top Reported Individual Agile Benefits, Non-Technical Teams.

6. Conclusion and Recommendations

6.1 Conclusion

Agile is shaped from the past, leveraging long-held business principles such as customer centricity, quality, lean thinking and continuous improvement. However, in response to the failure of traditional ways of working in highly dynamic and disrupted environments, agile is also moulding the future with a new mindset based around innovation, risk-taking, speed, adaptability and iteration. This NZ based study has helped elaborate and advance emerging theory that agile values and practices, originally the domain of technology, *can scale effectively into non-technical teams, leading to positive and transformational change across the organisation.*

This study has reinforced that many agile challenges, success factors and benefits in non-technical environments are similar to those reported by technology focused teams. However, this work has also contributed new data and findings in a business and NZ context.

When first exposed to agile, NZ businesspeople were extremely interested and excited to learn more, in fact most were demanding 'something new' in the face of traditional siloed and plan-driven ways of working. Very low resistance to change was identified - possibly a uniquely NZ trait - and although initial understanding of agile was generally low, all respondents had some previous exposure and most were already demonstrating agile values and practices informally. Developing agile capability in a more formal business context emerges as a natural and logical progression. Businesspeople could quickly grasp and apply basic practices and most appreciated that agile is fundamentally about the value of people and teams, not technical processes or techniques.

As agile maturity increased in a business context, so too did respondent's wider appreciation of the principles of customer-centricity and on creating customer value, along with agile's role in creating highly flexible and change responsive teams structured around value-streams. The greatest business challenges identified were lack of management support – often due to poor knowledge - and a reluctance by leaders to truly empower teams. Other key challenges were insufficient resourcing of cross functional squads, the time required to adjust to new ways of working, the challenge of shifting organisational culture and mindset, and insufficient training and communication. The single most important success factor is allowing agile to evolve slowly via a tailored and adaptive approach, followed by strong top-down leadership, creating an environment which encourages risk taking and learning from 'failing fast', building a culture based on *agility* across the organisation, and clarity of overall vision, strategy and objectives.

The main business benefits identified are faster delivery of increased customer value, improved product quality, and the building of highly flexible and adaptive teams focused on short-term

priorities and goals. Other key benefits include improved communication across the organisation, more effective collaboration between business and technical teams, and significant improvements in worker's engagement and motivation.

While these are all positive benefits, the evidence for them is largely anecdotal and qualitative in nature, and it is assumed but not proven that they are contributing to the defined goals of the organisation. This gap around the definition and measurement of benefits accruing from agile transformation emerges as a key finding from this study; quantification of benefits is therefore a future step that organisations should attend to as they continue their agile journey. Further empirical and quantitative research is also required to demonstrate an explicit link between agile ways of working and the achievement of organisational strategies and goals, and this evidence is required before the proposition of this study can be fully corroborated.

6.2 Limitations

Some limitations of this study are recognised.

Firstly, while a cross-section of people and NZ organisations were represented, participation was purely voluntary thereby introducing the risk of voluntary response bias; those participating may have had a greater pre-existing interest and positive predisposition towards agile ways of working.

The sample size (20 respondents) also increases the risk of under-coverage bias and a variation between the reported results versus those which may have been recorded from a larger sample. However, the author is confident that by the final interviews a position of data saturation had been reached, this being defined as, "…when the researcher gathers data to the point of diminishing returns, when nothing new is being added" (Bowen, 2009). During the last interviews there were no new data points or themes emerging.

Due to COVID-19 the majority of interviewing was conducted remotely, rather than in the natural setting of the organisation (Lee et al., 1999), however while this limitation is noted it is unclear what impact, if any, this approach had on the quality of the data collected. All interviewees were very comfortable and experienced with using Teams remote conferencing, therefore it is likely that the impact was minimal.

The possibility of researcher bias is also noted (Bluhm et al., 2011; Fawcett & Waller, 2014; Yin, 2016), heightened by the author's professional and academic engagement over a two-year period. However, it is suggested this risk was mitigated by the author's high awareness of it, the transparent and methodological approach to data collection and analysis, and the open-ended interviewing technique adopted.

6.3 Future Research Opportunities

There are five main areas of potential future research identified by this study and as previously highlighted.

The first is to examine agile specifically in the context of NZ organisational culture and mindset, and the possible correlation with increased agile experimentation and adoption versus other countries. What, for example, is the impact of the NZ culture and our general willingness to give new things a go? Murphy (2006) describes NZ's isolation, smaller sized enterprises, 'can-do' attitude, and the "ability to improvise and be innovative" (p. 12), while Gardiner (2013) notes that NZ is often regarded to be at the fore of innovation, driven by our pioneering spirit and "no.8 wire mentality" (p. 50). Secondly, further research must also be undertaken to understand the impact of COVID-19, certainly one the largest market disrupters of our time. What bearing is the reality of a global pandemic having on people's general acceptance of change, attitudes to trying new things, and the urgency to innovate across every layer of an organisation? Further to this is to understand how successfully 'agile' organisations are adapting and responding to COVID, compared to organisations with more traditional ways of working. The third area is to develop a best practice model around defining value-streams in an agile context, and the organisational structures required to maximise the delivery of value from this model. Fourth, further research to quantify and measure the benefits directly derived from agile and to provide a more explicit link between this way of working and the achievement of companywide strategies and objectives.

Finally, this study was broadly positioned to *elaborate* agile theory and to build on the emerging propositions regarding successful adoption of agile in non-technical teams. The challenges and success factors of agile methods within non-technical teams have been well examined qualitatively and will serve as a useful extension to existing knowledge, and as guidelines for practitioners and organisations. There may now exist an opportunity to move into *testing* theory with larger studies potentially via more quantitative methods, particularly around benefit quantification and measurement. As the prevalence of agile transformations continues to grow across NZ organisations, so too does the opportunity to substantially grow the body of knowledge.

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8. Appendix

8.1 Appendix A: Information Sheet for Participants

School of Management: Master of Business Studies (Management)

'Agile for Business (Non-Technical) Teams'

Information Sheet for Research Participants

Organisations seeking agility is not a new concept. For decades management strategies have promoted lean, flexible and customer-focused working practices however since the early 80s, in the face of unprecedented market change and disruption, many organisations have struggled to be agile and to remain competitive.

Traditional software management practices have also failed to deliver innovation quickly in uncertain and dynamic markets, and by the late 1990s over 70% of technology projects were considered challenged or impaired (Standish Group, Chaos Report, 1998).

In response to these challenges Agile philosophies have matured, focused on collaboration, customer centricity and lean thinking, combined with extremely flexible, fast and incremental delivery methods which embrace – not resist – change. Initially the domain of small software projects, Agile has quickly scaled across larger and more complex projects driving benefits such as improved productivity and quality, reduced cycle times, and increased customer satisfaction and worker motivation.

As Agile has scaled so too has its impact on non-technical teams such as management, finance, marketing and operations, and more recently organisations are introducing Agile company wide as a transformational strategy.

More and more non-technical people are being exposed to Agile values and are adopting variants of its working practices, however there is limited research in this area - certainly none within a NZ context.

This Masters level study seeks to address this knowledge gap via qualitative research which will interview a broad cross-section of non-technical people who have had recent experience with Agile. Willing participants are sought ranging from those early in their Agile journey, through to those fully involved in large Agile transformations.

Interviews will help to formulate answers to the following three (3) research questions:

ID	Research Question
RQ01	What common Agile pre-perceptions, observations and expectations exist amongst non-technical teams, prior to engaging in Agile working practices directly?
RQ02	What common challenges and success factors are reported by non-technical teams when adopting to Agile working practices across the organisation?
RQ03	What perceived benefits of adopting Agile work practices are commonly reported by non-technical teams?

Interview process:

- Interviews will be conducted one-on-one, lasting for approximately one hour.
- Sessions will be held onsite at a time convenient to each participant.
- Interviews will be recorded and subsequently transcribed for academic record.
- The identity of all participating individuals and companies will be kept confidential and will not be disclosed within the research findings.
- All interviewees are required to sign a Massey University **Research Participant Content Form (attached)**.

Benefits of participating:

As well as extending management theory it is intended to make the research findings practical and actionable for NZ organisations and Agile practitioners alike.

A summary of the research findings will be made available to all respondents and follow-up workshops to review learnings and recommendations are also welcomed.

Participation in this research will help your organisation:

- Understand the perceptions, attitudes and expectations that non-technical people have regarding Agile.
- Identify common challenges impeding Agile transformation and specific success factors driving results.
- Better define measures of success and to quantify the potential outcomes of Agile.
- Learn, change and improve your Agile programme.

I am extremely excited about conducting new Agile research and to sharing new insights with you.

Your permission to interview people from your organisation is most appreciated in advance, and I look forward to discussing this opportunity with you further.

Kind regards,

Andrew Blewden

Massey University – Master of Business Studies (Management) research student

About Andrew Blewden:

- Programme, Project and Change Management professional with over 25 years industry experience.
- Independent contractor working within NZ organizations with a focus on change.
- Passionate about Agile and new ways of working that can transform organisations.
- Studying and conducting research part-time, have completed the research literature review over 2019.
- Certified professional - ITIL, PMP, MSP, PRINCE2, APM Change Mgmt., BCom (Hons), Post Grad Cert (Business).

Ethics:

- This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher named in this document is responsible for the ethical conduct of this research.

- If you have any concerns regarding the conduct of this project that you want to raise with someone other than the researcher or supervisor, please contact:
    - The Ethics Committee   **humanethics@massey.ac.nz or (06) 356 9099 x 86015**

Project Contacts:

- Should you have any questions regarding this research please contact:
    - Andrew Blewden (researcher):   ███████████████ **or** ███████████
    - Dr Jeff Kennedy (supervisor):   **J.C.Kennedy@massey.ac.nz or (09) 213 6378**

8.2 Appendix B: Interview Questions

Agile for Business (Non-Technical) Teams – DRAFT Interview Questions

Introduction:

Interviews will commence with a short summary of Agile and key developments, followed by an overview of the research being undertaken including the research gap and specific research questions.

Research Question RQ01: *What common Agile pre-perceptions, observations and expectations exist amongst non-technical teams, prior to engaging in Agile working practices directly?*

ID	Interview Questions
01.01	When did you first notice or have exposure to Agile principles and / or working practices in your current or any previous organisations?
01.02	What teams were engaged in Agile and how were you involved?
01.03	At this time how would you describe your level of knowledge or understanding regarding Agile values, principles and work practices?
01.04	At this time how was Agile being led and communicated within your organisation?
01.05	At this time what did you observe about Agile and what perceptions or opinions did you form?
01.06	At this time did you have any expectations regarding the results or benefits that Agile could deliver to your organisation?

Research Question RQ02: *What common challenges and success factors are reported by non-technical teams when adopting to agile working practices across the organisation?*

ID	Interview Questions
02.01	Describe how you became more directly involved in Agile working practices and over what timeframe?
02.02	Describe the key Agile values and principles that you and your team have adopted? Why these specifically?
02.03	What specific Agile working practices or techniques have you adopted? Why these specifically?
02.04	Have your Agile working practices or techniques changed over this time, if so how?
02.05	What have been the most significant challenges you've encountered in adapting to these new Agile working practices?
02.06	What factors have helped you the most in adapting successfully to your new Agile working practices?
02.07	How would you describe the current culture of your organisation? Do you think that Agile is a good cultural fit for your organisation? For NZ organisations generally?

Research Question RQ03: *What perceived benefits of adopting Agile work practices are commonly reported by non-technical teams?*

ID	Interview Questions
03.01	Since you have been adopting Agile values, principles and working practices, what level of maturity or expertise do you think you / your team have achieved?
03.02	Since you have been adopting Agile values, principles and working practices what are the main benefits you have experienced or noticed?
03.03	Have these benefits been measured in any way, if so how?
03.04	Thinking about your previous perceptions or expectations of Agile, have these changed now that you are working more directly within an Agile environment?
03.05	Based on the results achieved to date in your teams, is your manager and / or organisation remaining committed to Agile values, principles and working practices?
03.06	Do you have any final comments, feelings or ideas that you'd like to share around Agile?

8.3 Appendix C: Participant Consent Form

School of Management

'Agile for Business (Non-Technical) Teams'

Research Participant Consent Form

I have read, or have had read to me in my first language, and I understand the Information Sheet attached as Appendix I. I have had the details of the study explained to me, any questions I had have been answered to my satisfaction, and I understand that I may ask further questions at any time. I have been given sufficient time to consider whether to participate in this study and I understand participation is voluntary and that I may withdraw from the study at any time.

1. I agree/do not agree to the interview being sound recorded.

2. I wish/do not wish to have my recordings returned to me.

3. I agree to participate in this study under the conditions set out in the Information Sheet.

4. I wish/do not wish to have a summary of the research findings provided to me.

5. I wish/do not wish to have a post-research workshop to discuss the research findings in more detail.

Declaration by Participant:

I _____ hereby consent to take part in this study.

Signature: _____   Date: _____

Ethics:
- This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher named in this document is responsible for the ethical conduct of this research.
- If you have any concerns regarding the conduct of this project that you want to raise with someone other than the researcher or supervisor, please contact:
  o The Ethics Committee   **humanethics@massey.ac.nz** or (**06 356 9099 x 86015**

Project Contacts:
- Should you have any questions regarding this research please contact:
  o Andrew Blewden (researcher):   ▮▮▮▮▮▮▮▮▮▮▮▮ **or** ▮▮▮▮▮▮▮
  o Dr Jeff Kennedy (supervisor):   **J.C.Kennedy@massey.ac.nz or (09) 213 6378**