



# The Practical Adoption of Agile Methodologies

APM Volunteer Research report

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**This report was written  
by members of the  
APM North West branch.**

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## Executive summary

The Association for Project Management (APM) has sponsored this review of the practical adoption of agile methodology in project management in the North West.

The objective of the study was to understand the extent to which agile tools techniques and roles are practically in place in corporate project management methodologies; to determine the level of agile commitment, e.g. pilot, full use, selective based on need, as well as drivers for selection or de-selection of the methodology.

Consistent with academic precedents, a qualitative approach was adopted: first and second semi-structured interviews of north-west companies and project managers who use agile approaches have been held, to establish the level of adoption then explore elements adopted and their relative success. These findings were then mapped to give a common glossary of terms through a convergent dictionary approach to the interviews. Following the data analysis, a Delphi review was undertaken to reflect findings and recommendations back to the target population for validation.

Understanding of practical adoption has been gained through analysis of findings from in depth interviews, to identify best practice.

The key findings are:

- Drivers for adoption of agile are time and cost constraints.
- The environment has to be right: customer access and effort, senior management support, a good team, and flexible culture. A large factor to consider before embarking on an agile project is to understand the roles and behaviours needed for project management and the level of willingness to organise around project delivery. It is best to deal with instability, such as rapid change in environment, innovations, unclear requirements.
- It is still largely used by IT, rather than non-IT teams, as our participants from construction and engineering needed to meet the safety and regulatory criteria that indicate 'go waterfall'.

When choosing a project for agile adoption, consider the options for co-location, the range of skills of team members and their availability, empowerment of a single product owner, use of tools and techniques to enhance communications.

Agile needs more from a project manager in the way of communication for risks, issues and stakeholder management, as speed of resolution is of the essence.

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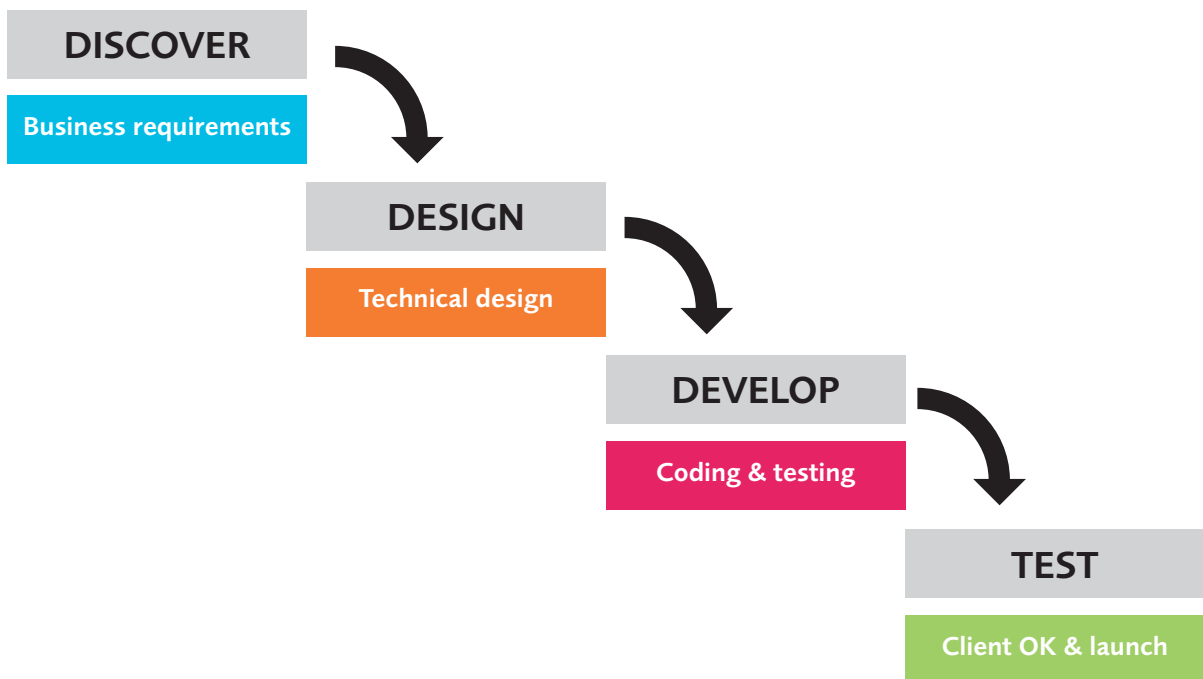
## APM North West branch

## 1. Introduction

### 1.1 What is agile?

Agile development, or agile project management, is an iterative and incremental method of managing the design and build activities for engineering, information technology, and new product or service development projects, for example agile software development. It requires capable individuals from the relevant business, with supplier and customer input to work in a highly collaborative manner, in small stages, to complete small portions of the deliverables in each delivery cycle (iteration), and where possible deploying deliverables to live (increment) to achieve value and real feedback, whilst iterative methods evolve the entire set of deliverables over time, completing them near the end of the project. The end result is a product that best meets current customer needs and is delivered with minimal costs, waste, and time, as the iterations encourage feedback and review, so achieving benefits earlier than via traditional approaches.

There is a large body of literature describing various agile methodology tools and techniques and some research into its adoption. However, most usage occurs in software development and innovation. Many companies have considered its adoption in response to habitual failure of IT delivery from more traditional project management approaches.



*Diagram from Michael Reich, Commonplaces, NH USA, 2014*

### 1.2 Why is agile needed?

Information systems (IS) projects have a reputation of failure to deliver business requirements, meet cost, quality and time targets or realise benefits, despite 30 years of research and development of best practices. The profession continues to have high profile failures that make headline news, such as the NHS records system. The motivation for this research is to provide material for IS project managers to use and help to improve project outcomes. Therefore, the profession will be enhanced by reversing the common view that IS projects consistently fail to deliver.

The consequences of failure are expensive, to either remediate the new systems to achieve the benefits plan or start a new project or stage of development. Loss of confidence and opportunity cost must also be considered by the organisation commissioning the IS project. In some cases, such as regulatory compliance, timescales are imposed from outside the organisation and can attract fines, loss of revenue or even failure to operate. The cost of failed IS projects in the UK alone is many billions of pounds annually (British Computer Society study, 2004).

Historically, research has focused on the causes of failure of IS projects, or on individual project elements. Failure factors include a mix of people, technology and methodology issues. People failure factors include poor team communications, lack of vision, poor stakeholder management and changing requirements while technology based problems are usually around hardware or software elements not working as expected and increasing costs or delivery timelines. Failure to follow good project management practices has also been proven to impact the chances of success.

Several professional bodies are available in the United Kingdom to enhance the project management profession while their members come from a variety of professions; construction, engineering and information systems, which would indicate a willingness for the profession to learn and adopt best practice. With all of these communities there is an underpinning set of publications for their bodies of knowledge these being very similar with some process and language differences but all with transferrable approaches and best practice.

The Association for Project Management (APM) is committed to developing and promoting project and programme management through its FIVE Dimensions of Professionalism with a mission statement:

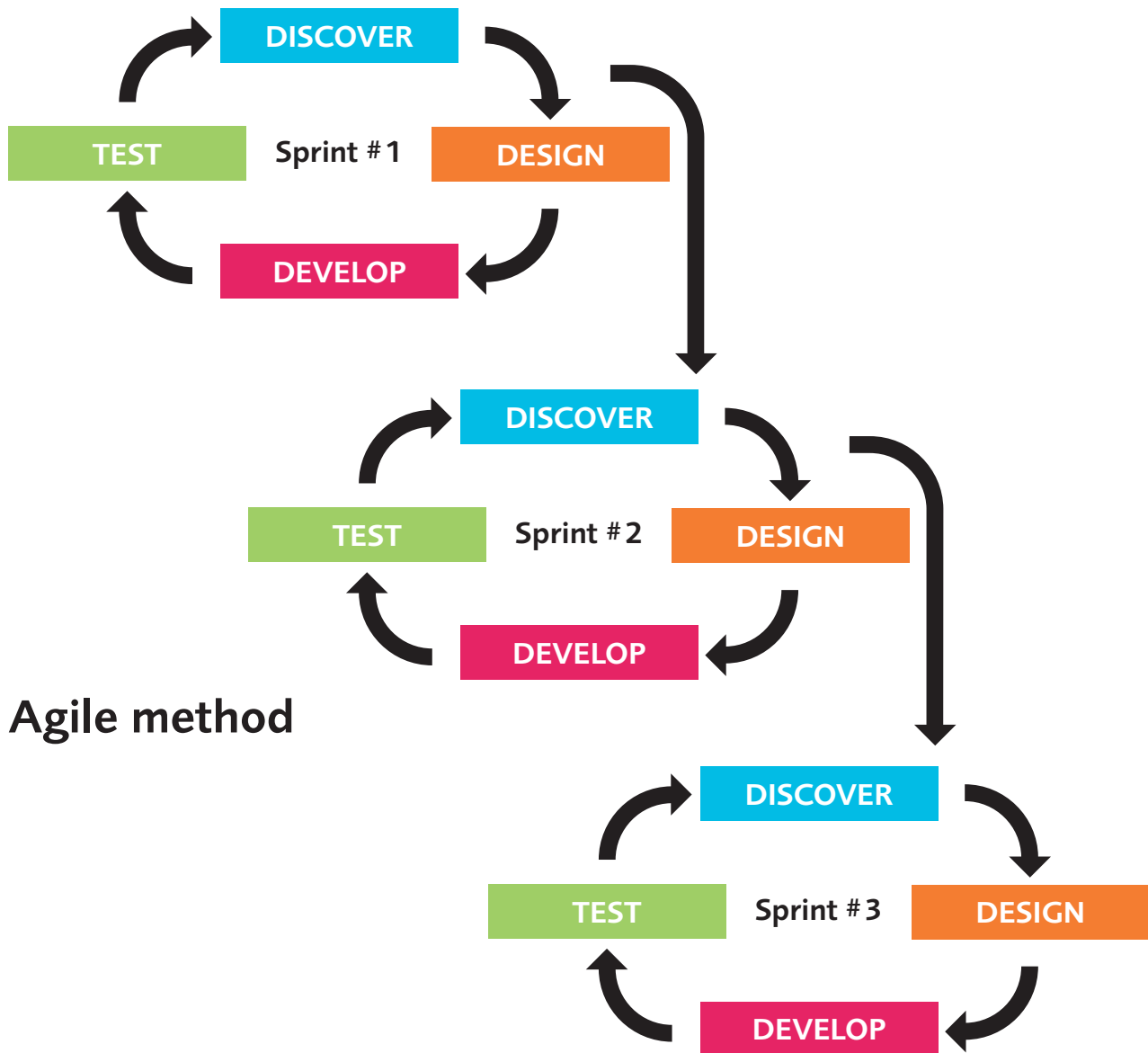
'To provide leadership to the movement of committed organisations and individuals who share our passion for improving project outcomes.'

The APM Body of Knowledge defines the knowledge needed to manage any kind of project. It underpins many project management standards and methods including the National Occupational Standards in Project Management, whilst a competency framework provides a guide to project management hard and soft skills, including relationship management and benefits realisation. APM qualifications and knowledge align with the IPMA organisation.

Whilst there are numerous project and benefits management approaches, either as an industry standard or specific to organisations, all follow a similar life cycle for comparative purposes but the level of adoption and practical usage is important for broader application of agile processes, tools, roles and techniques.

The body of knowledge underpinning these organisations is well documented and supported but there are no studies explicitly linking and exploring how the outcome of information systems development projects might be influenced by the interaction between the main processes, roles, tools and techniques. The study findings will be used to add to the tools and techniques within the professional documentation sets and training materials and hence expand the APM Body of Knowledge, for agile.

It is to be hoped that the findings from this study will give project sponsors and teams further information on which factors best influence successful adoption of the agile development approach and so where to concentrate best practice and effort throughout the project life cycle. It is the aim of this study, therefore, to start to fill the 'practical agile adoption for success' gap in the current body of professional literature, and start to explore its usage on non-IT and innovative projects.



*Diagram from Michael Reich, Commonplaces, NH USA, 2014*



## 2. Literature review

### 2.1 Why agile grew out of information systems development – a history of failure

The APM Body of Knowledge incorporates tools and techniques for identifying stakeholders and influence networks, with advice on how to incorporate good stakeholder management into the project management processes. These tools and techniques are usually used in a 'waterfall' approach, where each project stage is sequential, such as requirements definition, solution development, build and deployment.

Despite this, the success and failure rates of IS projects has been well explored for decades, (Willcocks and Margetts 1994), and the reasons IS projects fail are now fairly well understood. Moreover, a plethora of potential best practices – aimed at reducing the likelihood of IT failures – have also now been proposed. For example, the introduction of 'hybrid managers' has been recommended as a mechanism for avoiding failure (Earl, 1994), as have the power and competencies both in IS and the business (Markus and Bjorn-Andersen 1987, Griffiths 1994).

Early research focused on technology as an external force, then moved onto human factors and eventually an acknowledgement that both factors are significant to success [Orlikowski, August 1992]. If the technology itself, and the social context in which it is to be applied, are likely to influence project outcomes, then it is likely that representatives from both the IT department and the wider organisation will need to be involved in its development and implementation [Mata, Fuerst, & Barney 1995]. Indeed, the contribution of effective and harmonious IT-business relationships and consequent IS organisational structures and decision-making frameworks, has been explored [e.g. Winfield, 1990; Hoffman, 1994; Scott Morton, 1990; Peppard, 2001], [Venkatraman & Loh, 1994]. IS management and evolution have also been well explored, (Hirscheim, Earl, Feeny, Lockett 1988). A key factor in successful IS implementations is the understanding of user requirements and the interaction between IS and the business line [Rockart 1988].

A consideration when defining the relationship management and building a project team is the type of project and the match to project manager personality. Dvir (2006) hypothesises that the "fit between project manager's personality and management style and the types of projects they manage is crucial to project success". His study focused on the relationships between project profile, project manager personality and project success. Similarly, Shao & Muller (2011) defined programme success criteria and factors, into nine categories, five of which related to people three to process elements and one to strategic alignment. A key success factor was the programme manager. Fisher (2011) identifies six skills and behaviours of an effective project manager which include cultural awareness and influencing others. These would seem to relate to a success factor for information systems projects being effective relationship and stakeholder management.

Business partnering is now a recognised industry role (British Computer Society Skills Framework for the Information Age), and has parallels with research findings in other areas, such as construction projects. Hellard (1995) states that the key elements of successful project partnering are:

- Commitment
- Equity
- Trust
- Mutual objectives
- Effective problem solving
- Timely communication and
- Continuous measurement and improvement.

The conclusions to be drawn from this body of literature are that much of systems development is about technical and social interactions during projects to develop harmonious IT/business

relationships. These are supported through various project management and development life cycle practices, such as business requirements specifications and user acceptance testing, as well as structural conditions such as reporting relationships and policies [Markus & Benjamin, 1996]. As a basic principle, IT has to be business-driven and investment decisions taken on the basis of business value, with a business-smart IT organisation and an IT-smart business organisation the ideal [Dvorak, Holen, Mark & Meehan, 1997]. Additionally, teams need to be actively built to include business people as well as technical staff [Pitt, Berthon & Lane 1998].

### 2.2 How agile addresses the causes of development project failures

Agile methodologies have been propounded increasingly for IS projects over the last 10 years. Kent Beck introduced the concepts of extreme programming, (Agile XP), while in 1986 by Hirotaka Takeuchi and Ikujiro Nonaka in the "New Product Development Game" developed scrum. Both evolved from a previous software development methodology: DSDM (Dynamic Systems development Method). The DSDM Consortium are guardians of the agile project management framework surrounding all agile delivery methods.

The Agile Alliance has promoted joint application development methodologies with high user involvement in build decisions (Beck, 2000). These methods promote continuous monitoring and adapting of deliverables to meet fixed benefits. Unfortunately, due to the challenges of complexity, scale and interconnectivity facing software engineers, the level of systems failure remains stubbornly high (e.g. Ewusi-Mensah & Przasnyski, 1994; Doherty, & King, 2001). Indeed, a report by the British Computer Society [BCS, 2004] concluded that:

"Billions of pounds are wasted every year on new IT systems', as 'only around 16 per cent of IT projects can be considered truly successful."

Laanti et al (2011) examined an organisation-wide adoption of agile practices at Nokia, and their results revealed that "respondents agreed with the benefits of agile usage, including higher satisfaction and effectiveness, increased quality and transparency, and earlier detection of faults and that 60% would prefer to stay with the methods than return to their previous ways of working."

Agile approaches place emphasis on business ownership of products and prioritise team efforts based on business benefit. The methodology aims to enhance team working and shared understanding of goals, based on a lean concept of "Voice of the Customer" and is akin to the lean six sigma process improvement approach.

All of these approaches advocate a key user who is empowered to prioritise the work of a self-sufficient team, with the project manager becoming a 'servant leader' who coaches the team for improvements, as well as addressing other disciplines such as wider stakeholder management to keep the team focused purely on delivery. The aim is to deliver earlier benefits by doing highest value work first. However, the agile methodologies are less comprehensive, dealing predominantly with the software development stage. Some companies, such as Siemens, have adapted the tools and techniques and applied them to engineering work successfully, but their usage is still limited.

Most agile adoption has been driven from the software development arena, but there is a body of research now investigating whether this methodology can be used by other industries. Conforto (2014) states that "project planning and control is a challenge for companies engaged in developing new products and technologies" and that there is a drive to implement only pure agile project management. It is the aim of this study to investigate how often that occurs and whether partial adoption also brings benefits over a more traditional project approach.

### 2.3 Challenges to applying an agile project management methodology

Project managers use their own experience to pick and choose the best methods and practices, whatever the methodology and adapt them to their specific delivery. Adrian Malone of the APM Specific Interest Group on knowledge management states that project managers can create the right environment and provide appropriate tools for people and teams to collaborate in the creation and sharing of knowledge.

A relatively new trend is the use of social media in project teams. PM 2.0 documents the possible use of social media in project management to improve team working, stakeholder management and communication. Where agile is adopted across functions, team and geographies, use of social media and information sharing tools is vital, so a factor in practical adoption is team location and mitigations if not co-located.

The benefits of using social media for broad stakeholder management is based on the reach, allowing any and all interested parties to track progress and receive updates or even request further information that may not necessarily have been caught by more traditional stakeholder management methods. Any subsequent reduction in 'noise' will help build towards the perception of success. The key difference is that information and the voice of the customer is therefore in real time so can be a useful additional to a project manager's communications toolset. Daim et al (2011) investigates the use of technology, specifically e-collaboration and community platform tools, in global virtual teams.

Tools such as wikis and blogs are used to neutralise some of the issues around virtual teams working across time zones, as well as individualise services. Unfortunately, there is a lack of research papers, as authors practise what they preach and publish via blogs or focus on broader social media trends such as the interactive workplace, rather than specific project usage; evidence needs to be gathered as to how well these tools and techniques (such as wikis, Sharepoint, Facebook, Twitter) are used and their impact on project success.

### 3. Study approach

#### 3.1 Research scope

The research population, for expediency of access and availability, has been contained to the North West: it is posited that the corporate and professional project management population here is representative of the wider United Kingdom environment and that lessons learnt can be transferrable across the IS project management profession as a whole. Care was taken to investigate a range of projects of varied 'scale', which may have an impact on project selection for suitability of agile methods and be an indicator of the maturity of agile practice adoption.

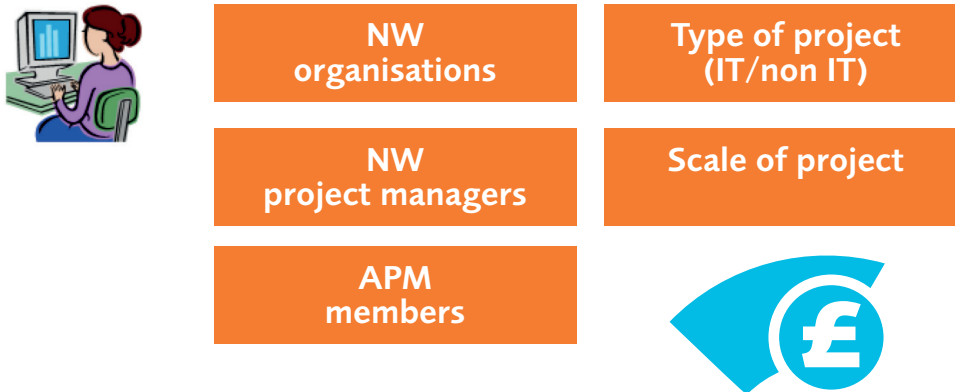


Diagram 1: Research scope

A key point to note is the membership, either corporate or personal, of interviewees, professional bodies, as a pre-disposition to the adoption of new methods and best practice.

#### 3.2 Research methodology

Ashurst et al (2008) undertook exploratory research using a case study approach, to address the need to cover a range of organisational parameters, whilst Waardenburg (2013), established a Grounded Theory approach to agile practices in traditional enterprises, aiming to develop a theory from data rather than gathering data in order to test a hypothesis.

The aim is to uncover the issues study participants have experienced, and resist having preconceived ideas and so limit the questions asked during the interview process. This method allows the problems to naturally emerge.

Previous studies into these factors have followed a qualitative approach, utilising a range of surveys, questionnaires and interviews. Wateridge (1997) delivered a questionnaire on success criteria with subsequent interviews, asking respondents to indicate and rate the five most important criteria for success. This was followed by further interviews of key project staff, gathering individual perceptions of those success criteria. Agrawal (2006), investigated quantitative success criteria through questionnaires targeted at project managers, and business account (relationship) managers representing the senior end customer.

Shao et al (2009) reviewed programme success and found that much is still conceptual, with little literature suggesting measurements, including PMI and OGC guidance, which relates purely to benefits realisation, value creation or organisational change. In the qualitative study of 2011 for program context and success, semi-structured interviews were used to collect data, with interviewees being the people with the best knowledge of the research subject. Sample numbers were identified on a theoretical saturation point and stopped when no new concepts or categories emerged from interviews.

The study therefore followed an 'interpretive' style, to gain knowledge of the practical extent of agile adoption, supported by real world evidence.

### 3.3 Data collection

The data collection process used for this study was semi-structured and qualitative, and structured in three stages; first and second interviews and a Delphi review.

Evidence was gathered through a series of semi-structured interviews, covering the following areas:

- Roles and responsibilities
- Tools and techniques
- Behaviours
- Organisational enablers
- Training and skills
- Project methodology context
- Terminology

Practically, a concentration diagram was used as the basis for interviews to cater for speed of responses with a checklist for to review to give consistency of approach.

Data was captured on interview sheets and validated through a Delphi review (detailed in the following section on data analysis).

#### 3.3.1 Challenges to data collection

Defining criteria to measure project success has been recognised as a difficult task (Baccarini, 1999). Pinto and Martel, (1990) used three dimensions to define project success: the efficiency of the implementation process, the perceived quality of the project, and finally, client satisfaction.

Time, cost and quality goals can be collected as quantitative data items, but perception of success is qualitative. So, previous research has used a range of data collection methods but most commonly semi-structured interviews.

Therefore, a key challenge to overcome was of financial disclosure, both full project life cycle costs and proposed and achieved benefits. Access to key people, particularly since the aim is to review closed projects, may be problematic, as participants may have moved on to other work or even other companies, as well as allaying concerns around sharing of competitive information. There may well be emotional barriers to overcome, although the expectation is that people who have worked on successful projects will be willing to air their views more openly.

#### 3.3.2 First interview outline

An initial telephone interview was planned, to establish the following with potential participants:

- Have you heard of agile project management?
- Do you/your organisation use it? If yes, will you be using it again?
- Have you been trained to use it?

The same questions were adapted for use as a survey tool and published through the Association for Project Management branch meeting with the Institute of Chemical Engineers, to gain the perceptions and professional views of a wider (non-IS) audience.

### 3.3.3 Second interview outline

This was a series of open questions to understand the corporate personal and project context, and drive a free flowing discussion for rich data.

Context:

- Contact's role in agile – champion, practitioner, observer, recipient
- Scale of project – <100k, 100-900k, >£1 million, >£5 million
- Type of project – regulatory, innovation, service improvement

Discussion generation:

- How do you define benefits and decide on methodology to use?
- What does agile mean to you? (generate key word list, check meanings)
- How many people do you have on the team? (More than 10 and it's not really agile...)
- How long has it been running? (Indicates adherence to time-boxing and benefits realisation timescale)

## 3.4 Data analysis

### 3.4.1 Convergent term mapping

Term	Alternatives	Meaning
Agile	Scrum, DSDM, XP, agile project management, SAFE, kanban	Iterative development approach
Product owner	Client, business ambassador, the truth, sponsor	Responsible for product
Scrum master	Project manager, team leader	Servant-leaders, coordinators
Backlog grooming	Re-planning, pull	
Daily scrum	Stand-up team meeting	Plan, do, review daily session
Estimating	Re-factoring, planning poker, run rate review, throughput metrics, measures	
Sprint	Iteration, development phase	Short development phases
Sprint planning	Planning game, backlog chart, requirements planning	
Sprint retrospective	Sprint review, review, retrospective, lessons learnt, continuous improvement session	

### 3.4.2 Data mapping

Derived from Almeida et al, 2012, the following categories were used to map the semi-structured interview responses:

Organisation	Process	Project team	Project type and others
Organisational structure type	Capability of reconfiguration	Self-directed teams	Product succession planning
Organisational culture	Process automation	Team autonomy to make decisions	Urgency to complete/pace
Entrepreneurial culture	Process modularity	Team membership	Goal clarity
Learning organisation	Easy access to information	Team dedication	Project complexity
Agile style work environment	Formalisation	Team knowledge about agile	Project newness
Acceptance of agile methodology	Frequent development milestones	Team experience/expertise	Support systems e.g. test harnesses, design tools
Adequate reward for agile use	Process concurrency	Project manager experience	Customer involvement
Emphasis on speed	External integration	Team size	Collaborative work
Performance measuring		Team location	Suppliers' involvement
Knowledge management systems			
Multidisciplinary teams		Multidisciplinary teams	
Resource competition			
Strong executive support			
Decentralised decision making			

### 3.4.3 Delphi review of findings

The Delphi method is a structured communication technique, originally developed as a systematic, interactive method which relies on a panel of experts. Delphi is based on the principle that forecasts (or decisions) from a structured group of individuals are more accurate than those from unstructured groups.

The Delphi technique's unique contribution is the 'boiling down' of differing expert opinions or other stakeholders into consensus for decision making, without creating direct confrontation or allowing strong individuals to dominate the process.

Usually all participants remain anonymous. Their identity is not revealed, even after the completion of the final report. This prevents the authority, personality, or reputation of some participants from dominating others in the process. Arguably, it also frees participants from their personal biases, allows free expression of opinions, encourages open critique, and facilitates admission of errors when revising earlier judgments.

The experts answer questions (first stage interviews), then responses are collected and analysed by the facilitator, common and conflicting viewpoints are identified. If consensus is not reached, the process continues, to gradually work towards synthesis, and building consensus.

The facilitator (the author), then provides an anonymous summary of the experts' comments, in this instance via email. The experts are encouraged to revise their earlier answers in light of the replies of other members of their panel. It is believed that during this process the range of the answers will decrease and the group will converge towards the "correct" answer and the mean average score of the final rounds determine the results.

### 3.5 Participants

Ten APM North West corporate members were initially contacted, but only four responded, and of those, only two confirmed interest in participating in the study. Of those, only one actively participated at the next stage. The main reason for non-participation was concern about gaining approval to publish, even anonymously, potentially sensitive information about project performance.

Following discussion with the study sponsor, the APM North West branch chairman, it was agreed to request participation from individual project managers, often working at those organisations and based in the region. The participation agreement was positive, with all out of 14 people contacted contributing their experiences and learning. In tandem, a request for input from project managers attending a joint event between the APM and the Institute of Chemical engineers; of 120 attendees, only two had heard of agile, and none were using it.

All participants had considered using agile in a variety of organisations, across a range of projects, but predominantly in regulated environments such as financial services or pharmaceuticals. However, five had never practised it, and the reasons for using a different methodology were explored during the first interview. Only three project managers had used agile for non-IT delivery, and were advancing from agile to kanban, following a successful track record and wide scale adoption within the relevant company over several years.

The projects discussed during interviews ranged from multi-million pound programmes, to £100,000 software developments. The majority of projects cited as examples were from £500,000 to £2 million, which appeared to indicate a similar scale of team size and duration that was then explored during the second interview.



## 4. Findings

### 4.1 All participants agreed that ...

#### 4.1.1 Agile is a misunderstood term

Their experiences indicated that sponsors and budget holders thought of agile as, "this should be quicker and cheaper", until tried for the first time, as there is an expectation that only the development work needs resourcing, and overheads such as project management, quality control, architecture and design are not understood or perceived. All participants commented that if you are fortunate enough to have an all-round, highly experienced set of developers, maybe, but that's not agile! There is a risk without those overheads that the end delivery is not coherent and doesn't integrate with the rest of the business.

Two participants mentioned project scale as a risk; for instance, if this is a pilot and only part of a wider delivery, there needs to be effort and capacity to deliver the remainder, as there is a tendency to perceive agile as a way to develop a prototype that then, rightly or wrongly, carries on as a full production solution.

#### 4.1.2 The company environment has to be ready

The three 'mature' adopters emphasise that before embarking on an agile delivery methodology, it is important to consider the broader project management context and how agile can be embedded within existing processes and controls. All project managers interviewed agreed that if the whole company is used to working on projects in a structured methodology, then buy-in is easier, compared to somewhere unused to delivering change and so development is not a core competency. The consensus is that the environment has to be right: customer access and effort, senior management support, a good team, and flexible culture.

#### 4.1.3 Multifunction people and co-location are the ideal

Everyone interviewed was adamant that the team ideally would be physically as close as possible. Having a full time, multi-functional team of analysts, designers, testers and developers all in one room is the goal, to aid knowledge sharing and save time.

Tony Davis says: "The team was co-located in a single block of desks for about six months. A couple of months ago hot-desking was introduced and we just found desks where we could. Within days breakdowns in communications became apparent and there were tensions in the stand-ups. Our cycle-time started to increase. I'm always in early so one morning I printed off a bunch of 'Reserved for Open API Project' labels and took over a block of desks. Later I made it official by getting Facilities to agree. Things improved quickly."

It was agreed that smaller teams communicate better, so the general recommendation was for an ideal team size between five and nine, with get a good mix of skills and personalities. If bigger teams are necessary, then the advice was to try to split down into smaller groups, by features or functional areas, rather than live with a bigger team.

Two participants proposed that using a generic term helps to break down silos, e.g. designer, analyst, programmer. This supports the idea of a team being multifunctional where members act as hybrids. The ideal would be to have every person able to do every job, but a more realistic aim is to have "generalising specialists" (according to agile coach Dot Roberts), and assign the type of work anyone can do, such as organising workshop logistics, across the group, regardless of individual specialisms, to avoid resentment/preferential treatment. Go for the best, most experienced team that is necessary for the job.

All participants noted that didn't work well was using less experienced team members, who struggled to fit work into the broader context of understanding, and therefore to consider integrating their work

into the whole. It is important for each team member to understand what other people are doing, where their work fits and progress against the bigger picture.

Four interviewees reiterated that an experienced team is obviously more effective, and not specific to an agile methodology. This aspiration is not specific to agile but the impact is greater, as work is moving much faster. Time lags, Chinese whispers, etc, can be reduced possible over distance but reducing the hindrances is harder and needs more tools. However, if you can't get the optimum, the project manager must allow time for team members to develop and improve, so cater for addressing any skills or experience gaps.

### 4.1.4 Communications and ways of working take more effort with agile than waterfall

Jo Hinchcliffe states: "Communications and ways of working are key." All participants agreed it's important to spend time up front defining the organisation and agreeing processes and procedures before starting sprint planning. Some communications tactics used consistently by participants were to show prototypes to users regularly to get interim feedback during sprints.

She continues: "Find failures quickly to meet expectations of agile development being cheaper and not just quicker but be aware of the potential conflict between the scrum master looking after the health of the team and a project manager driving for speed. Also clarify the communications and stakeholder management between the project manager, product owner to keep effort away from the scrum master and the team."

It is important to celebrate success at sprint reviews and retrospectives and most project managers mentioned recognition activities. Jo Hinchcliffe states: "There is no hiding in agile. Everyone has to pull their weight or it really shows." So project managers must put effort into proper team building and understand the individual's strengths and weaknesses as well as for the team as whole, to get most effective use of skills.

### 4.1.5 Self-organising teams need help

Exploring the previous points, six project managers explained that self-organising teams need a full range of skills and co-location, with easy and regular access to business users preferred. Estimation for early sprints can only be accurate if based on the experience of the team members on something similar, or their ability to compare and extrapolate. They need to understand and be able to explain to the project office, project manager and scrum master the unnecessary layers and bottlenecks that need removing.

Paul Johnson quotes two of the principles taken from the Agile Manifesto, which reinforce the benefits of self-organisation: 'Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done' and 'The best architectures, requirements and designs emerge from self-organising teams.'

### 4.1.6 It's all about delivering small but delivering often

The theory is that estimating improves over time; as a rhythm is established accuracy improves. The aim is to go for quick wins, which are usually easier to estimate and to do. More complicated requirements could very well be superseded by the time the team get to them. However, whilst all participants agreed with the theory, three noted that estimating is generally more accurate than for waterfall, but put waterfall in front of inexperienced people and see how wildly the estimates and actuals vary!

Alastair Ardern states that "a fixed cost focuses product owners when prioritising requirements to deliver. Anything that introduces a barrier or handover needs to be scrutinised as it holds up real work. As a key user or sponsor, if you are not getting what you want, stop".

### 4.1.7 Planning and reviews have to be done, but can be fun

The agile theory advocated a cycle of build, measure then learn, to deliver value, improve workflow and improve quality to deliver the right thing.

Martin Berman advocates using methods such as planning poker for estimation, as part of sprint planning, (but add in time for training and development), as the fun element encourages creativity and helps to generate discussion. He states, "It's good to introduce a new concept, to get all the teams in one room, to assess the relative size of work chunks, and not just do this for each sprint. It's fun and a bit different, and really helps with motivation. However, you do need to add in time for training and development and try to use a tool like Jira between the technical teams. Just ensure analysts are included for traceability, visibility and to support estimation."

Two project managers drew attention to a further risk of an agile approach. They said it's important to consider how to avoid a "technical debt", by rushing to get something done; always plan in requirements for tidying work up as you go along.

One project manager mentioned that there is often a preconception that agile means no documentation. Whilst this is not the case, most participants said that they had actively considered the appropriate level of documentation to produce. One participant suggested that using Kipling's 'six honest serving men' still works: who needs this, what are they going to use it for, why do they need it, when and how often does it need to be produced, where will it be stored, how will it be delivered and consumed?

All agreed that retrospectives are essential and that the review process after each iteration or sprint is the only way to gain continuous improvement and hence velocity

### 4.1.8 Measure and track!

Several participants warned against teams thinking they are working in an agile way without following the basic principles. Thus they sacrifice waterfall standards of control. It's important to get metrics for visibility as well as control in any method, even a "non-pure" approach.

## 4.2 Participants had to consider...

### 4.2.1 When agile is the most suitable approach to use.

Level of certainty versus time to market is the balance that needs to be considered when selecting suitable projects to go agile. All cited that a typical case is if a customer knows what they don't want, but can be coaxed to describe the first benefit they do want delivered. agile then enables rapid prototyping, to aid driving out fuller requirements.

Another point made by one project manager is to select an agile delivery approach, when the drive to deliver is greater than the risk, e.g. shipping early stage Ebola vaccine without full clinical trials results.

Four participants mentioned that it's a hard sell to stakeholders; "give us money, we promise to deliver something but we don't know what or exactly when". This comment was felt to emphasise the need for strong project management around an agile delivery, as there is a tendency for stakeholders to think agile is all that's needed, when actually it's a development subset of a full project management lifecycle that actually necessitates more stakeholder management, risks and issues identification and pre-emptive actions. The difficulty they identified is to select a project where a client can spend enough time with the team and all agreed that, if you can't get that, it's not suitable as it won't work, so a better approach would be a waterfall methodology. So, their experience was that it needs to be explained as a significant time commitment that has to have delegated authority and buy in from senior management. One participant noted that the first time through, it's a "leap of faith", and so there is a risk of giving up and losing benefits.

As part of this study, we did ask construction and engineering companies about their adoption of agile and got a resounding lack of practitioners. Kevin Faussett comments that: "Agile is not used as construction and engineering works have clear requirements, relatively stable environments, known work and therefore high quality estimates. They are also heavily regulated with safety implications."

This bears out the academic research that agile adoption is limited in those arenas and bears out the technology practitioners views, who were unanimous in saying they wouldn't use agile for fixed scope, regulatory and safety work. All agreed that agile works better than waterfall for high risk, fast moving, urgent need work, that can get buy in and time, but the requirements are unclear. No one would use it as a methodology in safety related situations e.g. aeronautics. Chris Bell says that, his "experience of the technology and innovation experience is that agile is the method to choose when there is uncertainty: over requirements, prioritisation, environment, and time and cost are pressures". He also noted that in his experience, agile appeals to younger people who haven't previously been exposed to waterfall.

Tony Davis identified the following:

Waterfall	
Pros	Cons
<ul style="list-style-type: none"> <li>Works best when there are defined requirements</li> <li>Best for stable environment</li> <li>The team is distributed and hence control can be managed by defined deliverables, milestones and dependencies</li> <li>Best if scarce skills or resources have limited availability</li> <li>Plans are repeatable for similar projects</li> </ul>	<ul style="list-style-type: none"> <li>Requires investment to define scope and schedule before work begins</li> <li>Scope changes can be slow and the adverse impact increases over the life cycle</li> <li>Risk of nothing to show for the money until the end</li> <li>Change adds effort and risk, so a strict change control process must be in place to avoid 'scope creep'</li> </ul>
Agile	
Pros	Cons
<ul style="list-style-type: none"> <li>Works well when the detailed requirements are unknown or subject to change</li> <li>Give flexibility to 'course correct'</li> <li>Needs regular stakeholder feedback</li> <li>The team is co-located, multi-functional and enables to work in a collaborative way</li> <li>Early return on investment by regular delivery</li> </ul>	<ul style="list-style-type: none"> <li>No advantage for projects where the scope and detailed requirements are well understood and change can be controlled</li> <li>Uncertainty around scope and schedules can make stakeholders nervous</li> <li>Less effective if the 'team' is distributed</li> <li>Demands management and prioritisation of the backlog</li> </ul>

### 4.2.2 What split of waterfall/agile to use

Many projects discussed during the interviews began as waterfall, to get enough understanding to get a 'go' decision, then moved to an agile approach at various stages of the justify stage. When to move to agile was not a consistent view, with some maintaining all stages, post business case could be appropriately delivered in an agile way, with others maintain its just for the development stage, so post-detailed design. All agreed their preferred deliveries were in small chunks, rather than compiling items to be joined together at the end, as that was too close to a waterfall approach and increased risk of delivering the wrong thing or hitting integration problems after significant time and effort had been expended.

This mixed stage approach also has the advantage of building confidence in governance groups who have not been exposed to agile before. Another stakeholder management technique most project managers used was to share the scrum or kanban boards showing key metrics on a regular basis, and concentrate on making the tracking and communications highly transparent.

### 4.2.3 Scrum or kanban?

Two of the organisations studied had progressed from scrum sprints to a kanban approach, (kanban was developed by Toyota to improve productivity), perceiving it to give greater flexibility, because it is a continuous process. Paul Johnson and Tony Davis both agree on the key differences between the two methods:

Kanban	Scrum
Continuous delivery, does not assume you can fit everything into a sprint	Time-boxed sprints, good for supporting committed time-constraints
Work is 'pulled' through the system (single piece flow)	Work is 'pulled' through the system in batches (the sprint backlog)
Changes can be made at any time with agreement	No changes allowed mid-sprint
Cycle time	Velocity

### 4.2.4 How to get a great product owner

Tony Davis states that: "The role of product owner is key and needs to be a senior, empowered specialist with appropriate responsibility and authority from their primary role in the business."

- Business involvement – dedicated, part time or devolved to an analyst.
- Risk of product owner just adding things in and taking control
- Need someone who can convert business language into technical activities but is aware of the need to fit into corporate and regulatory governance.
- Must understand the 'customer' and have the authorisation to take decisions.

Multiple users and even project owners means a forum must be set up to manage conflicting requirements and priorities, or result in changing or re-planning activities. Jo Hinchcliffe shared a simple idea for project managers to book time into people's diaries ahead of time, outside of a sprint and to schedule more input than may actually be needed, to give some flexibility and capacity to support the team. It is, as in any project methodology, important to be clear up front about holidays, needs, expectations and actively communicate and manage team members.

Using a business analyst in lieu of a product owner was one adaptation several participants had used. All who had agreed it was a workaround and far from ideal. The analyst had to go back to the customer or part time product owner, which built delay into the workings of the team and reduced throughput.

What everyone remarked upon and liked was the management benefit of building up trust, as compared to no visibility with waterfall until the end product is delivered, then discovering that its not suitable. Delivery teams also appreciated being able to see their product in live use.

### 4.2.5 Do I need a scrum master and a project manager?

As previously stated by all participants, co-location is most important, but especially with the role of scrum master; one project manager noted that his experience of having a remote or even offshore scrum project management of agile works best when at a single team level, but often a project is made up of multiple teams, with a scrum master as team leader. All participants agreed that the project manager's leadership style needs to be facilitative, a "servant-leader", rather than a more traditional, directive style.

Similarly, two participants specifically expressed the view that traditional command and control does not work, as it stops the agility by taking away the individual's responsibility for their own work, and can bias the estimation process. Therefore, the project manager needs to be someone who tasks the team, but helps, supports, coordinates and, above all, listens.

The consensus from participants is that both the scrum master and project manager are required, but need to work closely together to manage the product owner and team resourcing.

The project manager must scrutinise the metrics closely to be able to track progress and communicate it externally to the team, but also use them as an indicator of blockers and so to clear issues away from the group before they become serious. If the project is part of an overall programme, the project manager will then be able to communicate effectively to the programme manager.

Mark Sutherland shared the learning gained from an on-going pilot: projects within a large programme are following scrum standards set down by the Government Digital Service for the framework, assurance and service standards, bringing developers in from suppliers, with the sponsor acting as the product owner.

The project teams are using agile after an initial discovery phase, which generates the product backlogs. Each sprint is two weeks, with daily stand-ups and regular planning games. The team are physically located in the business area, as they were originally based in a different building, which didn't work so well. They now have their own separate environment and team members get awareness and training on how to work in their agile team.

The work is digital technology, with agile development selected as the preferred methodology because of the drive to reduce budgets and do more for less, and deliver quickly. It was believed that adopting the methodology initially for technology would be a good fit. It wasn't initially a success, due to a lack of capability and trying something totally new on a big piece of work. However, following training, relocation, separating the work into streams and adding real time information sharing tools such as wikis, a new mindset has been established.

The recommendation now is to ensure that people are comfortable and the right fit for the new ways of working, especially when fitting into a more established set of development and project management methodologies. Mark Sutherland says that at first "using PRINCE2, all the neat project stages were 'messed up' with agile. The first time through, pre-training, was part waterfall and part RAD. Following that experience, a set of principles have been established, how to put multifunction teams together, and a portfolio management team across all agile projects".



#### 4.2.6 How to project manage across multiple agile workstreams and projects

Martin Berman notes: "If you result in having a number of agile projects and dependencies, how to manage them all together has to be carefully defined. Whilst a group of sprints in a single team can be added together to make an "epic" of related deliverables, there is also the concept of a 'scrum of scrums' to manage and align across teams, for instance, if you have lots of enabling work, or are working on legacy solutions."

Several participants reflected that, if delivering more than one project, it is important to consider organising by "product line" rather than project based teams, as the team own the functionality, build up knowledge and have a sense of pride in their area, working on product specific projects over time. Also, consider how work can be split up: one project manager expounded not using sprints, but having a kanban style pull from the team to work on small stories for workable items and just deliver when ready. This gives early value, but it was clear during the interviews that the approach was used by a highly experienced and skilled team, so may not be suitable in all situations. Metrics were vital, put in place and managed in that situation, as sprints do act as a natural delimiter.

The product owner needs to attend all sprint planning sessions, and some had support from business analysts to do detailed requirements. All projects discussed held requirements in an overall list, then each team drew them down. Everyone broadly defined each sprint, then broke them down into smaller stories.

The participants had deliveries that needed integrating to a wider project environment, so stated that it is important to put thought into the interfaces between legacy and agile workstreams, e.g. to define the style and scope of business requirements, for consistency across teams and to reduce time and effort. This then helps to decide how to break work down in streams – possibly by functional areas or into a logical delivery order or process flow basis.

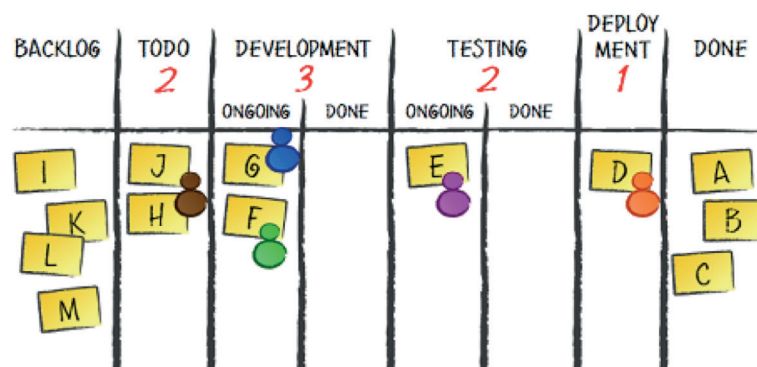
Another key consideration that many participants had struggled with was deciding whether each team includes testing in a sprint before delivering, or whether the product is tested and integrated by the scrum of scrums or in a legacy methodology. The advantage is that delivery stays focused with a reduced set of skills needed in the team, but the disadvantage is delay and handover before a finished product is actually delivered. Wherever possible, they preferred to develop tests in conjunction with requirements, then check they were incremental and run consecutively to build up over time. One project manager suggested splitting a sprint into two sections, with a build of two weeks with a third week to integrate and test across streams or modules or three weeks for larger requirements and two weeks for smaller deliverables. These can then be ordered according to when scarce or partial resources are available.

Another participant suggested defining a process pipeline, then track to keep within a number of sprints e.g. s-1 to s+1 of each other. He also implemented an overall design authority, to act as a change board, which gave an appropriate change control process and reviewers, to assess the impact across projects of one sprint not delivering something on the broader deliveries. So, a programme board can support the product owner, as well as host an analyst to start defining future requirements on behalf of the product owner, as well as shape future epics.

### 4.2.7 Use of tools and techniques to address gaps

A key agile principle is worth reiterating, that of, 'individuals and interactions over tools and techniques'.

Everyone was adamant that having a team in the same location, face to face, was very much to be desired, but if it's not possible and a team is distributed (across buildings, countries), the project manager has to think very carefully about enabling communications, and investigate the technology, such as skype, google hangouts, instant messaging, webex and video conferencing. Collaboration tools are readily available on the internet, such as kanban boards, Elementool and team Foundation Server from Microsoft, with many being freeware.



They also put effort into considering a broader use of social media for risk mitigation if not co-located, not just shared boards:

<http://msdn.microsoft.com/en-us/vstudio/ff637362.asp>

<http://elementool.com/>

<http://info.leankit.com/online-kanban-board>, <https://kanbanize.com/>

Only one, non-IT project manager who responded, has successfully used social media for team communications, but not for an agile delivery. The general view was that policing the suitability of content was problematic in a formal, corporate environment, so the overheads outweighed benefit.



## 5. Conclusions

The participants represented a broad range of project management experience, styles and project scales, but the drivers for selecting agile as a methodology were the same: either a need for speed, a fixed budget with uncertain requirements but clear benefits/outcome, or a willingness to pilot and prototype. However, the projects delivered by the participants in an agile methodology were predominantly information technology solutions. This could be due to some membership or network bias, or could be indicative of a lack of adoption for wider project deliveries.

All participants identified key success factors:

- Project management maturity and culture of project management to understand roles and expected behaviours.
- An agreed time commitment from client/customer is critical.
- Co-location or ability to meet regularly face to face as a team.
- Investment in training and team building.

They noted that many project management principles are the same, regardless of methodology, but more relevant to agile are communications methods, experienced team members, co-location and senior management buy in. However, agile is perceived to take more initial effort to get the best conditions, such as that colocation, a full range of skillsets in the team, full time not part time resourcing. Also, that the agile principle of servant leader also applies to the project manager, not just to the scrum master.

With one exception, participants all blended methods from the range of agile methodologies, but the majority used a basis of scrum, (as XP seems to have been popular earlier in the adoption trend). And one is moving from scrum towards kanban. The participants adaptations broke down into three areas:

1. Artefacts consistent as a minimum set were a product backlog, sprint planning sessions, sprints, daily meetings and retrospectives.
2. Where adaptations were made, it was mainly to sprints duration, but the consensus on an ideal duration was two to four weeks, several had used a business analyst as the client, and what was tracked and in what format was particular to each organisation, so tracking metrics were adapted (but always needed, even if not a classic burndown chart).
3. Peer programming had a limited adoption.

A key learning point was to design up front how to integrate with legacy methodologies, manage governance for mixed methodologies across a company, and how to organise multiple workstreams, whether split by project, functionality or simply to make teams an effective size.

All had had some positive experience and would use agile again, as it does deliver early benefit, for less money. None of the participants would use agile for regulatory or safety changes, or where a stable environment has clear set of requirements.

## Glossary

<b>Benefits realisation</b>	The process of understanding, planning, realising and reporting both financial and non-financial benefits associated with technology enabled business change.
<b>Business relationship management</b>	A formal approach to understanding, defining and supporting a broad range of inter-business activities and relationships over time.
<b>Information systems (IS)</b>	An integrated set of components for collecting, storing and processing data.
<b>Information technology (IT)</b>	The software and hardware systems that support data intensive applications to deliver information, knowledge and digital products.
<b>Kanban</b>	Kanban is a method for managing knowledge work with an emphasis on just-in-time delivery while not overloading the team members. In this approach, the process, from definition of a task to its delivery to the customer, is displayed for participants to see and team members pull work from a queue
<b>PRINCE and PRINCE2</b>	A process based method for effective project management.
<b>Project management</b>	The discipline of planning, organising, motivating and controlling resources to achieve specific objectives.
<b>RAD</b>	Rapid application development
<b>Scrum</b>	An iterative and incremental agile development framework for software projects.
<b>Waterfall</b>	A sequential design and delivery process.
<b>Wiki</b>	A website where content is modified by end users

## References

- Agarwal, N. & Rathod, N (2006)** "Defining success for software projects: an exploratory revelation", International Journal of project management 24 pp 358-370.
- Almeida, L.F.M, Conforto, E.C>, Silva, L.S. & Amaral, D.>C (2012)** "Critical factors in Agile projects for new product developments" Produto & Producao, 13(1) p. 93-113.
- Ashurst, C., & Doherty, N (2004)** "Towards the formulation of a "Best practice" framework for benefits realisation in IT projects". Electronic Journal of Information systems evaluation, paper 1, issue 2.
- Baccarini, D (1999)** "The logical framework method for defining project success" Project Management Journal, December
- Conforto, E, Salum F, Amaral D, Luis da Silva LS, de Almeida LFM (2014)** "Can Agile project management be adopted by industries other than software development?", Project Management Journal June/ July 2014, pp21-34
- Daim, T.U., Ha A, Reutiman, S, Hughes B, pathak U, Bynum W, Bhatla A (2012)**, "Exploring the communication breakdown in global virtual teams", International Journal of project management 30, pp 199-212
- De Wit, A (1988)** "Measurement of project success" Butterworth & Co Ltd 0263-7863/88/030164-07
- Doherty, N.F. & King, M., (2001)** "An investigation of the factors affecting the successful treatment of organizational issues in systems development projects". European Information Systems, 10.
- Dvir, D., Sadeh A, Malach-Fines, A (2006)** "Projects and project managers: the relationship between project manager's personality, project types and project success", Project Management Journal, December.
- Dvorak, R.R., Holen, E., Mark D, & Meehan III, W.F. (1997)** "Six principles of high-performance IT" The McKinsey Quarterly Number 3.
- Earl, M.J., (1989)** "Management strategies for information technology, Prentice-Hall, London.
- Earl, M.J. (1992)** "Putting IT in its place; a polemic for the nineties" Journal of Information technology 7.
- Earl, M.J. & Feeny, D.F.**, "Is your CIO adding value", Sloan Management review, Spring 1994.
- Earl, M.J. & Skyrme, D.J. (1990)** "Hybrid managers; what do we know about them?" RDP90/6, Templeton College, Oxford.
- Ewusi-Mensah, K. & Przasnyski, Z., (1994)** "Factors contributing to the abandonment of Information Systems Development projects", Journal of Information technology.
- Feeney, D., & Willcocks, L., (1998)** "Core capabilities for exploiting information technology", Sloan management Review, Spring, 39.
- Fisher E (2011)** "What practitioners consider to be the skills and behaviours of an effective people project manager", International Journal of project management 29 pp. 994-1002
- Grace,M (2011)** "Opinion piece: If social networking sites are the most appropriate channels to reach our stakeholders, surely we must embrace this platform?", Project, June 2011
- Griffiths, C. (1994)** "Responsibility for IT; a grey area of management" Information management; the evaluation of information systems investments, Willcocks, L. (ed), Chapman & Hall
- Grindley, K. (1991)** "Managing IT at Board level; the hidden agenda exposed" Pitman, London.
- Hellard, R.B. (1995)**, "Project partnering: Principle and practice" Thomas Telford, London
- Henderson, J.C. & N. Venkatraman (1993)** "Strategic alignment; leveraging information technology for transforming organizations", IBM Systems journal Vol 32, Number 1.

- Hirschheim, R., Earl, M., Feeny, D., Lockett, M.,** "An exploration into the management of the information systems function; key issues and an evolutionary model" Information management for productivity and strategic advantage open conference, March 1988.
- Hochstrasser, B. & Griffiths, C., (1990)** "Regaining control of IT investments" Kobler Unit, Imperial College, London.
- Kang D.B & Moe T.L. (2008)** "Success criteria and factors for international development projects: a life-cycle based framework", Project Management Journal, March.
- Kaplan, B. & Duchon, D. (1988)** "Combining qualitative and quantitative methods in information systems research; a case study", MIS quarterly, December.
- Keen, P.G.W. (1993)** "Information technology and the management difference; a fusion map" IBM Systems journal vol 32 no 1.
- Kotter, J.P. & Heskett, J.L. (1992)** "Corporate culture and performance" The Free press, New York.
- Laanti M, Salo O, Abrahamsson P. (2011)** "Agile methods rapidly replacing traditional methods at Nokia: A survey of opinions on Agile transformation" information and software technology 53, pp. 276-290.
- Lin, C. & Pervan, G. (2001)** " IS/IT investment evaluation and benefits realisation issues in a Government organisation" 12th Australasian conference on information systems.
- Markus, L & Benjamin R. I. (1996)** "Change agency – the next IS frontier" MIS Quarterly, December.
- Markus, L. & Bjorn-Andersen, N.** "Power over users; its exercise by systems professionals" "Communications of the ACM, vol 30, June 1987.
- Markus, M.L., & Robey, D., (1995)** "Business process reengineering and the role of the information systems professional" Business process reengineering; a strategic approach, V. Grover & W Kettinger (eds), Idea group Publishing.
- Mata, F.J., Fuerst, W.L, & Barney, J.B. (1995)** "Information technology and sustained competitive advantage: a resource-based analysis"
- Mcfarlan, F.W., (2001)** "Information technology changes the way you compete" Harvard Business Review V662 March-April 1984 pp. 98-103.
- Orlikowski, W.J.** "The duality of technology; rethinking the concept of technology in organisations" Organizational science (3:3), April 1992.
- Peppard, J & Ward, J.(1999)** "'Mind the gap'; diagnosing the relationship between the IT organisation and the rest of the business" Journal of strategic information systems 8.
- Pitt L., Bethon P., Lane N., (1998)** "Gaps within the IS department: barriers to service quality", Journal of Information technology 13, pp 191-200.
- Rockart, J.F. (1988)** "The line takes the leadership – IS management in a wired society", Sloan Management Review 57, summer.
- Scott-Morton, M.S. (1991)** "The corporation of the 1990s; information technology an organizational transformation" Oxford University Press, Oxford.
- Shao, J & Muller R (2011)** "The development of constructs of program context and program success: a qualitative study", International journal of project management 29, pp. 947-959.
- Shao, J & Turner J.R., Muller, R., (2009)** "The program manager's leadership style and program success: literature review and research outline." Proceedings of IRNOP IX (International research network for organizing in projects) October 11-13, 2009, Berlin, Germany
- Strassmann, P.A. (1990)** "The business value of computers" The information economics press, New canaan.

**Symons, L, Orlov, L.M. & Sessions, L (2006)** "Measuring the business value of IT", Forrester.

**Turner, J.R. (1993)** "The handbook of project-based management", McGraw Hill

**Venkatraman, N. & Loh, L (1994)** "The shifting logic of the IS organization: from technical portfolio to relationship portfolio", Information Strategy: The executive's journal, winter.

**Waardenburn, G.V., van Vliet, H (2013)** "When Agile meets the enterprise", Information and Software technology 55 p2154-2171.

**Ward, J. & Peppard, J.,(1996)** "Reconciling the IT/business relationship; a troubled marriage in need of guidance" Journal of strategic information systems 5.

**Ward, J. & Peppard, J. (2005)** "Unlocking sustained business value from IT investments: balancing problem-based and innovation-based implementations", California Management Review, May.

**Ward, J., Taylor, P., & Bond, P. (1996)** "Evaluation and realisation of IS/IT benefits; an empirical study of current practice", European Journal of Information Systems, 4.

**Wateridge, J (1997)**, "How can IS/IT projects be measured for success?", International Journal of Project Management, 1998 Vol 16, No1, pp. 59-63.

**Wateridge, J. (1996)** "Delivering successful IS/IT projects& key elements from success criteria to implementation via management, methodologies and teams", PhD thesis.

**Willcocks, L.P. & Margetts, H. (1994)** "Risk and information systems; developing the analysis", Information Management; the evaluation of information systems investments, Willcocks, L. (ed) Chapman & Hall, London.

## Bibliography

- Agarwal, N., & Rathod, U(2006).** Defining "success" for software projects: An exploratory revelation. *International Journal of Project Management*, 24 358-370.
- Anantatmula, V., & Thomas, M. (2008).** Global projects: How to manage them successfully? Paper presented at the Project management Institute Research Conference, Warsaw, Poland.
- Atkinson, R. (1999).** Project management: Cost, time and quality, two best guesses and a phenomenon, its time to accept other success criteria. *International Journal of Project Management*, 17, 337-342.
- Avots, I** "Why does project management fail?" *California Management Review* 12 (1969) 77-82
- Baccarini, D. (1999)** The logical framework method for defining project success. *Project Management Journal*, 25-32.
- Baker, B N, Fisher, D and Murphy, D C** Factors affecting project success *National Technical Information Services*, N-74-30092 (September 1974)
- Baker, B N, Fisher, D and Murphy, D C** Project management in the public sector: success and failure patterns compared to private sector projects *National technical Information Services*, N-74-30092 (September 1974)
- Baker, B N, D. C. Murphy, and D. Fisher,** "Factors affecting project success," in *Project Management Handbook*, D. I. Cleland and W. R. King, Eds. New York: Van Nostrand, 1983, pp. 669-685.
- Baker, B. N., Murphy, D. C. and Fischer, D.,** Factors affecting project success, In *Project Management Handbook*, Eds Cleland and King. Von Nostrand Reinhold, 1983.
- Baker, B N, Murphy, D C and Fisher, D** "Factors affecting project success", in Cleland and King (Eds) *Project management handbook* Van Nostrand Reinhold, USA (1983).
- Baker, N., Murphy, D., & Fisher, D.** (1988). Factors affecting project success. In D. I. Cleland, & W. R. King (Eds), *Handbook of project management*, New York: Van Nostrand Reinhold.
- Baker, B.N., Murphy, D.C., & Fisher, D** (1988). Factors affecting project success. In D.I. Cleland & W.R. King (Eds) *Project management handbook* (pp. 902-919). New York: Van Nostrand Reinhold.
- Bell, J. (1987)** *Doing your research project, A guide for first-time researchers in education and Social Sciences.* O.U. Press, Bristol.
- Belout, A., & Gauvreau, C (2004).** Factors influencing project success: The impact of human resource management. *International Journal of Project Management*, 22, 1-11.
- Berry, R. (1996)** *The Research Project: How to write it.* Routledge, London.
- Boiney LG (1998)** Reaping the benefits of information technology in organisations. *The Journal of applied behavioural Science* 34(3), 327-346.
- Cameron, Bobby. Cullen, Alex. Worthington Brandy, Oct 10, 2008.** IT Demand Management and the PMO. The PMO is both part of and a precursor to IT demand management
- Cascio, W., & Shurygailo, S. (2003).** E-leadership and virtual teams. *Organizational dynamics*, 31, 362-376.
- Cash H and fox, R** "Elements of successful project management" *J Systems Management* (1992) 10-12
- Cecere, Marc., Merriman, Dan & Visitacion, Margo. Nov 19, 2002.** Enabling Business Value via IT – Integrating Strategic Planning and IT Value Management.
- Cervone H.F. (2010)** "Understanding Agile project management methods using Scrum", [www.emeraldinsight.com/1065-075x.htm](http://www.emeraldinsight.com/1065-075x.htm)
- Cheng, M., Dainty, A. R. J., & Moore, D. R.(2005).** What makes a good project manager? *Human Resource Management Journal*, 15(1), 25-37.

- Cicmil, S., Hodgson, D. (Eds.), 2006.** Making Projects Critical, Management, Work and Organisations. Macmillan, Palgrave.
- Cooke-Davies, T.J. (2000).** Towards improved project management practice. Uncovering the evidence for effective practices through empirical research. Unpublished doctoral thesis, Metropolitan University, Leeds, UK
- Cooke-Davies, T.J. (2002).** The "real" success factors on projects. *International Journal of Project Management*, (20(3), 185-190.
- Cooke-Davies, T.J. (2004).** Project Management maturity models. In P.W.G. Morris & J. K. Pinto (Eds), *The Wiley guide to managing projects* (pp. 1234-1264). Hoboken, NJ: Wiley.
- Cullen, Alex., Nov 7, 2008.** The Business-IT Expectation gap.
- Davern MJ and Kauffman RJ (2000)** Discovering potential and realizing value from information technology investments. *Journal of Management Information Systems* 16(4), 121-143.
- De Cotius, T A. and Dyer, L.** defining and measuring project performance, *Research Management*, 16, 1979 17-22.
- De Wit, (1988)** "Measurement of project success" *International journal of Project Management* 6 (3).
- Dingsoyr T., Nerur S., Balijepally V, Moe N B. (2012)** "A decade of Agile methodologies: Towards explaining Agile software development" *The journal of systems and software* 85, pp. 1213-1221.
- Doherty NF and King M (1998)** The consideration of organizational issues during the systems development process: an empirical analysis. *Behaviour & Information Technology* 17(1), 41-51.
- Doherty NF and King M (2001)** An investigation of the factors affecting the successful treatment of organisational issues in systems development projects. *European journal of Information systems* 10, 147-160.
- Driver, Erica and Moore, Connie. Nov 2007** "The Seven Tenets Of The Information Workplace". *Information & Knowledge Management Professionals*.
- Duncan, G L and Gorsha, R A** "Project management: a major factor in project success" *IEEE Transactions on Power Apparatus and systems* 102 (11) (1983) 3701-3705
- Dvir, D., Sadeh, A., & Malach-Pines, A. (2006).** Projects and Project managers: The relationship between project manager's personality, project, project types, and project success. *Project Management Journal*, 37(5), 36-48.
- Edwards C and Peppard J (1997)** Operationalizing strategy through process. *Long range planning* 30(5) 753-767.
- Estelle Phillips (Author), D.S. Pugh (Author)** How to get a PhD: A handbook for students and their supervisors (paperback) 235 pages. ISBN-13: 978-0335205509
- Ewusi-Mensah K and Przasnyski Z (1994)** Factors contributing to the abandonment of information systems development project. *Journal of Information Technology* 9, 185-201.
- Farbey B, Land F and Targett D (1993)** How to assess your IT investment. Butterworth-Heinemann, Oxford.
- Fortune J., & White, D. (2006)** Framing of project success critical success factors by a system model. *International Journal of Project Management*, 24 (1), 53-65.
- Gill, J and Johnson, P (2002)** *Research Methods for Managers*, sage, London.
- Gerush, Mary. Visitacion, Margo., D'Silva, David and Knoll, Adam. Oct 29, 2010.** Best Practices: Five Strategies for Leading Diverse, Distributed Teams to Success.



**Hayfield, F** "Basic factors for a successful project" Proc. 6th Internet Congress Garmisch-Partenkirchen FRG (1979) pp 7-37.

**Hellard, R. B. 1995.** Project Partnering: Principle nad Practice. Thomas Telford, London.

**Hertel, G., Geister, S., & Konradt, U. (2005).** Managing virtual teams: A review of current empirical research. Human Resource Management Review, 15(1), 69-95.

**Hochstrasser B and Griffiths C (1991)** Controlling IT investment, Chapman Hall, London.

**Howard, K & Sharp, J.A. (1983)** The Management of a student research project. Gower, London.

**Husselbaugh, Brett Mar 19, 2001.** Want to ensure IT Projects deliver expected benefits? Look into earned value management.

**Iivari J., Iivari N. (2011)** "The relationship between organisational culture and the deployment of Agile methods", Information and software technology 53, pp. 509-520.

**J.S. Hammond III,** "A practitioner-orientated framework for implementation," in The Implementation of Management science, R Doktor, R. L. Schultz, and D.P. Slevin, Eds. New York: North-Holland, 1979, pp. 35-62.

**Jugdev, K Muller, R., 2005.** A retrospective look at our evolving understanding of project success. Project Management journal 36 (4), 19-31.

**Jurison J (1996)** Towards more effective management of information technology benefits. Journal of Strategic Information systems 5(4), 263-274.

**Keitt T.J. March 2011.** The state of Collaboration Software Implementations: for Content & Collaboration Professionals.

**Keitt TJ, March 21, 2011.** The State of Collaboration Software Implementations: 2011 Content & Collaboration Professionals

**Keen P (1991)** Key note address: relevance and rigor in information systems research. In Information System Research: Contemporary Approaches and Emergent Traditions (Nissen HE, Klien HK and Hirschheim R Eds), pp 27-49 Elsevier Publishers, Amsterdam.

**Khang, D. B., & Moe,T.L. (2008).** Success criteria and factors for international development projects: A life-cycle-based framework. Project Management Journal 39(1), 72-84.

**Koplowitz, Rob. Apr 22, 2010.** Enterprise social networking 2010 market overview. Information & knowledge management professionals.

**Krzanik L., Rodriguez P., Simila J, Kuvaja P., Rohunen A (2010)** "Exploring the transient nature of Agile Project management practices" Proceedings of the 43rd Hawaii International Conference on System Sciences.

**Larson, E. W. and Gobeli, D. H.** Significance of project management structure on project success. IEEE Trans on Engineering Management , 36(2), 1989, 119-125.

**Lyytinen K and Hirschheim R (1987)** Information systems failures: a survey and classification of the empirical literature. Oxford surveys in Information Technology \$, 257-309.

**McCraken, G. (1988)** The Long Interview. Qualitative Research Methods series 13. Sage University Paper. London/Beverly Hills.

**De O. Melo C., Cruzes D.S>, Kon, F., COnradi R. (2013)** "Interpretative case studies on Agile team productivity and management", Information and Software technology 55, pp. 412-427.

**Miles MB and Huberman /AM (1994)** Qualative Data Analysis. Sage Publications, Thousand Oaks, CA.



**Morris P W G and Hugh, GH** Preconditions of Success and Failure in Major Projects Templeton College, the Oxford Centre for Management Studies, Kinnington Oxford, Technical paper No.3 (September 1986)

**Morris, P W G and Hough, G H** "The pre-conditions of success and failure in major projects" Technical Paper No 3, Major Projects Association, Templeton College, Oxford (1986).

**Muller, R., Turner, J.R., 2007b.** The influence of project managers on project success criteria and project success by type of project. *European Management journal* 25 (4), 298-309.

**Munns, A.K., & Bjeirmi, B.F. (1996).** The role of project management in achieving project success. *International Journal of Project Management*, 14 (2), 81-87.

**National Audit Office (2006)** delivering successful IT enabled business change. Report by the comptroller and Auditor General, HC 33-1 Session 2006-2007, November.

**Nicholas, J M** "Successful project management: a force-field analysis" *J system Management* January (1989) 24-30

**Office of Government Commerce (OGC). (2005).** Managing successful projects with PRINCE2. London: The Stationary Office.

**Office of Government Commerce (OGC), (2007).** Managing Successful Programmes (MSPTm). TSO, Norwich.

**Orlikowski WJ (1992)** The duality of technology: rethinking the concept of technology in organizations. *Organization Science* 3(2) 398-427.

**P. W. G. Morris,** "Managing Project interfaces – key points for project success," in *Project management handbook*, D. I. Cleland and W. R. King, eds. New York: Van Nostrand, 1983, pp 3-36.

**Peppard J and Ward J (2004)** Beyond strategic information systems: towards an IS capability. *Journal of Strategic Information Systems* 13(2), 167-194.

**Peppard J and Ward J (2005)** Unlocking sustained business value from IT Investments. *California Management review*, 48(1), 52-69.

**Peppard J, Ward J and Daniel E (2007)** Managing the realization of business benefits from IT Investments. *MIS Quarterly Executive* 6(1), 1-11.

**Perry C** Thesis resource paper: A structured approach at presenting these [http://www.uq.net.au/auction\\_research/art/cperry.html](http://www.uq.net.au/auction_research/art/cperry.html)

**Pinto, J.K., & Slevin, D.P. (1988).** Critical successfactors in effective project implementation. In D.I. Cleland & W.R. King (Eds), *Project management handbook* (pp. 479-512). New York: Van Nostrand Reinhold.

**Posner, B Z** "what it takes to be a good project manager " *Project Management Journal*" (1) (1987) 51-54

**Project Management Institute (PMI), 2006.** The Standard for Program Management. Project Management Institute, Inc., Newton Square (USA).

**Project Management Institute. (2008)** A guide to Project management body of knowledge (PMBOK guide)- Fourth edd. Newton Square, PA: Author.

Project Management Institute. (2009) *Project Management Professional (PMP) credential handbook*. Newton Square, PA: Author.

**Project Management Institute (PMI). (2008b).** Organizational project management maturity model (2nd ed.) Newton Square PA: Author

**R. D. Archibald,** *Managing High Technology Programs and Projects*. New York: Wiley, 1976.

**Robey D and Markus L (1998)** Beyond rigor and relevance: producing consumable research about information systems. *Information Resources Management journal* 11(1), 7-15.

**Schwaber, Cary., Gilpin, Mike and D'Silva, David.** June 19, 2008. ALM2.0: getting closer, but not there yet.

**Shao, J., Turner, J.R., Muller, R., 2009.** The program manager's leadership style and program success: a literature review and research outline. *Proceedings of IRNOP IX (International Research Network for Organizing in Projects)*. October 11-13, 2009, Berlin, Germany.

**Sheedy, Tim., Parker, Andrew. & Galvin, Sean., June 12, 2008.** People Management is fundamental to the success of large system integration projects. *Sourcing & vendor management professionals*.

**Shenhar, A.J., Dvir, D., Levy, O., 1997.** Mapping the dimensions of Project success. *Project Management journal* 28 (2), 5-13.

**Shenhar, A.J., Wideman, R.M., 2000.** Optimizing Success by matching Management style to Project Type. The original of this paper first published on the Project Management forum website, September, 2000. (Updated presentation, April, 2002).

**Shenhar, A. J., Dvir, D., Levy, O., & Maltz, A. C. (2001).** Project success: A multidimensional strategic concept. *Long range Planning*, 34, 669-725.

**Silvermann, D (2001)** *Interpreting Qualitative Data – Methods for Analysing Talk, Text and Interaction*, Sage, London.

**Soldan P., Landryova L., (2011)** "Agile methods of project management " 12th International Carpathian Control Conference.

**Spundak M., (2104)** "Mixed Agile/traditional project management methodology – reality or illusion?", *Procedia – Social and behavioural sciences* 119 pp. 939-948.

**Strassman P (1990)** *The Business Value of Computers*. The Information economics Press, New Cannan Connecticut.

**Sterpe, Peter. Aug 28, 2007.** Rescuing train wrecks: Putting derailed software projects back on track. *Application development & Program Management Professionals*.

**Symons, Craig. Sept 25, 2006.** *Measuring the Business value of IT*.

**Thamhain, H. J. (2004).** Linkages of project environment to performance: Lessons for team leadership. *International Journal of Project Management*, 22, 533-544.

**Thomas, J. L., Delisle, C., Jugdev, K., & Buckle, P.(2002).** *Selling project management ot senior executives: Framing the moves that matter*. Newton Square PA: Project Management Institute

**Thomas, J. L., & Mullaly, M. E. (Eds). (2008).** *Researching the value of project management*. Newton Square PA: Project Management Institute

**Tuman, J.,** *Models for Archiving Success through team building and Stakeholder Management*. In the *AMA Handbook of Project Management*, ed P. C. Dinsmore, AMACOM, 1993.

**Uikey N, Suman U (2012)** "An empirical study to design an effective Agile Project Management Framework", *CUBE* September 3-5

**Visitacion, Margo. May 11, 2001.** *IT/Business Alignment – Cross Functional Project Management*.

**Visitacion, Margo. Dec 28, 2001.** *Market Overview: Enterprise project management space supports general and specific needs*.

**Visitacion, Margo. Oct 1, 2002.** *Companies must subscribe to Organizational Project Management maturity to experience real growth*.

**Visitacion, Margo. Jan 30, 2003.** Project Management Best Practices: Key Processes and Common Sense

**Visitacion, Margo. June 14, 2004.** The PMO and Value Realization.

**Wateridge, J.** IT projects: A basis for success. International Journal of Project Management. 13(3), 1995, 169-172.

**Wateridge J.** Delivering successful IS/IT projects: 8 Key elements from success criteria to implementation via management, methodologies and teams. PhD thesis 1996.

**Wateridge, J. (1995).** IT Projects: A basis for success. International Journal of Project Management. 13 (3). 169-172.

**Wateridge, J., 1998.** How can IS/IT projects be measured for success? Int. J. Proj. Manage. 16 (1), 59-63.

**Ward, J., Taylor, P. and Bond, P.** Evaluation and realisation of IS/IT benefits: An empirical study of current practice. European Journal of Information Systems, 4 1996, 214-225.

**Weitz, L.** How to implement projects successfully. Software magazine, 9(13), 1989, 60-69.

**Westerveld, E (2003).** The project excellence model: Linking success criteria and critical success factors. International Journal of Project Management, 21, 411-418.

**West, Dave. Oct 19, 2010.** The Time is Right for ALM2.0+ Application Development & Delivery Professionals.

**Wit, A D** "Measurement of project success" Project Management 6 (3) (1988) 164-170

**Wright, G & Fowler, C (1986)** Investigative design and Statistics. Penguin, Harmondsworth.

**Yin, R. K. (2002).** Case Study Research: Design and Methods. Thousand Oaks, Sage Publications.

## Online bibliography

1. Executive Brief, Which Life Cycle Is Best For Your Project?, PM Hut. Accessed 23. Oct 2009.
2. Agile Project Management, VersionOne
3. Richet, Jean-Loup (2013). Agile Innovation. Cases and Applied Research, n 31. ESSEC-ISIS. ISBN 978-2-36456-091-8
4. Agile Project Leadership Network (APLN)
5. Agile Project Leadership Network's Declaration of Interdependence
6. Agile Manifesto
7. Project Management Institute, A Guide to the Project Management Body of Knowledge (PMBOK Guide), Fifth Edition
8. <http://Agilemethodology.org> blog
9. [www.dsdm.org/dig...papers/Agile-project-management-white-paper](http://www.dsdm.org/dig...papers/Agile-project-management-white-paper)
10. [www.esi-intl.com/government.../WhitePapers/ESI\\_Agile-WP.ashx](http://www.esi-intl.com/government.../WhitePapers/ESI_Agile-WP.ashx)
11. [www.apmg-international.com/nmsruntime/saveasdialog.aspx?IID...](http://www.apmg-international.com/nmsruntime/saveasdialog.aspx?IID...)
12. [www.pmi.org](http://www.pmi.org) > ... > PMI Agile Certified Practitioner (PMI-ACP)
13. [www.best-management-practice.com/gempdf/dsdm\\_white\\_paper\\_v3.pdf](http://www.best-management-practice.com/gempdf/dsdm_white_paper_v3.pdf), White Paper. March 2010. Agile Project Management: Integrating DSDM Atern into an existing. PRINCE2™ environment. Keith Richards, Director.

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