POLITECNICO DI TORINO

Master of Science in Engineering and Management

Thesis Title

"Waterfall project management through Agile tools:

Mapping PMBOK® with Atlassian software suite"

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ABSTRACT

Industries are lagging in the application of modern information and communication technology as tools to enhance project performance. Where this technology has been applied, little has been done to meet up with the pace of advancements in information and communication technology.

The projects which use ICT tools have led to tremendous productivity and competitive gains. Crucial to the running of such projects is the sharing of information amongst the professionals, who all show a tendency of conflicting priorities. In the face of such conflicting priorities, there needs to be a system of communication that brings them together with the purpose of making them integrate to work as a team classical project management method were unable to cope with complex business environment, project uncertainty and increasing customer demands on product specification flexibility.

A common misconception in Project Management is that PMBOK® can only be applied for Traditional or Waterfall Project Management, and Atlassian products can only be used when a Project is being managed using Agile Project Management. Therefore, the question in research was if it is really the case? If PMBOK® is only valid for traditional project management and Atlassian products can only be used for projects being managed by Agile methodology. Hence, to derive to a conclusive result a mapping method has been used which descriptively covers PMBOK® Processes. Each process is mapped versus Atlassian Products' capabilities in a Matrix. Each factor is given a score based on fulfilment criteria to have a cumulative and weighted score.

And for that we mapped PMBOK® (5^{th} edition) process with Atlassian products we find out that out of 47 processes of PMBOK® (5^{th} edition), 45 processes can easily be mapped directly with Atlassian products or indirectly with Add-ons and Agile has an issue with cost that's why Cost and Resource activity estimation have zero coverage.

Agile/Scrum methodology and PMBOK® guide are not diametrically opposed.

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1 INTRODUCTION

1.1 GAP ANALYSIS:

The response from our critics indicates that they used to consume too much time and energy on documentation and planning. Despite this, the proven results didn't reach expectancy as well as accuracy both in terms of planned product or the execution process. Thus, resulting in inflexibly and anti-software engineering environment. In contrast, nowadays it's usual to work and communicate in a geographically dispersed organization with the help of various ICT tools.

The challenge in an organization is to be able to respond quickly. The teams really struggle with the service management and they want to find a service management solution that can be built and implemented quickly. Atlassian software suite helps them with all these challenges but there was a concept that Atlassian software suite are only for Agile Project Management and the PMBOK® is based on only Traditional waterfall approach and it is a non-software-based platform. This thesis aims to make a relation between Atlassian software suite and PMBOK processes.

1.2 RESEARCH QUESTION AND OBJECTIVE:

Our research question is whether traditional Waterfall methodology could be implemented to Agile tools or not? Is there any connection between Atlassian Products and PMBOK® processes or not?

Objective: Implementing/Mapping the PMBOK® processes with Atlassian software suite.

1.3 PROJECT MANAGEMENT

Project management is the application of processes, methods, knowledge, skills and experience to achieve the project objectives.

1.4 PROJECT MANAGEMENT INFORMATION SYSTEM (PMIS)

A framework tool or system for collecting, organizing, storing, processing & disseminating (Spread widely) project information. Used by upper and lower management to communicate each other.

1.5 PROJECT MANAGEMENT INSTITUTE

It's an internationally recognized organization that has developed standards for the domain of project.

1.6 ORGANIZATIONAL PROJECT MANAGEMENT (OPM)

OPM is a governance model that will translate the strategy into certain directions for the portfolio, program and project management practices within the organization that will sort the business value.

1.6.1 PROJECT: A temporary endeavour undertaken to create a unique product, service or result.

1.6.2 PROGRAM: Group of projects and program activities managed in a coordinated way to obtain benefits not available from managing them individually.

A project may or may not be the part of program, but a program will always have projects.

1.6.3 PORTFOLIO: Project, Program and operations managed as a group to achieve strategic objectives. The program or project in a portfolio may not be related but they help in achieving a common organizational goal. [1]

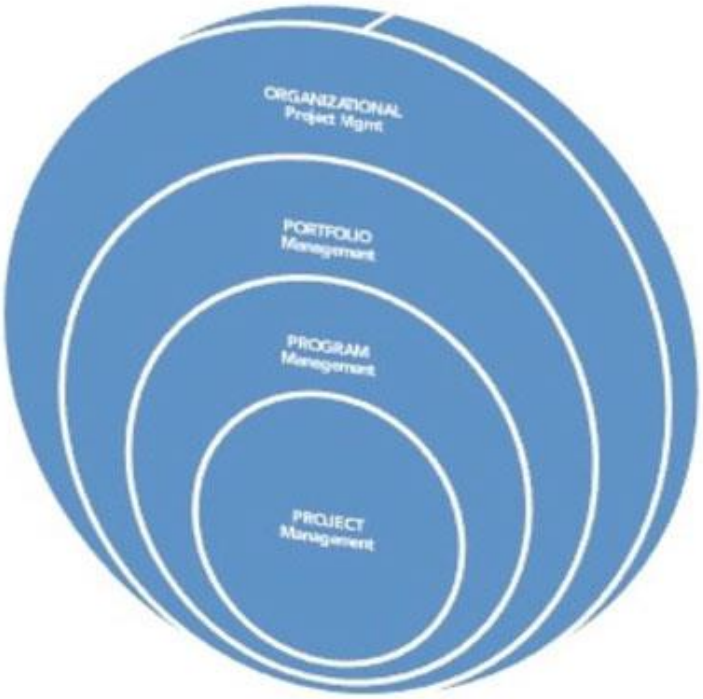


Figure 1. 1: Organizational Project Management (Source: Don Philmlee.com)

1.7 TRADITIONAL PM.

'A set of techniques and tools that can be applied to an activity that seeks an end product, outcomes or a service'. [1]

Traditional PM breaks down the project starting with what we are going to do in the WBS, then looks at the cost of those tasks and it creates plan for the time.

Traditional PM give us a lot of project management tools, like clear project specification, the WBS, the responsibility matrix, the cost account, the dependency chart and the network analysis and we also talked about senior management support, stakeholder analysis, team building and good communication.

Things are always going to be changed, so why to plan for whole project in the start. It's not always like that, that projects finish on time and within budget, so we are forced to change the methods.

The first thing we will do in PM is identify what we are going to do (its best for runner and repeater type projects). It's not good when you have a limitation of resources or rather, we can say that which resources you need the achieve project objective. If our goal is not clear, we cannot use traditional PM

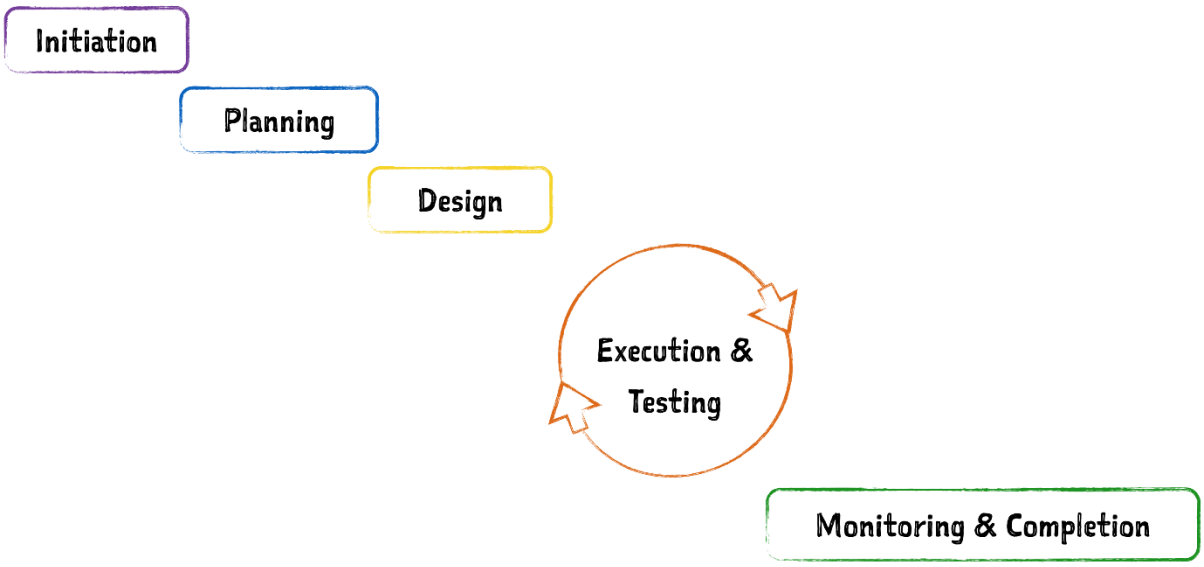


Figure 1. 2: Traditional Project Management (Source: Zapier.com)

1.8 AGILE PROJECT MANAGEMENT.

- We can deliver value **fast** i.e. the requirement which add the maximum value deliver those faster.
- It's an **Incremental & Iterative process** where we develop, demonstrate and change our plan and then we move forward, so it give us a fast response.
- No design is needed, it's an iterative process we can't visualize complete architecture in advance. (Design should emerge ahead)
- Agile is making small, small things and sharing it, don't think about the big picture.
- No managers but leaders (facilitators, problem solver etc) are needed.
- Keep doing planning continuously the project life cycle by making customer a part of development team.

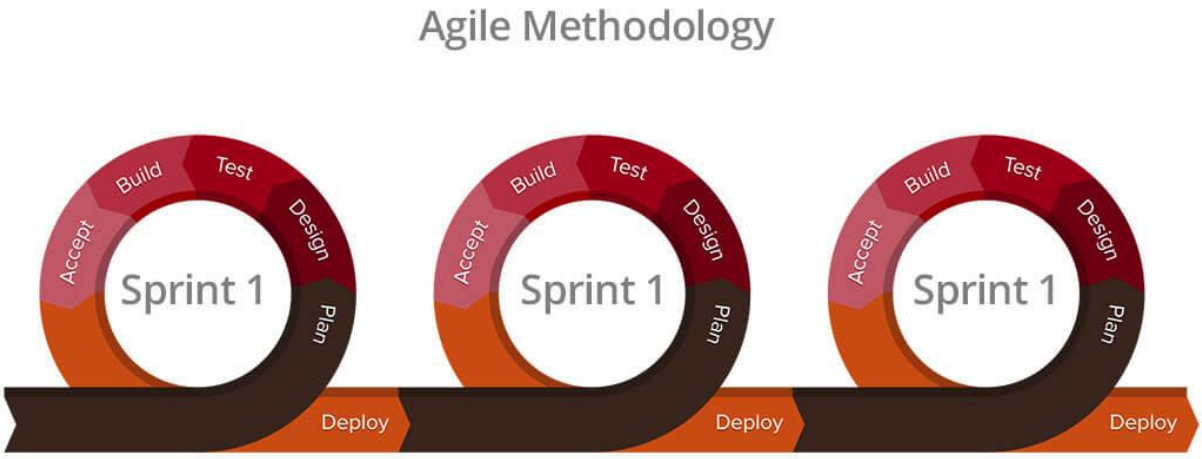


Figure 1. 3: Agile Project Management (Source: Orangescrum.com)

1.9 ADVANTAGES OF USING AGILE.

- Stakeholder engagement (before, during and after each sprint).
- Transparency.
- Early and predictable delivery (Time boxed fixed schedule sprints of 1 to 4 weeks).
- Predictable cost and schedule.
- Allows for change.
- Focuses on business value.
- Focuses on users.
- Improves quality. (https://resources.collab.net/agile-101/agile-methodologies, n.d.).[2]

1.10 AGILE METHODOLOGIES:

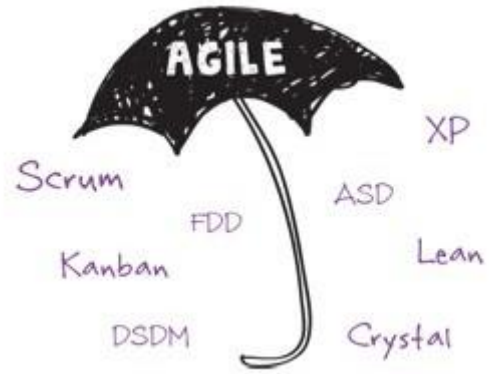


Figure 1. 4: Different Agile Methodologies (Source: httpsresources.collab.netagile-101agile-methodologies)

• Adaptive software development.

• Agile modeling.

• Disciplined agile delivery.

• Dynamic systems development method.

• Extreme programming.

• Feature-driven development.

• Kanban.

• Scrum.[3]

Out of all these methodologies two fundamental styles are **Scrum** and **Kanban.**

1.11 SCRUM.

Twice the work in half the time[4] . Doing planning in small chunks. Make small team of three to nine peoples.

Scrum is a flexible agile development method that need constant improving and tweaking for every team. It's one of the best Agile practices being used nowadays. In Scrum features are written from the perspective of end-users.

Do detailed planning in small chunks, actively seek to improve the plan.

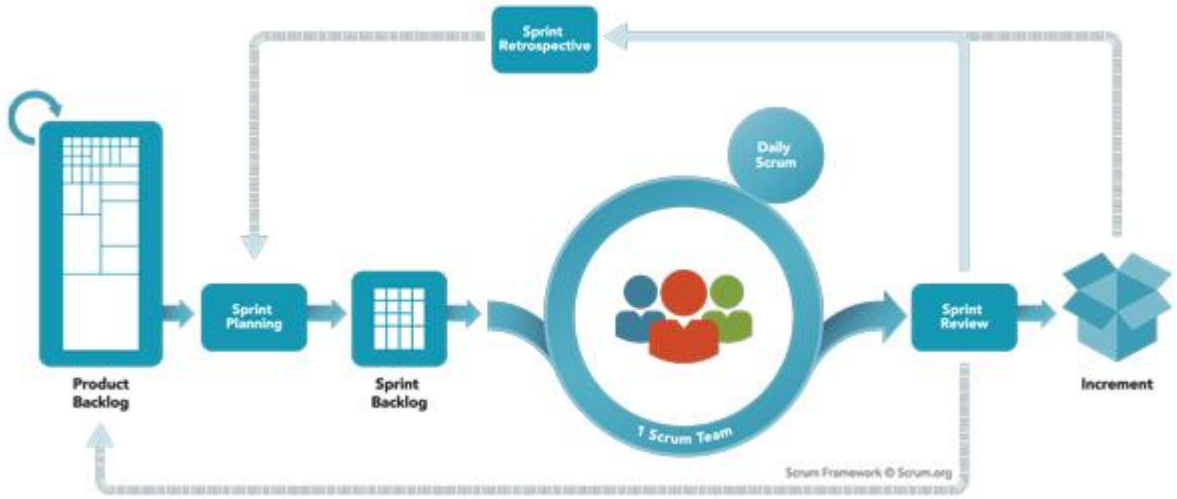


Figure 1. 5: Scrum Framework (Source: scrum.org/resources/what-is-scrum)

i. Populate a backlog of all the things you need to do on the project. Write a small description (Who, Why and What they need).
ii. Estimate relatively, use Fibonacci series (for better understanding). The item which generates more value/profit put it on top.
iii. Plan your work sprint (Sprints should be less than one month usually two weeks).
iv. Make your work visible by making a chart of Do, Doing and Done and update Burndown chart.

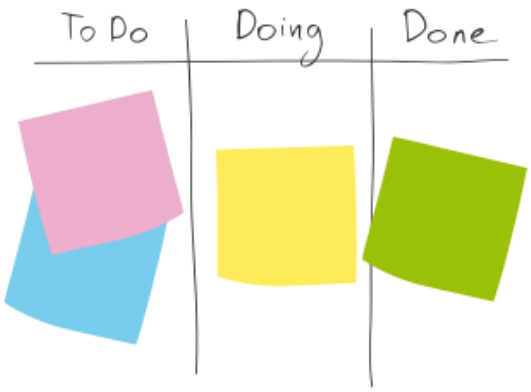


Figure 1. 6: chart of Do, Doing and Done (Source: Hello Rindle)

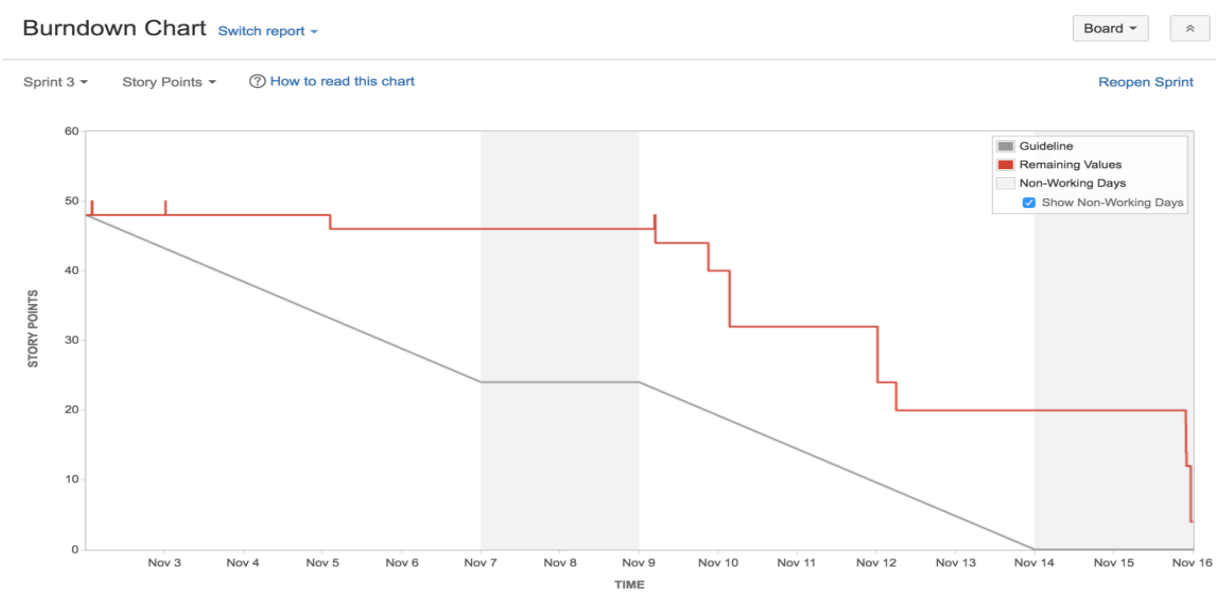


Figure 1. 7: Burndown Chart (Source: Atlassian Documentation)

v. 15/30 minutes daily stand up meeting.

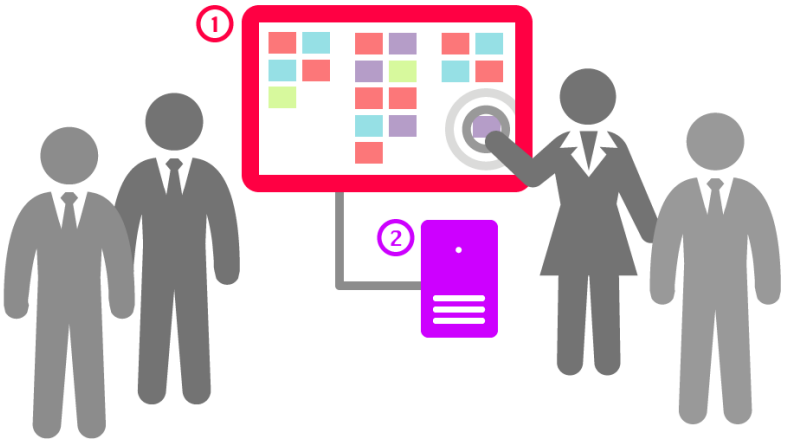


Figure 1. 8: Daily Stand-up meeting (Source: LeanKit)

vi. End of sprint demo your minimal product, get the feedback from user/customer (Approved? Or Need improvement?).

vii. Get your team together, discuss what went well? What didn't go well? What improvements can be made? [5]

Figure 1. 9: Discussion at the end of Project/Phase (Source: Queensland Band Association)

1.11.1 BENEFITS OF SCRUM.

In Scrum you improve exponentially, because of daily meetings and feedbacks in the end.

80/20 principle, 80% of the value will come after 20% of the work.

1.11.2 ARTEFACTS CREATED WITH SCRUM.

i. Product backlog
ii. Sprint Backlog
iii. Burndown Chart

1.11.3 MAIN ROLES IN SCRUM:

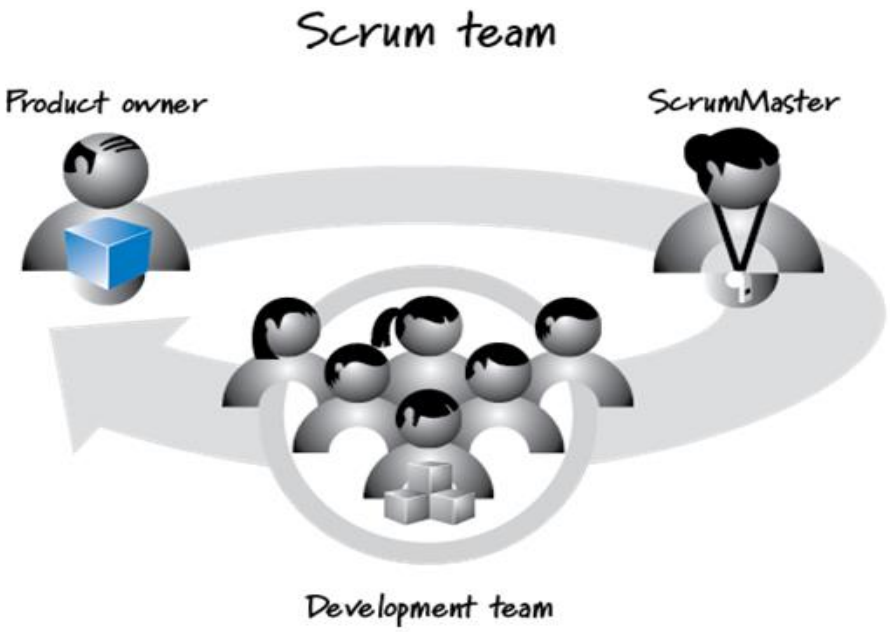


Figure 1. 10: Scrum Main Roles (Source: pkpmp.wordpress.com)

i. Product Owner: decides what to build.
ii. Development/Scrum Team: Build it.
iii. Scrum Master: Coaches the team, protects the team and he ensure that obstacles are busted.

Its scrum that makes the work, its team that does the work but still you do need a scrum master [4].

1.11.4 SPRINTS.

Sprint, a time-box of one month or less during which a "Done", useable, and potentially realisable product Increment is create[6]. Goal of a sprint is to get a subset of the release backlog to a ship ready state. It's not possible to succeed always in getting everything across the board. Any item that failed to make it will be recycle to the next sprint.

Shorter the release cycle shorter the sprint should be.

Figure 1. 11: Sprint (Source: scruminc.com/scrumlab-prime/sprint-3/)

1.11.5 SPRINT 0:

Some set of activities which might be needed before you start sprinting (Pre-sprinting period).

1.12 KANBAN.

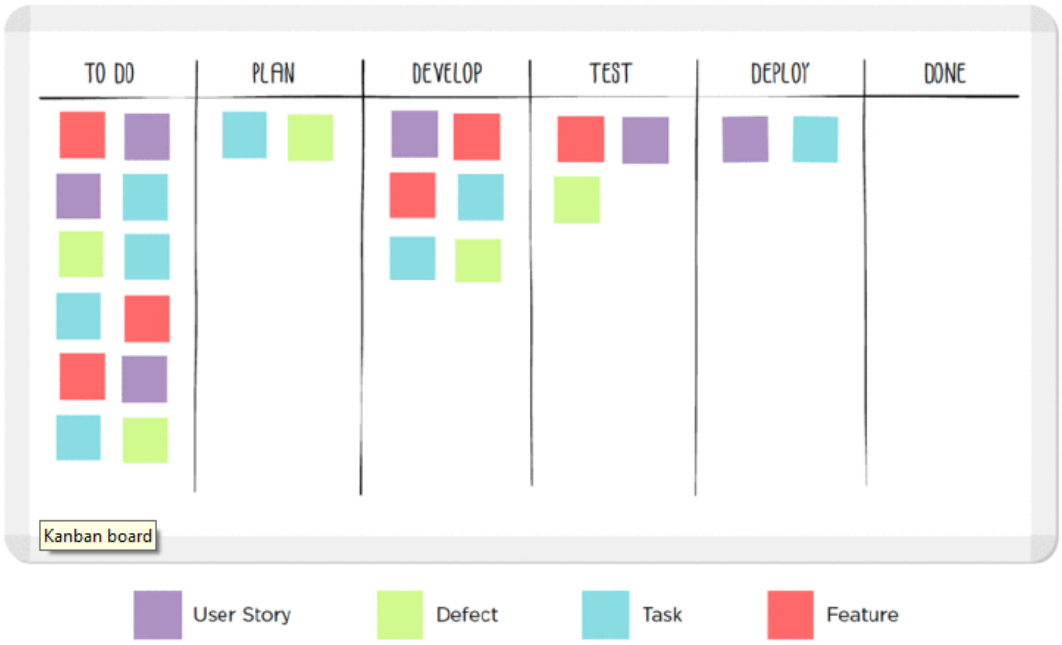


Figure 1. 12: Kanban board with 6 steps workflow (Source: Leankit 2015)

- Kanban board helps us visualizing our work and work stages.
- No two weeks sprint. It's a continuous process there is no backlog and there is no retrospective.
- It's a lean scheduling system developed in Japan by Toyota Motor corporation.
- A Kanban system utilizes visual clues that tell what to produce, how much to produce and when to produce. Example: A sushi menu.

Kanban is lacking two things with respect to Agile, that are:

I. **Effective transition from backlog to development:** With so many blocked cards in the board it's clear that they are not doing a good job of transiting from backlog to development.
II. **Hard limit on WIP:** By limiting the number of cards in each column, we make sure that things get across the board as quickly as possible.

In Kanban each developer tries to work on multiple tickets at the same time which is never a good thing.

Work in Progress (WIP) limits: Kanban doesn't impose limits on the number of items that can lie in any one work flow step at any given time. [7]

NOTE: Neither Scrum nor Kanban are not as prescriptive as may someone can apply. High performance teams discover what works better for them.

Both scrum and Kanban have one thing in common, 'THE PULL SYSTEM'

1.13 PULL SYSTEM.

A pull system is a production or service process which is designed to deliver goods or services as they are required by the customer or, within the production process, when required by the next step.[8]

1.14 AGILE VS TRADITIONAL PM

Agile Project Management	Traditional Project Management
Adapting changes in the core plan and still being responsive.	It requires manager control changes in the plan.
All about customers (Customers really gets what he wants)	It puts conformity to the plan
Control with teams at all levels (Better and fast delivery)	Top to bottom hierarchy for control (Slow delivery)
Highly customizable (Can change the original product).	Not so customizable (Can't change the original product).
It has Scrum Master.	It has Project Manager.

Table 1. 1: Agile PM vs Traditional PM

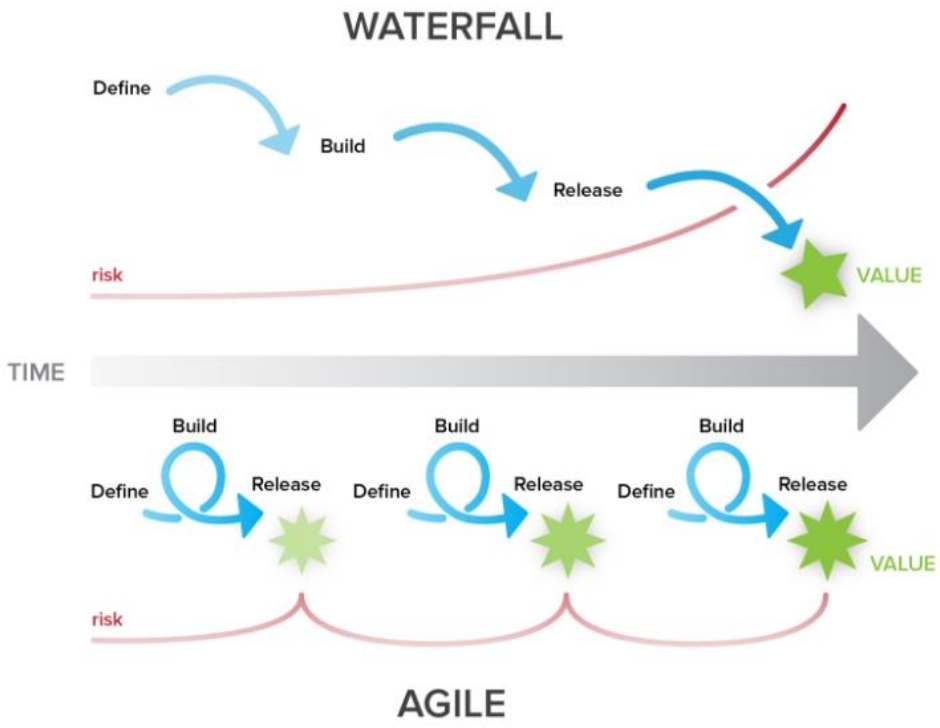


Figure 1. 13: Agile vs Traditional (Waterfall) Methodology (Source: httpsblog.ganttpro.com 2)

In project management, there are three variables: scope of work, budget, and time. In traditional methods, scope of work is fixed (the product requirements), and budget and time are flexible. But in Agile methods time and budgets are fixed, and scope of work is flexible.

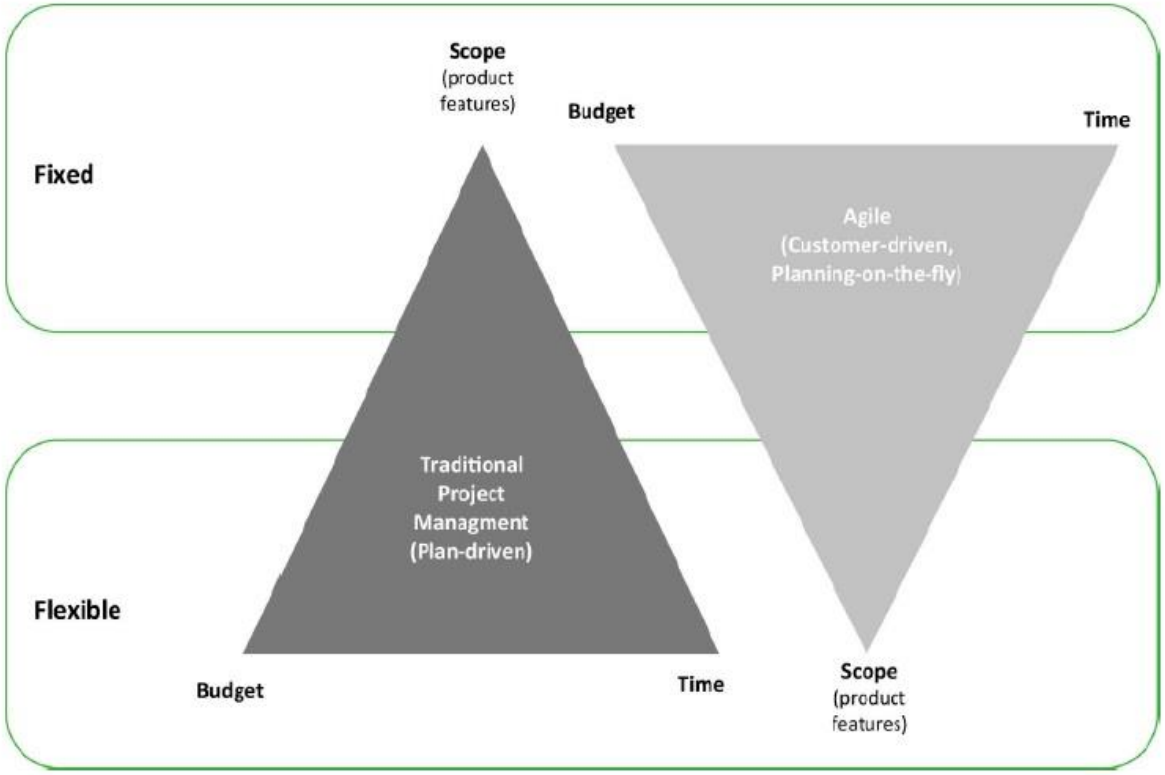


Figure 1. 14: Traditional PM vs Agile (sfisaca.org)

1.15 ATLASSIAN.

To work on something that can change the world, to work without feeling micromanaged, to be challenged and continuously learned.

Nearly all great human achievement is result of teamwork. The teamwork can be hard, that's why Atlassian makes tools to help teams of all types to organize, discuss and complete their work across devices, offices and time zones. Atlassian focused on changing the way the team work.

Atlassian helps the companies to focus on what really matters and work efficiently. After certain time when a company grow, the challenge is making people work together. Most essential thing when collaborating is communication and Atlassian products really help you to become more efficient because it helps to become more transparent. Atlassian is useful tool to make cross functional collaboration.

Nowadays the world is shifting to Atlassian, some of the major companies that using Atlassian are:

FlixBus, Skyscanner, NASA and Audi [9].

Figure 1. 15: Atlassian Products (Source: capitalfactory.com/2015/04/09/capital-factory-welcomes-atlassian-as-newest-community-sponsor/)

2 LITERATURE REVIEW

2.1 PMBOK® 5TH EDITION.

PMBOK® guide identifies the needs for and adopts to any sequencing and revisiting of the PM disciplines and activities as needed by the individual project.

PMBOK® guide is all about

- Project lifecycle.
- Project management process
- Project management process groups
- Project management knowledge areas.

2.2 PROJECT LIFECYCLE.

Series of phases connecting project from start to end. Its collection of phases each phase may have distinguish focus.

There could be different kind of relationships, could be overlapping, series and iterative.

2.2.1 THREE TYPES OF LIFECYCLES:

Predictive lifecycle**:** Where we can plan well the subsequent phases of the project.

Iterative & Incremental lifecycle: We do a set of work for a duration and then we take feedback on a given work and the remaining phases depends upon the knowledge we acquire from these iterations. We deliver a project with series of iterations.

Adaptive lifecycle: It's all about AGILE way of managing products. Same as iteration cycles but they are shorter like weekly from 1 to 4 weeks scrums fits in adaptive.

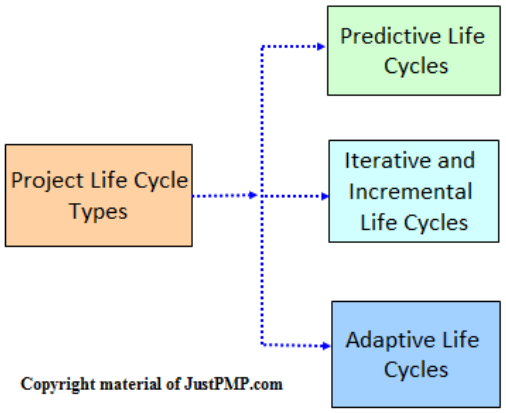


Figure 2. 1: Types of Project Lifecycle (Source: Justpmp.com)

2.3 PROCESS:

A process is a set of interrelated actions and activities performed to create a pre-specified product, service or event. Each process is characterized by its inputs, the tools and techniques that can be applied and the resulting output.

2.4 TWO MAJOR CATEGORIES OF PROJECT PROCESS:

2.4.1 PROJECT MANAGEMENT PROCESS:

These processes ensure the efficient flow of the project throughout the lifecycle.

2.4.2 PRODUCT ORIENTED PROCESS:

These processes specify and create the project process.

There are 5 Phases of a project that are Initiating, Planning, Executing, Monitoring & Controlling and Closing.

2.4.2.1 Initiating:

Out of 47 process there are 02 processes that can help the you to define a new project/phase of an existing project.

2.4.2.2 Planning:

There are 24 processes which helps you to prepare and organize the project. i.e. to establish the scope of the project, refine the objectives, and define the plan of action required to attain the objectives.

2.4.2.3 Executing:

There are 08 processes can help you to effectively carrying out the project work.

2.4.2.4 Monitoring and Controlling:

There are 11 processes will track and regulate the progress of the project and performance of the project.

2.4.2.5 Closing:

There are 02 processes which helps you to finalize all activities across all process groups to close the project/phase.

2.5 PROJECT MANAGEMENT PROCESS INTERACTIONS:

The integrative nature of project management requires the Monitoring and Controlling Process Group to interact with the other Process Groups, as shown in Figure.

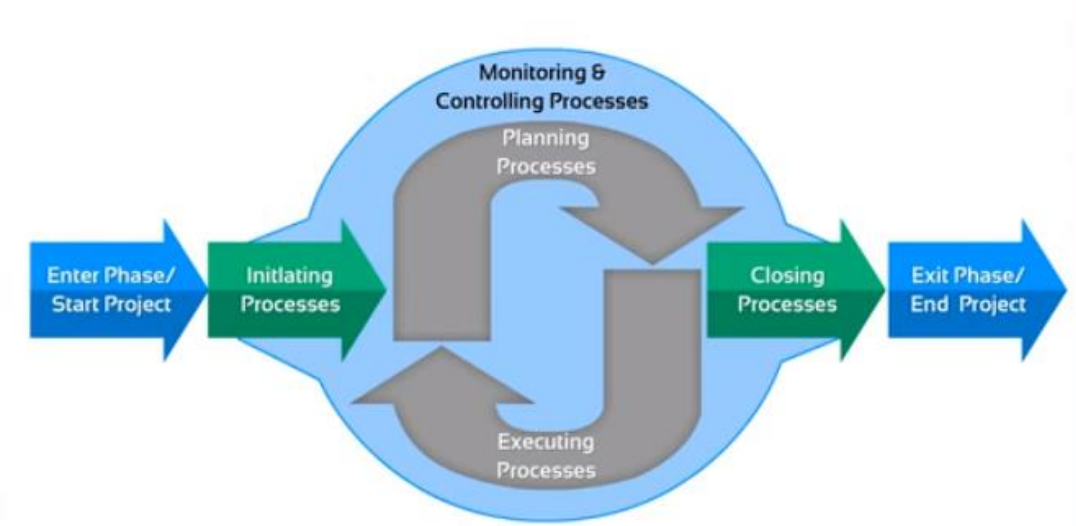


*Figure 2. 2: Project Management Process Group (Source: **PMBOK®** 5th Edition)*

2.6 KNOWLEDGE AREAS:

A Knowledge Area represents an area of specialization, a professional field, made of a complete set of concepts, terms, activities and tasks. These ten Knowledge Areas are used on most project most of the time, but at the same time it is clear that project teams should utilize them properly for their specific project [10].

(Ref: Wysocki R., (2013). "Effective Project Management: Traditional, Agile, Extreme", Wiley).

i. Project Integration Management
ii. Project Scope Management.
iii. Project Time Management.
iv. Project Cost Management.
v. Project Quality Management.
vi. Project Human Resource Management.
vii. Project Communications Management.
viii. Project Risk Management.
ix. Project Procurement Management.
x. Project Stakeholder Management.

And 47 processes.

Knowledge Areas	Project Management Process Groups				
	Initiating	Planning	Executing	Monitoring & Controlling	Closing
Project Integration Management	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Work	4.4 Monitor and Control Project Work 4.5 Perform Integrated Change Control	4.6 Close Project or Phase
Project Scope Management		5.1 Plan Scope Management 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS		5.5 Validate Scope 5.6 Control Scope	
Project Time Management		6.1 Plan Schedule Management 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Resources 6.5 Estimate Activity Durations 6.6 Develop Schedule		6.7 Control Schedule	
Project Cost Management		7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget		7.4 Control Costs	
Project Quality Management		8.1 Plan Quality Management	8.2 Perform Quality Assurance	8.3 Control Quality	
Project Human Resource Management		9.1 Plan Human Resource Management	9.2 Acquire Project Team 9.3 Develop Project Team 9.4 Manage Project Team		
Project Communications Management		10.1 Plan Communications Management	10.2 Manage Communications	10.3 Control Communications	
Project Risk Management		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative Risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Responses		11.6 Control Risks	
Project Procurement Management		12.1 Plan Procurement Management	12.2 Conduct Procurements	12.3 Control Procurements	12.4 Close Procurements
Project Stakeholder Management	13.1 Identify Stakeholders	13.2 Plan Stakeholder Management	13.3 Manage Stakeholder Engagement	13.4 Control Stakeholder Engagement	

Figure 2. 3: Project Management Process Group and Knowledge Area Mapping (Source: PMBOK®)

2.6.1 PROJECT INTEGRATION MANAGEMENT

i. Develop Project Charter:

It's the starting point of a project that authorise & identify the Project Manager and it is authorized by project initiator or sponsor. It's a document that authorizes the project.

ii. Develop Project Management Plan.

A roadmap plan for how the entire project will be managed. It's the centre of PMP and touches each and every process. This is not a onetime event it's an iterative event we incrementally are going to add to PMP through this process.

iii. Direct & Manage Project Work.

In this we integrate all the aspects of the project that pertain to execute the work. This is the process which gives you deliverable and work performance data (WPD).

work performance data (WPD): The raw observations and measurements (What is happening in the project). It provides the current state if the project.

EX: Actual cost, actual duration and the percentage of work physically completed.

iv. Monitor & Control Project Work:

The only knowledge area which generates Work Performance Report (WPR).

Its an integrative process where you make sure you are integrating all the moving parts to ensure that the project as a whole is well monitored and controlled.

Work Performance Report (WPR): Performance data collected from controlling process.

- Plan vs Actual.
- Am I Spending more/less money than planned.

EX: Status of deliverables, forecast estimates to complete etc.

v. Perform Integrated Change Control.

This process is about integrating all the changes. This is the process where you would review all of those change request with a group of people known as change control board. The board will approve/reject or put it into pending status, and you get a change log which documents everything.

vi. Close Project or Phase.

Gather all the lessons learned, document all the lessons learned and make sure you dint release team until they have given you all the artefacts and those other little things non-tangible in some instances that you identified upfront.

Terminated projects also goes to project/phase closure.

2.6.2 PROJECT SCOPE MANAGEMENT.

i. Plan Scope Management:

In this process our major goal is to define how we are going to manage scope, how we are going to define scope to start with. So, it's a plan that gives us guidance on how to do many things.

ii. Collect Requirements:

We want to collect all the requirements (business requirements, technical requirements, functional requirements etc) to get a good understand of what exactly the customer wants.

iii. Define Scope:

We need to define the parameters of the project. Then we can have a better idea of what is in the project and what isn't. what need to be done to get that end gain (final product).

iv. Create WBS:

It shows how a project scope is decomposed into lower levels of details. This process gives us scope baseline, WBS and work breakdown dictionary.

WBS: Is a hierarchical diagram which helps us in decomposing/Subdividing the work.

v. Validate Scope:

A process which takes a scope and quality verified/Project team verified deliverables and customer/sponsor either accept it or generate a change request.

vi. Control Scope:

Responsible for controlling the variances in scope i.e. responsible for ensuring the team is only doing the things which are declared and identified in scope baseline.

The process where project manager ensures that no one is adding extras, no one is gold plating and that there is no scope creep.

2.6.3 PROJECT TIME MANAGEMENT

i. Plan Schedule Management:

It provides guidance and direction on how the project schedule will be managed throughout the project. Here we put a plan together for how to manage time on the project, how to define the activities, how to sequence them and so on.

ii. Define Activities:

Break down the work packages (larger buckets into smaller pieces) into activities that provides a basis for estimating, scheduling, executing, monitoring and controlling the project work.

iii. Sequence Activities:

It defines the logical sequence of the work to obtain the greatest efficiency given all project constraints. Every activity except the first and last should be connected to one predecessor and successor.

Dependency Determination:

- Mandatory Dependencies: Often involve physical limitations, like superstructure will be constructed after substructure.
- Discretionary Dependencies: These dependencies are kind of more arbitrary.
- External Dependencies: These dependencies are usually outside the projects team control, like parts delivery.
- Internal Dependencies: These dependencies involve a precedence relationship between the project activities.

Lead & Lag time:

- **Lead time: Acceleration of the successor activity ie second activity can begib, conducted in parallel as the first activity. It can only be possible for finish to start relationship.**
- **Lag time**: Delay of the successor activity which means that certain time must past before the other activity begins. Can be possible for all the relationships.

iv. Estimate Activity Resources:

Identify the types, quantity and characteristics of resources required to complete the activity which allows more accurate cost and duration estimates.

v. Estimate Activity Durations:

It provides amount of time each activity will take to complete.

Analogous Estimating: Estimating something on the basis of previous experience.

Parametric Estimating: Statistical data between historical data and other variables (like square footage in construction) to calculate an estimate for activity parameters such as cost, budget and duration. **Example:** for constructing a road you need the no of sq.-km and other conditions it can tell us that it will cost you this much.

Bottom up Estimating: Divide the complete project into project schedule activities and for each activity get an input from the people who know about these activities.

Three Points Estimates: Rather than one number take three numbers.

a) Most likely
b) Pessimistic: what will be the cost if things go worst.

c) Optimistic: what will be the cost if things go best.

vi. Develop Schedule:

The process where you get all the information that you have assembled so far from defined activities all the way down to estimate activity durations and put that together into a schedule that has a start and end date for all the activities and the project as a whole.

vii. Control Schedule:

Making sure that the project is on schedule, there isn't any delay and there aren't any changes and if there are any changes they must be passed through the right process.

2.6.4 PROJECT COST MANAGEMENT.

i. Plan Cost Management:

How we are going to estimate then make a budget and control cost. We could also think about tolerance ± 5% etc. we can also think about estimate approaches to estimate the activity.

ii. Estimate Cost:

A process which gives us a dollar number against project activity.

iii. Determine Budget:

This process will give us cost baseline (here we determine the budget for the entire project).

iv. Control Costs:

A process dedicated to control projects within budget. Here the project manager will control the cost expenditures to make sure that they are being spent on what exactly was identified, no more no less.

2.6.5 Project Quality Management**.**

i. Plan Quality Management:

Where we identify the quality standards that need to be adhere to on the project. Output of this process will be quality management plan and process improvement plan.

ii. Perform Quality Assurance:

Process which helps us to assuring the quality plan. Means we will be delivering the deliverables which are conforming to requirement or quality guidelines provided.

iii. Control Quality:

Process responsible for inspecting deliverables for the conformance o the requirement

There is a difference between quality assurance and quality control.

Quality Assurance	Quality Control
Execution Process	Monitoring & Controlling Process
We look at the **process** that how well the team is adhering to quality requirement etc	We look at the **deliverable**, we check the deliverable specification against the agreed one.
Auditing only happens in assurance	**Inspection** only happens in control.

Table 2. 1: Quality Assurance vs Quality Control

2.6.6 PROJECT MANAGEMENT HUMAN RESOURCES.

i. Plan Human Resources Management:

Where you put together a human resources management plan that guides the project manager and the team for how to acquire, develop and manage the team. So, its plan for how to do those things.

ii. Acquire Project Team:

Process gives us people who would be working on our project. Where project manager is engaged in acquiring the project team from functional managers or external manager to the project. At the end of this process we should have people ready to join our project.

iii. Develop Project Team:

Where the project team gets trained, coached, mentored & developed. We talk about team building, we talk about off-site seminars and so on. The key goal is to equip the team with its skills that they need.

iv. Manage Project Team:

Issues, Conflicts & performance issues all are managed in this process.

2.6.7 PROJECT COMMUNICATION MANAGEMENT.

Different type of communications:

a) Formal & Informal.
b) Written & Oral.
c) Synchronous & Asynchronous.

Synchronous: Asking the question and getting the answer now. Ex: face to face or phone.

Asynchronous: Asking the question & after some time other will respond. Ex: Email or Paper communication.

i. Plan Communication Management:

It identifies & documents the approach to communicate most effectively & efficiently with stakeholders.

Who needs information? When? Where? What format of information should be? How the information can be retrieved?

ii. Manage Communication:

This process is all about collecting, analysing, formatting, segmenting and distributing information.

iii. Control Communication:

This process helps us ensuring we are following communication management plan and also we are taking care of issues which are raised in communication management plan by way of generating change request. Its checking and acting part of communication management plan.

2.6.8 PROJECT RISK MANAGEMENT.

i. Plan Risk Management:

This is the process where the project manager needs to plan for uncertainty that could impact the project.

ii. Identify Risks:

Here you want to identify these negative risks or threats and you also want to identify positive risks or opportunities that may be available.

iii. Perform Quality Risk Analysis:

This is the process where you qualitatively analyse risks. In qualitative risk analysis your main aim is to rank the risk from top to bottom.

iv. Perform Quantitative Risk Analysis:

Where the project manager and team should quantitative analyse the risk from a dollar perspective or from resource perspective or some other quantitative measures.

v. Plan Risk Responses:

This process talks about the responding the risks.

vi. Control Risks:

This process is all about making sure that project risk management is getting planned and executed as per project objectives.

2.6.9 PROJECT PROCUREMENT MANAGEMENT.

i. Plan Procurement Management:

Do you need to procure goods and services from an external firm, this is where you plan how to do it? Contract types involved and how you would carry out the entire procurement or contracting process. Unlike other process, this process tells us what all work can be procured from outside.

ii. Conduct Procurement:

In this process your main goal is to carry out that bidding process by having better conferences by reviewing the proposals that were sent in and ultimately selecting the seller.

iii. Control Procurement:

The process which helps us manages relationships with vendors and suppliers.

iv. Close Procurement:

You can close out a phase of a project or you can close the project. Gather all the lessons learned and make sure you don't release the team until:

- All terms and conditions which were mentioned in the agreement has been meet.
- Payments and claims have been settled.

2.6.10 PROJECT STAKEHOLDER MANAGEMENT.

i. Identify Stakeholders:

This is a process where we will identify the people who are getting impacted by our project.

ii. Plan Stakeholders Management:

In this process we plan to identify strategies to effectively engage stakeholder throughout the project life cycle.

iii. Manage Stakeholders Engagement:

This is the process where project manager and team are actively involved in executing the plan to keep stakeholders engaged. This is where you are having those face-to-face interaction and making sure that the stakeholder is aware of what he/she needs to be aware of.

iv. Control Stakeholder:

This process will maintain or increase the efficiency and effectiveness of stakeholder engagement activities as the project evolves and its environment changes.

2.7 ICT ENABLER FOR PM

The projects which use ICT tools have led to tremendous productivity and competitive gains. Crucial to the running of such projects is the sharing of information amongst the professionals, who all show a tendency of conflicting priorities. In the face of such conflicting priorities, there needs to be a system of communication that brings them together with the purpose of making them integrate to work as a team classical project management method were unable to cope with complex business environment, project uncertainty and increasing customer demands on product specification flexibility.

2.8 ANALYSE ATLASSIAN CAPABILITIES IN DIFFERENT CONFIGURATION SCENARIOS:

Atlassian provides the tools to help every team unleash their full potential. Atlassian connect is a giant step forward for the Atlassian development platform. Any developer can write a balance for a Atlassian on demand. Add-on are micro service which are independently deployable services which when put together with our application create a full solution to the users [9].

2.9 STATEMENT OF VALUES OF AGILE MANIFESTO:

1. **Individuals and interactions over processes and tools:** The first value in the Agile Manifesto is "Individuals and interactions over processes and tools." Valuing people more highly than processes or tools is easy to understand because it is the people who respond to business needs and drive the development process. If the process or the tools drive development, the team is less responsive to change and less likely to meet customer needs. Communication is an example of the difference between valuing individuals versus process. In the case of individuals, communication is fluid and happens when a need arises. In the case of process, communication is scheduled and requires specific content.
2. **Working software over comprehensive documentation**: Historically, enormous amounts of time were spent on documenting the product for development and ultimate delivery. Technical specifications, technical requirements, technical prospectus, interface design documents, test plans, documentation plans, and approvals required for each. The list was extensive and was a cause for the long delays in development. Agile does not eliminate documentation, but it streamlines it in a form that gives the developer what is needed to do the work without getting bogged down in minutiae. Agile documents requirements as user stories, which are enough for a software developer to begin the task of building a new function.

   The Agile Manifesto values documentation, but it values working software more.

3. **Customer collaboration over contract negotiation**: Negotiation is the period when the customer and the product manager work out the details of a delivery, with points along the way where the details may be renegotiated. Collaboration is a different creature entirely. With development models such as Waterfall, customers negotiate the requirements for the product, often in great detail, prior to any work starting. This meant the customer was involved in the process of development before development began and after it was completed, but not during the process. The Agile Manifesto describes a customer who is engaged and collaborates throughout the development process, making. This makes it far easier for development to meet their needs of the customer. Agile methods may include the customer at intervals for periodic demos, but a project could just as easily have an end-user as a daily part of the team and attending all meetings, ensuring the product meets the business needs of the customer.

4. **Responding to change over following a plan:** Traditional software development regarded change as an expense, so it was to be avoided. The intention was to develop detailed, elaborate plans, with a defined set of features and with everything, generally, having as high a priority as everything else, and with a large number of many dependencies on delivering in a certain order so that the team can work on the next piece of the puzzle.

With Agile, the shortness of an iteration means priorities can be shifted from iteration to iteration and new features can be added into the next iteration. Agile's view is that changes always improve a project; changes provide additional value [11].

2.10 AGILE MANIFESTO PRINCIPLES:

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

2.11 MAPPING OF AGILE MANIFESTO STATEMENT OF VALUES AND PRINCIPLES

We can map the Statements of the Agile Manifesto to the 12 supporting principles [13].

Statement of Values	**Principles**
Individuals and interactions over processes and tools	4. Business people and developers must work together daily throughout the project. 5. Build projects around motivated individuals. Give them the environment and support they need and trust them to get the job done. 6. The most efficient and effective method of conveying information to and within a development team is face-to-face conversation. 8. Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely. 11. The best architectures, requirements, and designs emerge from self organizing teams.
Working software over comprehensive documentation	1. Our highest priority is to satisfy the customer through early and continuous delivery of valuable software. 3. Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale. 7. Working software is the primary measure of progress.

	9. Continuous attention to technical excellence and good design enhances agility. 10. Simplicity—the art of maximizing the amount of work not done— is essential.
Customer collaboration over contract negotiation	1. Our highest priority is to satisfy the customer through early and continuous delivery of valuable software. 4. Business people and developers must work together daily throughout the project. 6. The most efficient and effective method of conveying information to and within a development team is face-to-face conversation. 8. Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.
Responding to change over following a plan	2. Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage. 9. Continuous attention to technical excellence and good design enhances agility. 12. At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behaviour accordingly.

Table 2. 2: Mapping of Agile Manifesto statement of values and Supporting Principles

2.12 WHAT AGILE ISN'T

- We will figure it out as we will move further.
- Agile is not without rigour and planning.
- Agile is not an excuse to the lack of a roadmap.
- Agile is not development without specifications.

2.13 PMBOK® AND AGILE SCRUM ACTIVITIES.

A common misconception in project management is that in order to properly follow the practices outlined in PMBOK® Guide we must use a waterfall approach. When we talk about the process a lot of time it creates a perception that these processes are serial in nature. We only do the planning once and a planning should be done for the complete project. but It's not true also agile projects follows project life cycle and the process mentioned in PMBOK®, it all depends about project life cycle you are performing. *PMBOK® ® Guide* identifies the need for and adapts to any sequencing and re-visiting of the PM disciplines and activities as needed by the individual project [14].

PMBOK® Guide identifies the need for a Product Breakdown Structure (PBS) as a good practice way to articulate a project's desired "product". SCRUM identifies a product Backlog for this purpose [14].

Planning, Execution and Monitoring & Controlling must work in a cycle. When we go to the new phase, we always perform Initiating activity & before closing a given phase, we also perform Closing activity. They are iterative in nature.

Initiating:

In the initiating phase we decide how many sprints will compose each release and the scope of software to deliver and also, we determine roles.

Planning:

We keep doing planning continuously the project life cycle by making customer a part of development team. In the planning phase we create product, sprint and release backlog. Plan work each day in the daily scrum.

Executing:

In executing we complete tasks each day during sprints and produce a shippable product when the sprint finishes. The product can also be used by the customers and can be charged.

Monitoring and Controlling:

In Monitoring & Controlling we resolve issues and blockers, demonstrate the completed product during the sprint review meeting and keep update the burndown chart.

Closing:

Get your team together, discuss what went well? What didn't go well? What improvements can be made? [15]

2.14 POINTS OF CONVERGENCE:

Project Scope Planning: *PMBOK® Guide* identifies the need for a Product Breakdown Structure (PBS) as a good practice way to articulate a project's desired "product". SCRUM identifies a product Backlog for this purpose.

Project Time Management: *PMBOK® Guide* identifies the need for a Work Breakdown Structure (WBS) as a good practice way to articulate the steps needed to product a project's desired "product". SCRUM identifies a Sprint Backlog for this purpose.

PMBOK® Guide identifies the need for a periodic status / progress reporting as a good practice way to communicate progress and maintain customer confidence as the project unfolds. Tracking progress also provides the project practitioners and stakeholders the visibility they need to identify when a project is not proceeding according to plan. SCRUM identifies a Sprint Backlog for this purpose. Some Companies utilizes a task completed chart as part of progress reporting for traditional projects and a sprint backlog chart for SCRUM / Agile projects [14].

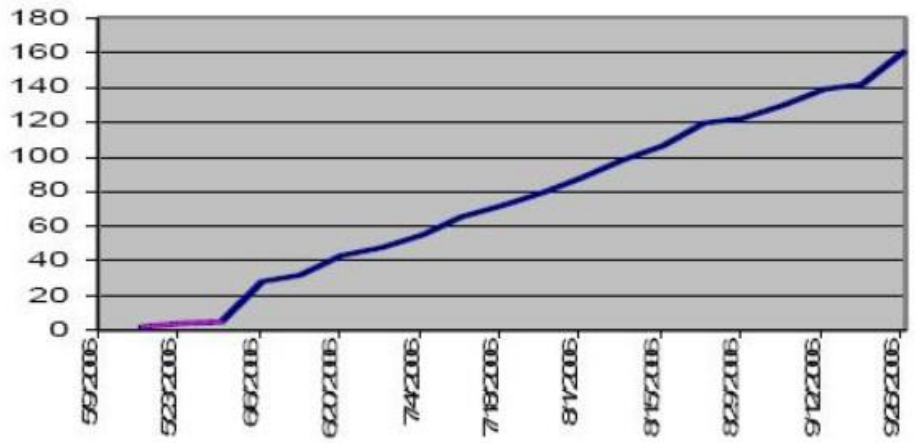


Figure 2. 4: Task Complete Chart (Source: PMI.org)

Blue: Task Planned Purple: Task Complete

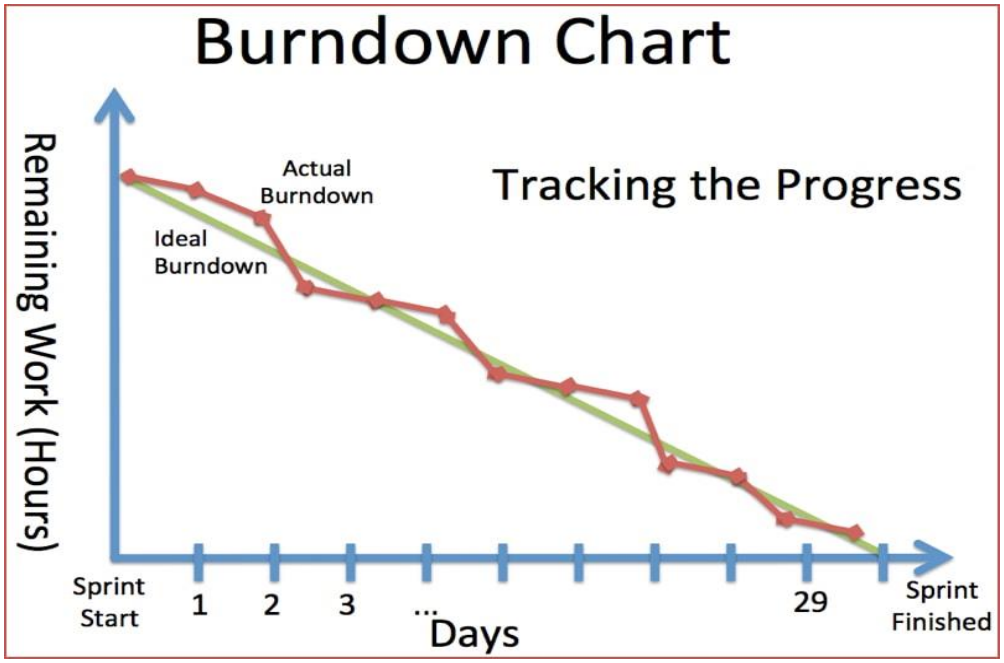


Figure 2. 5: Sprint Burndown Chart (Source: PMI.org)

2.15 POINT OF DIVERGENCE:

- No project manager in Agile Only Scrum master: SCRUM master's primary role is to help the team get the resources it needs and to insulate the project team from distractions from the outside such that they can focus on their agile assignments. SCRUM masters do NOT assign roles or responsibilities to their team members.
- In agile there is prioritization/Preference but not in PMBOK®. Scrum work from a customer prioritized backlog of desired features [14].
- An element that differs and is worth mentioning on agile project teams is the preference for Self-Directing Teams. The PMBOK® v5 Guide allows for teams to be tightly managed and in a command-and-control style or to operate in a collaborative empowered way. Both models and any point on the spectrum between these extremes work within the PMBOK® view. Agile methods however recommend Self Directed Teams that have more autonomy [16].

2.16 PROBLEMS WITH TRADITIONAL PROJECT MANAGEMENT APPROACHES:

Pros	Cons
Peace of Mind - first complete detailed specifications, then build.	Waste too much time in detailed specification.
Well Planned - Provide estimation effort and cost at definition phase.	Unreliable estimation during design phase.

Management favor – provide predicable release schedule and detailed activities.	Lack of adaption to unpredictable change.
Linear process – know what next step is.	Lack of flexible adaptive steps driven by build-feedback cycles.

Table 2. 3: Pros and Cons of Traditional PM

2.17 THE FAILURE OF TRADITIONAL PROJECT MANAGEMENT

Using the example of a project developed by external suppliers, customers who pay another company for carrying out a project feel uncomfortable and nervous about waiting to get it. What if they pay big money and find out just at the very end of the project that what the supplier (or the service provider) delivered is not what they wanted or needed? [13]. This is a tangible issue for projects run with the traditional project management methods.

Some concrete issues are set out below.

- Firstly, as the project is released entirely at its completion, since no incremental releases are in the plan, no value is gained from the project until it is finished.
- In the same way, testing activities are not carried out until the later stages of the project: the eventual uncovering of big problems can represent a serious issue, because it might be too late to fix them.
- Thirdly, customers see and are expected to approve the project once it is concluded, but in the meantime their requirements might have changed.
- Even if customers communicate a requirements variation, no change can be made to plans due to inflexibility of waterfall methodologies.
- Last but not least, another issue to consider is the tendency of waterfall methodology to rely on a single person direction: an eventual quit or replacement of the project manager may put the project in danger.

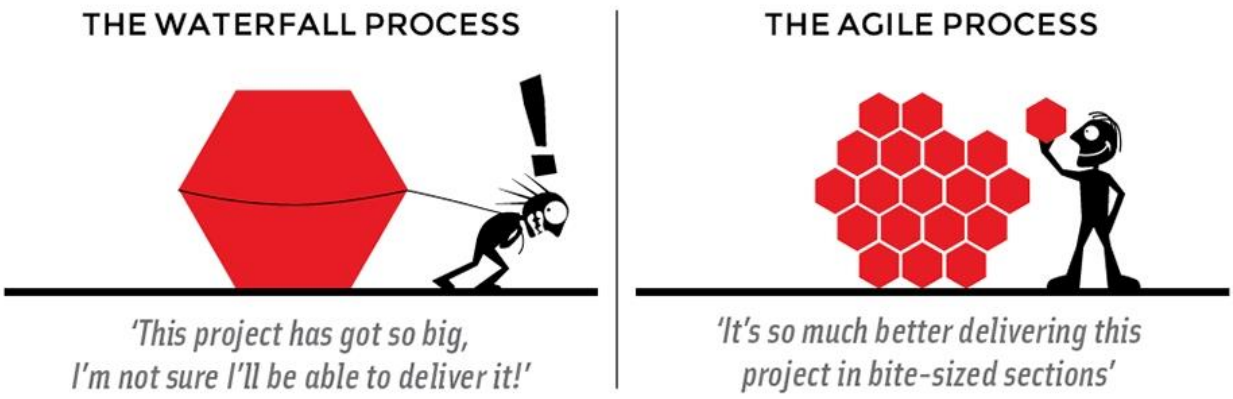


Figure 2. 6: Traditional PM vs Agile PM (Source: httpsblog.ganttpro.com)

1. **Planning is by activity rather than by feature**

In traditional approaches, work breakdown structures are based on activities. Understandably, the project manager becomes a taskmaster, driven to focus on task completion. But completed tasks (or activities if you prefer) do not necessarily equate to value in the eyes of the customer. Delivering value early and often is a fundamental tenant of agile project management.

2. **Multitasking causes further delays**

Another reason why traditional approach often breaks down is due to multitasking. While multitasking according to Clark and Wheelwright (2) can boost productivity when working on two tasks, they found that the time an individual spends on value-added work drops rapidly when the person is working on more than two concurrent tasks.

3. **Features are not developed by priority**

Traditional practices make an underlying assumption that completing all the tasks will result in meeting customer needs. This leads to task prioritization rather than feature prioritization or value delivery. That is, work tends to be prioritized for the convenience of the project team rather than for the benefit of the customer who is looking for a coherent set of features. And when delays occur, the team scrambles at the end to meet the deadline which translates into eliminating features.

4. **Uncertainty is ignored**

this is one of the biggest traps of traditional planning: It is often based on the assumption that if we do enough homework, we can finally come up with a complete and accurate specification of what the customer wants. In addition to ignoring the uncertainty inherent in what the customer wants, we fail to take into consideration the uncertainty in our ability to actually get the work done [17].

2.18 A BETTER WAY TO MANAGE PROJECTS: AGILE

More and more companies are turning to Agile development methods because the traditional type of project management is not succeeding. “Agile has evolved through the years from manufacturing processes such as *just-in-time* (JIT). JIT aimed to reduce waste and over-production by determining which parts were needed by the customer at each stage, rather than mass producing too much product that sat in a warehouse [18].

Agile was created because of the need of a response to the failure of traditional project management. Over the year's we found out that sometimes there is the need to go back to the previous phase, revise and modify something, and then going on with the new one. It provides for testing phases where it is possible to make corrections to plans.

Agile is successful since it understands that it involves people dealing with difficult and continuous problems which need to be solved and is useful since stakeholders' feedback on the product is used to continuously improve plans. In most cases, feedback is not only highly effective but are necessary in the long term as a continuous confirmation by the customer on the coherence of the software to his expectations.

2.19 WHICH ONE TO CHOOSE, FROM AGILE AND TRADITIONAL PM:

It's like deciding if you should take a plane or a car on a long trip. You don't just decide on one or the other without specific logic. If you need to get somewhere quickly, have little concern for sight-seeing along the way, and have no problems with flying, you would probably take a plane. If you want to take your time getting somewhere, see sights along the way, and enjoy driving, you would take a car. Likewise, organizations should use logic to decide when to use a more prescriptive or an agile approach to managing specific projects. Projects with heavy constraints, inexperienced and dispersed teams, large risks, generally clear up-front requirements, and a fairly rigid completion date are best done using a predictive approach. In contrast, projects with less rigid constraints, experienced and preferably co-located teams, smaller risks, unclear requirements, and more flexible scheduling would be more compatible with an agile approach

2.20 UNIQUE SCRUM ACTIVITIES BY PROCESS GROUP

Initiating:

- Determine roles.
- Decide how many sprints will compose each release and the scope of software to deliver.

Planning:

- Create product backlog.
- Create sprint backlog.
- Create release backlog.
- Plan work each day in the daily Scrum.
- Document stumbling blocks in a list.

Executing:

- Complete tasks each day during sprints.
- Produce a shippable product at the end of each sprint.

Monitoring and Controlling:

- Resolve issues and blockers.
- Create and update burndown chart.
- Demonstrate the completed product during the sprint review meeting.

Closing:

- Reflect on how to improve the product and process during the sprint reflection meeting [19].

3 MAPPING OF ATLASSIAN VS PMBOK® PROCESSES

By mapping PMBOK® processes against Atlassian software suit, the relevance of products of Atlassian can be analyzed in line with the PMBOK®'s processes. The relation is then quantified from 0 to 5 whereby 0 means no relation and 5 means that process can be completed by that product. The conclusion that is drawn is an educated guess that is done through the quantitative analysis. It doesn't necessarily justify that the result is truly accurate.

3.1.1 PROJECT INTEGRATION MANAGEMENT

3.1.1.1 Project Charter:

Project Poster (Score: 05): A project poster is a right way to tackle a problem, define project scope, and guide your work. It refines your thinking and share information with your stakeholders.

Unlike project charters, your project poster is a living document. Update it as you explore your problem space, challenge assumptions, validate solutions, gather feedback, and course-correct before you move forward [20].

Jira alone cannot produce appealing project charters but, the three tools together, can and these three tools are **JIRA (Score: 02), Confluence (Score: 02) and BigPicture (Score: 02)** [21].

3.1.1.2 Develop Project Management Plan:

Portfolio (Score: 05): Portfolio for Jira helps you to navigate you plans and keeps them up to date. Conforming what's in scope by refining the list of issues to be included in the plan [22].

Confluence (Score: 02): Communicate your stakeholders while developing Project Management Plan, let all of them know the details (keep all the stakeholders involved) [23].

DACI (Score: 02): As it is decision making framework, it will help in making decisions for developing Project Management Plan [24].

Project Poster (Score: 02) technique to build a shared understanding amongst team members and stakeholders. What are we doing? What's the value to customers and to the business? Why do we think this is the right solution? We get feedback on the answers to all these questions before anything hits the team's roadmap" [24].

3.1.1.3 Direct & Manage Project Work:

Confluence (Score: 05) is a single collaboration tool where teams can organize, create documents and discuss project work in one single place [23].

Jira **Portfolio (Score: 05)**: Helps you to manage multiple JIRA projects and teams. In portfolio you can manage team availability and skills set [25].

3.1.1.4 Monitor and Control Project Work:

Jira (Score: 05) Software provides a number of tools that you can use to monitor the progress of a sprint. If you run into problems or things are just not on track for the target date. It can help visualize or highlight problems, so your team can take actions to remedy them [26].

Confluence (Score: 03): Once you finalize your plans you can quickly share it with others to get their feedback [23].

3.1.1.5 Perform Integrated Change Control:

JIRA's (Score: 05) flexibility allows you create issues as a 'Change Request' and you can easily customize the workflow to your specific business process [27].

Confluence (Score: 03): we can attach a file to confluence page in which we have made the changes, and the board will review all of those change request with a group of people known as change control board. The board will approve/reject or put it into pending status, and you get a change log which documents everything.

3.1.1.6 Close Phase/Projects:

You simply can't "close" a project in **JIRA (Score: 02)**. If you delete a project, it's deleted [28].

3.1.2 PROJECT SCOPE MANAGEMENT.

3.1.2.1 Plan Scope Management:

Scope section in **Portfolio (Score: 05)** consist of all the issues that you want to work in your plan [29].

Confluence (Score: 03): We can plan our scope by discussing with all the team.

3.1.2.2 Collect Requirements:

We can use **Confluence (Score: 05)** for general requirements gathering and project discussion on pages [30].

While **JIRA (Score: 02)** has been developed primarily as an issue and project tracker out of the box, you can use JIRA for requirements management in conjunction with Confluence [31].

3.1.2.3 Define Scope:

The scope in **Portfolio for Jira (Score: 05)** is the global to-do list for upcoming releases for your work. The scope is comprised of three (3) hierarchy levels by default:

i. Epics
ii. Stories
iii. Subtasks [32]

3.1.2.4 Create WBS:

JIRA (Score: 05): We have three levels of hierarchy, In JIRA: Projects -> Issues -> Sub-Tasks. We can also include Project Categories. This basic hierarchy is insufficient to represent a Work Breakdown Structure (WBS) [33].

With the **JIRA Agile add-on**, we add a new element to the basic JIRA hierarchy: Epics. So now we have: **Projects -> Epics -> Stories (issues) -> Sub-Tasks** [33].

Portfolio (Score: 05): If you're using JIRA Portfolio, you can make a clear distinction between your products / applications, and the actual projects you are working on.

One of the most important aspects of JIRA Portfolio is the fact it adds a new element to the JIRA Structure: **Initiatives**. Initiatives allow you to group epics into higher-level projects.

Gantt-Chart (Score: 05): We may want to view our project and schedule tasks in more visually-oriented way and for this we can use WBS Gantt-Chart for JIRA add-on [34].

3.1.2.5 Validate Scope:

Portfolio (Score: 05): Scope section consist of all the issues that you want to work on in your plan. You can prioritize, assign, edit story points & add dependencies to issues [29].

3.1.2.6 Control Scope:

For controlling the scope, we can use **confluence (Score: 03)** Responsible for controlling the variances in scope i.e. responsible for ensuring the team is only doing the things which are declared and identified in scope baseline.

3.1.3 PROJECT TIME MANAGEMENT

3.1.3.1 Plan Schedule Management:

In **confluence (Score: 05)** we can discuss with all the group that how we are going to manage our project schedule.

3.1.3.2 Define Activities:

We can define activities in **JIRA (Score: 05)** in three categories. To do, in progress and Done.

Confluence (Score: 03): because it needs JIRA's help to work with confluence. On Confluence you have a Dashboard with "All updates" that show users activity from all spaces/pages that you have access to [35].

3.1.3.3 Sequence Activities:

If your organization uses Atlassian's **Jira (Score: 02)** application and your administrator has integrated **Bamboo (Score: 03)** with a Jira application, you will be able to view the issues that have been linked to a build [36].

3.1.3.4 Estimate Activity Resources:

Due to the dynamic nature of agile projects, resources can vary over time. We cannot estimate activity in Atlassian software suite.

3.1.3.5 Estimate Activity Duration:

We can't estimate complete duration in **JIRA (Score: 04),** though we can get the idea, for that JIRA uses Story Points (1,2,4,8,16,32 and 48). It will give you an idea of how much work is being committed to in a sprint [37] [5].

3.1.3.6 Develop Schedule:

Portfolio (Score: 05): The automatic scheduling mechanism in Portfolio for Jira is one of its core capabilities, and it provides a better way for you to optimize and allocate resources realistically.

Tempo Timesheet (Score: 05): It helps in planning & scheduling the resources.

3.1.3.7 6.7: Control Schedule:

We can easily control our schedule in **JIRA (Score: 05)**, As JIRA is a tracking software.

Tempo Timesheet (Score: 05): It manages employees time. Approve/Reject planned time off.

Confluence (Score: 03): We can make sure that the project is on schedule and there isn't any delay like if anyone from team have any issue they can collaborate in confluence.

3.1.4 PROJECT COST MANAGEMENT.

3.1.4.1 **7.1: Plan Cost Management**:

Tempo Budget (Score: 05): Sets customizable price table to suit your clients project needs [38].

Confluence (Score: 03): We can collaborate with our team that how we are going to estimate then make a budget and control cost.

3.1.4.2 7.3: Estimate Costs:

Agile projects have a different approach to budget and cost management than traditional projects. That's why we cannot estimate cost in Atlassian software suite.

3.1.4.3 7.3: Determine Budget:

Tempo Budget (Score: 05): Manages budgets, it gives us complete project and portfolio overviews of investments.

3.1.4.4 7.4: Control cost:

Tempo Budget (Score: 05): Track the Earned value Management (EVM) of complete work. I.e. complete overview of planned vs actual [38].

Confluence (Score: 02): Analyze and manage cost centers. We can easily asses all log times, price rates and expenses logged for each account & share with customers and stakeholders.

3.1.5 PROJECT QUALITY MANAGEMENT.

3.1.5.1 8.1: Plan Quality Management, 8.2: Perform Quality Assurance and 8.3: Control Quality:

Atlassian tools are not compliant to support quality management by default, we have to use certain add-ons to create a compliant set-up.

Out of many two are briefly described here:

a) **JIRA (Score: 02)+Confluence (Score: 02)+Bitbucket (Score: 02):** JIRA Software supports design controls or System Development Life Cycle (SDLC), with Bitbucket and Confluence playing supporting roles [39].
b) **Confluence (Score: 02)+Comala Workflow (Score: 02):** Using both Confluence and Workflows together can form a Quality Management Solution (QMS) system that is feature-rich, well-supported, and scalable to your organization [40]

3.1.6 PROJECT MANAGEMENT HUMAN RESOURCES.

3.1.6.1 **9.1: Plan Human Resources Management**:

Portfolio (Score: 05) for JIRA helps managing multiple JIRA projects and teams.

Tempo Planner (Score: 05): Plan & schedule resources. Helps team visualize and plan team resources. Project managers can easily plan ahead and schedule their teams.

Confluence (Score: 05): It helps people work together, share information effortlessly and plan for how to do those things.

Team Playbook (Score: 05): Step-by-step instructions for tracking your team's health, and new ways of working ("plays"). It's by teams, for teams – any team [41].

Tempo Budget (Score: 02): Plan and manage people, time and cost in real time.

BigPicture (Score: 02): You can add a new role under BigPicture > Administration but cannot edit it afterwards

3.1.6.2 9.2: Acquire Project Team:

Portfolio (Score: 05) lets you create virtual users to represent external contractors or team members that haven't been hired yet.

3.1.6.3 9.3 Develop Project Team:

You can easily develop a team in **JIRA (Score: 05)**, by following these 3 steps [42].

1. Select your plan and go to the People tab.
2. Select Create Team.
3. Enter a name for your team.

Portfolio (Score: 05): Teams are automatically created based on the data sources you choose and it's easy to add team members straight from JIRA.

Confluence (Score: 02): It helps people work together and share information effortlessly (We talk about team building, we talk about off-site seminars and so on).

3.1.6.4 9.4: Manage Project Team:

JIRA (Score: 05) administrators define project roles and Project administrators assign members to project roles specifically for their project(s) [43].

Portfolio (Score: 05) helps manage team capacity. Add or remove team members to each team.

Tempo Planner (Score: 05): Manages team and program capacity

Team Playbook (Score: 05): Step-by-step instructions for tracking your team's health, and new ways of working ("plays"). It's by teams, for teams – any team [41].

BigPicture (Score: 05): You can add a new role under BigPicture > Administration but cannot edit it afterwards [44].

Confluence (Score: 05): Confluence will bring all your artefacts together into a unified release dossier.

TEMPO Timesheet (Score: 03): It helps in easily viewing, managing and configure project teams in JIRA. It manages employees time.

Tempo Budget (Score: 02): Plan and manage people, time and cost in real time.

3.1.7 PROJECT COMMUNICATION MANAGEMENT.

3.1.7.1 10.1: Plan Communication Management:

Atlassian Corporation launched **Stride (Score: 05)**, which is a cloud-based team business communication and collaboration tool. With stride you can get a full communication toolkit at your fingertips [45].

You can communicate with your team on (**Confluence Score:05)**.

3.1.7.2 10.2 Manage Communication:

Stride (Score: 05) to bring all the varying ways teams communicate - through text, voice, and video - together into one place.

We can also manage communications in **Confluence (Score: 05)**.

3.1.7.3 10.3 Control Communications:

Stride (Score: 05): You can mark any message as a decision or action to capture important outcomes, track your teams work and close the loop [45].

Confluence (Score: 05): Where you have long control narratives with diagrams and in things.

3.1.8 PROJECT RISK MANAGEMENT.

3.1.8.1 11: Risk Management:

Risk Management for JIRA (Score: 05): Track, control and communicate your Project risks [46].

Risk Register (Score: 05): Manage project, product, and organization risks within Jira [47].

BigPicture (Score: 05): It helps you to see the Risk and perform maintenance. Empower with ability to visualize risk in 3D.

we can use the Risk matrix module of BigPicture to keep things tidy and usable. Risk module serves to prioritize selected tasks from the Program [44].

We can also control risk and plan risk responses in **Confluence (Score: 02).**

3.1.9 PROJECT PROCUREMENT MANAGEMENT.

3.1.9.1 **12.1: Plan Procurement Management**:

Confluence (Score: 02): it helps us in discussing that do we need to procure goods and services from an external firm or not.

3.1.9.2 12.2: Conduct Procurement:

JIRA Core (Score: 05): Attach quotes, diagrams, photos, and other relevant documents to each issue [48].

3.1.9.3 12.3: Control Procurement:

Financial teams can use **JIRA Core (Score: 05)** to keep track of and approve purchases.

Confluence (Score: 02) helps us manages relationships with vendors and suppliers, getting the performance reports and procurement process reviews.

3.1.9.4 12.4: Close Procurement:

You can even close financial books in **JIRA Core (Score: 05)** [48].

3.1.10 PROJECT STAKEHOLDER MANAGEMENT.

3.1.10.1 13.1: Identify Stakeholders:

JIRA (Score: 05) has two user groups, Developers (Participants) and Users (Stakeholders). The former are the people who can submit the issues and also can resolve them and the later can only submit the issues.

DACI (Score: 05) play from the Atlassian Team Playbook to specify who the project's drivers, approvers, and contributors are, as well as who needs to stay informed on decisions.

Confluence (Score: 02): Stakeholders can get all the updates about the project that what is going on.

3.1.10.2 13.2: Plan Stakeholder Management:

Team Playbook (Score: 05). Clearly defining everyone's place in a project will get people on the same page faster.

Confluence (Score: 05): This is the place where all team can collaborate and plan to identify strategies to effectively engage stakeholder throughout the project life cycle.

At Atlassian, we put a 2x4 table at the top of every project-related document in **Confluence** so that everyone always knows where they stand.

3.1.10.3 13.3: Manage Stakeholder Management:

Atlassian manages the stakeholders by allowing them to rank their requests in order of importance. Sales team will have a different list of priorities to the support team for instance. In **JIRA (Score: 04)** Agile Classic, we do this by given them access to a planning board for their issues and associate the context to a Ranking field.

Confluence (Score: 05): No matter what kind of project we are working, we should make sure that we are documenting almost all the documents and others can acknowledge the work by liking or commenting. They can also give their reviews about that.

TeamPlaybook (Score: 05): You want your key players to shine, and by defining roles and responsibilities, you're keeping your stakeholders focused on what matters and setting them up to succeed.

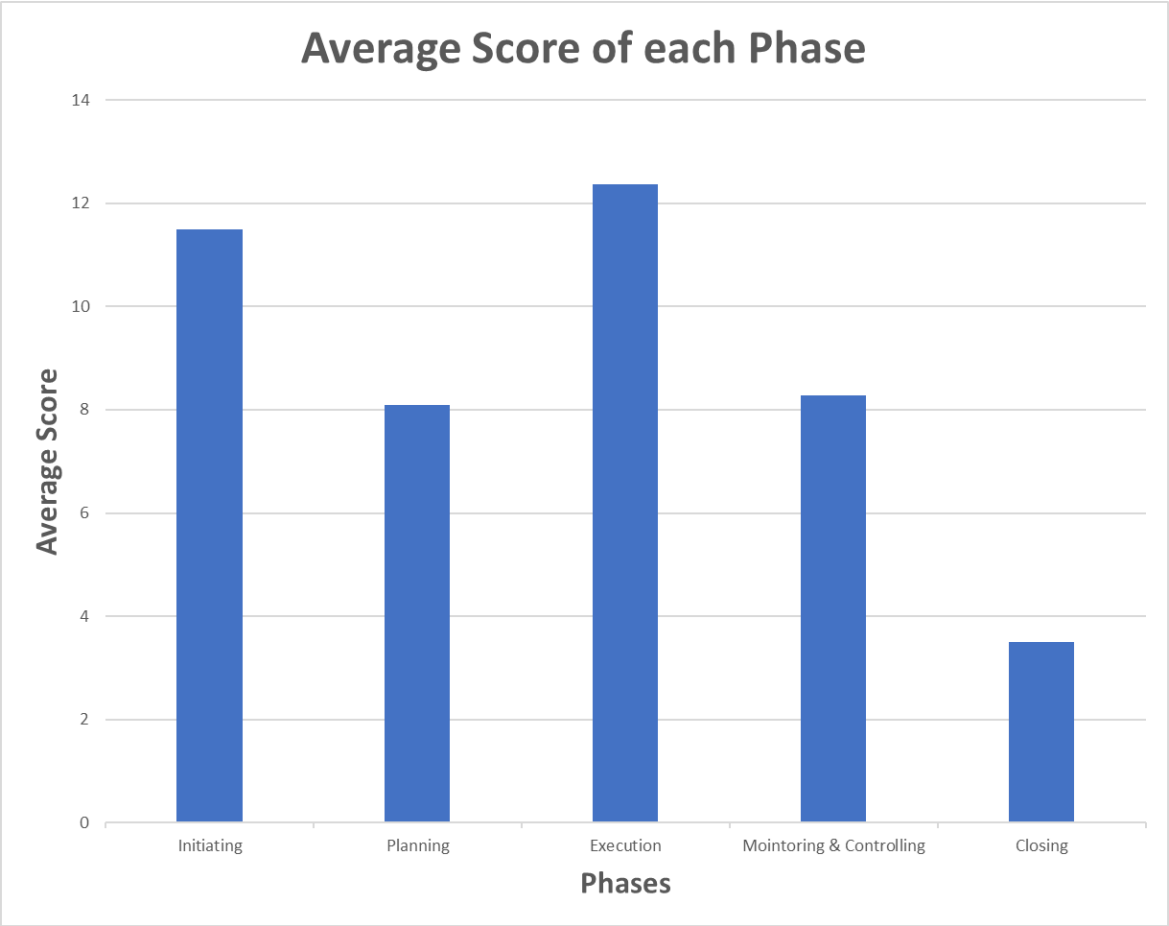
3.1.10.4 13.4: Control Stakeholder Management:

We must keep inform stakeholders and clarify everything at every step and ask for their opinions always, so that they cannot insert their opinion late into project. The **DACI (Score: 05)** clearly delineates who is actively "Contributing" and who is "Informed".

Confluence (Score: 05): No matter what kind of project we are working, we should make sure that we are documenting almost all the documents and others can acknowledge the work by liking or commenting. They can also give their reviews about that.

4 CONCLUSION/RESULTS

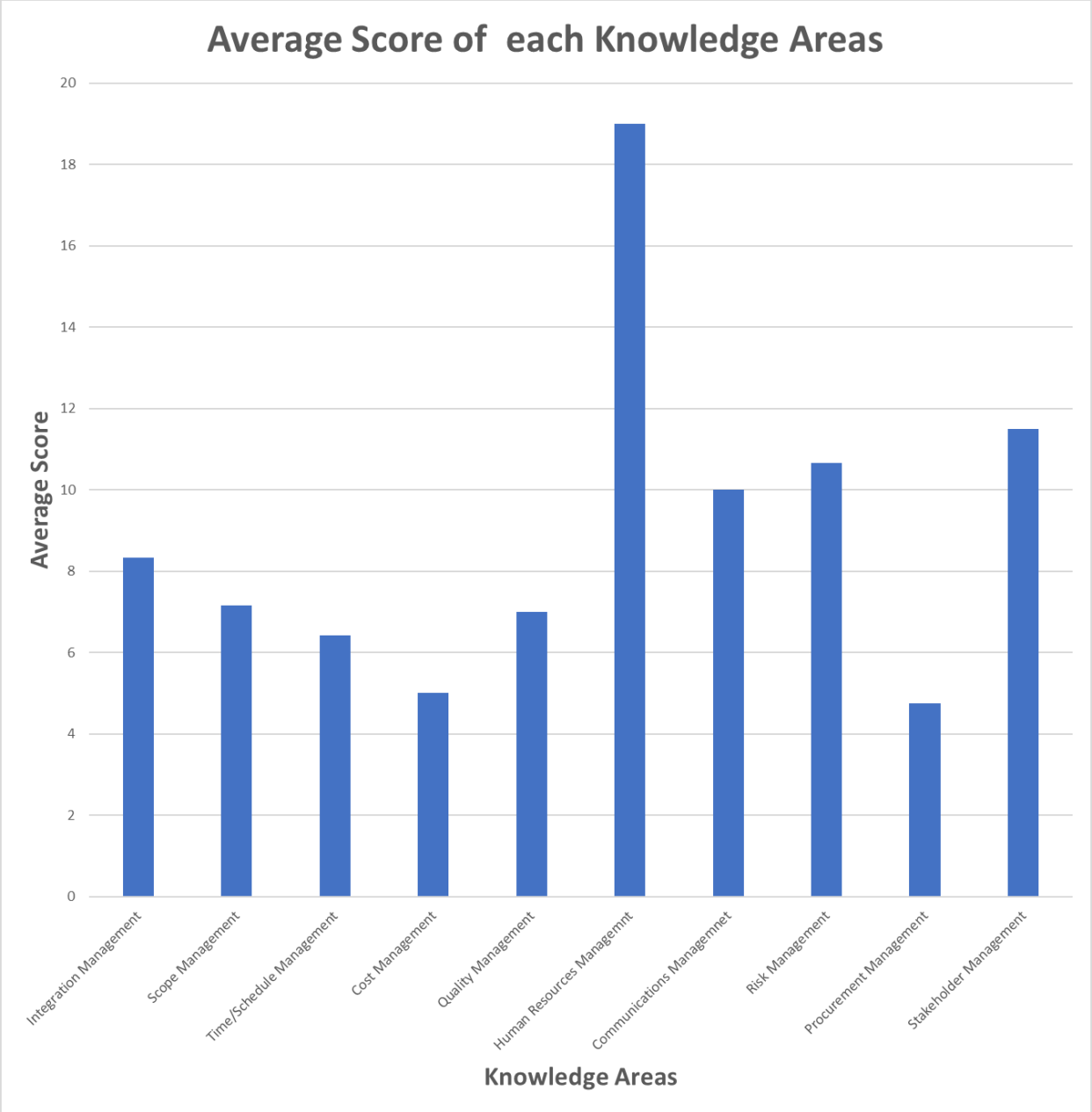
4.1 RESULTS:



Graph 1: The average in each phase, after ranking all the PMBOK® processes with their relevance scores.

Initiating a project in agile is very frequently used because Agile methods are beginning to acknowledge that some upfront work is required to ensure project success**.** Agile values responding to change more than following a plan, and its incremental approach allows projects to adapt rapidly to changes which means putting more emphasis on execution.

In agile development closing a project is less of an issue since even if the project is prematurely closed after a few iterative cycles of development, some of the more important characteristics have already been added. This minimizes the loss. Consequently, projects using agile development are less likely to go in the closing phase.



Graph 2: The average in each knowledge area, after ranking all the PMBOK® processes with their relevance scores.

The graph above represents the average of scores of all the PMBOK processes in each knowledge area.

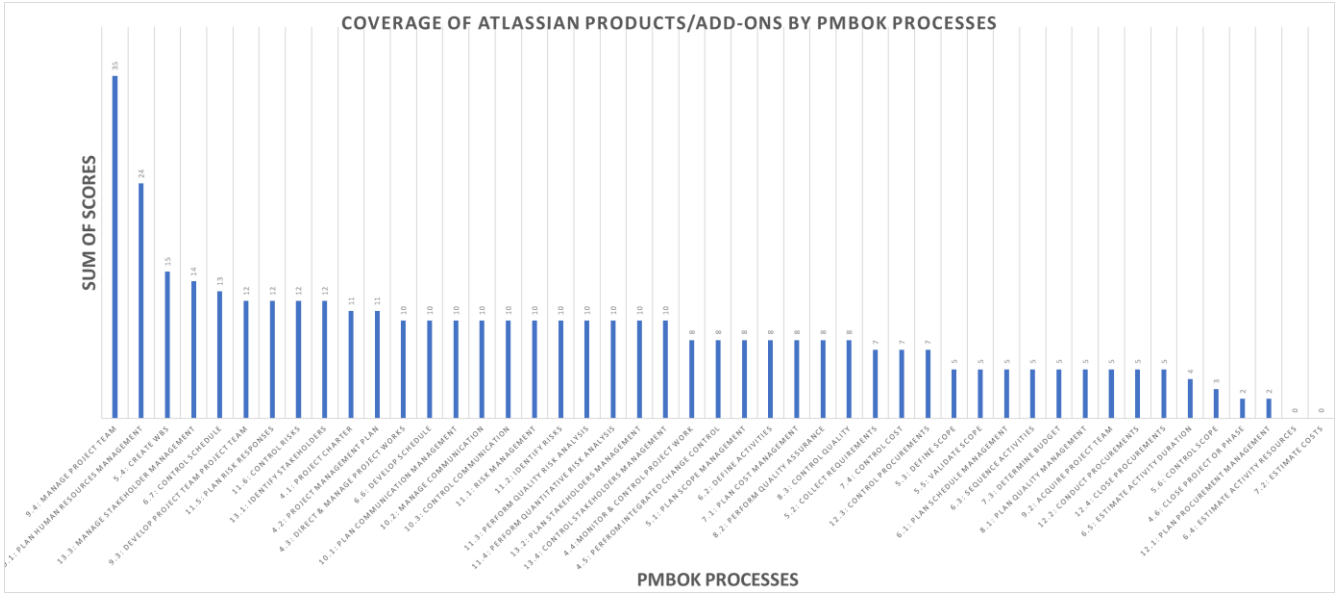
Agile values Individuals and interactions over processes and it can be seen that the result logically confirms the idea that Atlassian products adhere to importance of Knowledge area Human resources Management in similar way.

Agile Manifesto Principles apply to stakeholders on agile projects. However, the following seem to stand out the most '*Our highest priority is to satisfy the customer through early and continuous delivery of valuable software'* and '*Business people and developers must work*

together daily throughout the project'. This sets an important tone for stakeholder's management.

With the fast pace of change, there is a sense of unpredictability in agile projects. Therefore, Procurement management has very low coverage with Atlassian software suite.

Because of emphasis on value, change, and simplicity, agile projects have a different approach to budget and cost management than traditional projects which also means that the costs score is low.

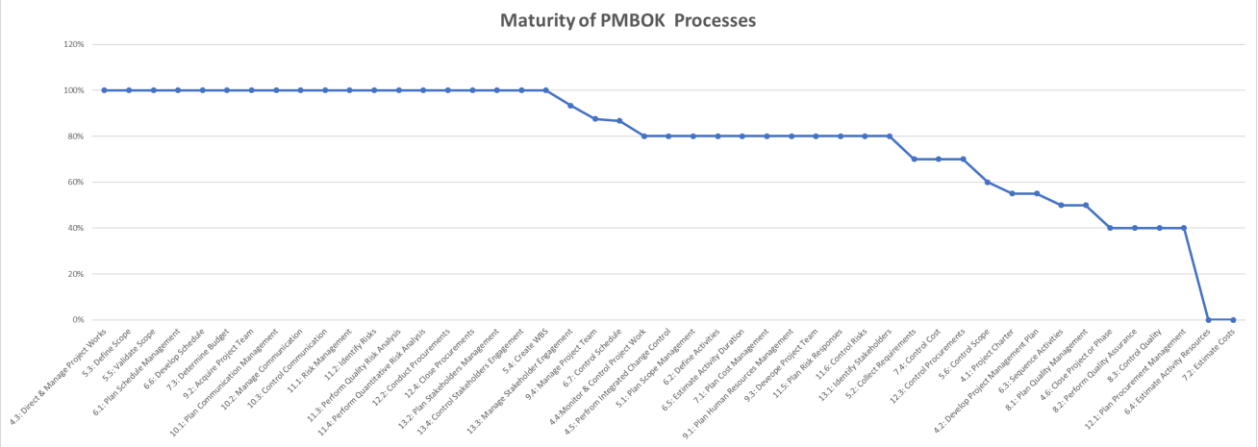


Graph 3: Sum of the Atlassian products/addons scores for each of the process

As we can see from the above graph, the agile methodology mainly recommends interactive team collaboration through sprint review meetings and refining WBS over time in an iterative incremental manner as more is leant about the project/product. The Atlassian products also adhere to importance of collaborative development and WBS in a similar way.

Due to the dynamic nature of agile projects, estimations can vary over time. Therefore, the results for maturity and coverage of Atlassian products for Estimate Activity Resources and Estimate Costs are negligible.

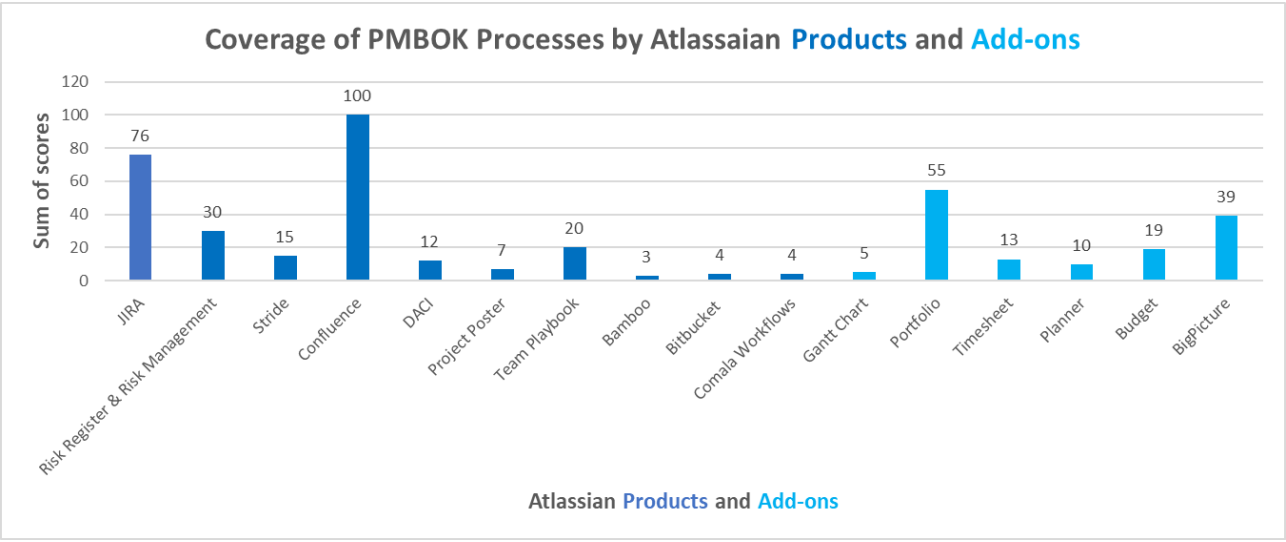
There are also few processes (with total score less than 5) which cannot be completed covered by Atlassian products and Add-ons. For example, Control Scope and Estimate Activity Duration.



Graph 4: Maturity of PMBOK processes

Maturity measures the possibility of completing a process fully in all the ~~one or more~~ Atlassian Software Suit products it can use. Having less than 100% maturity means there exists at least one product which doesn't completely meet the process completion requirement.

By comparing the graphs 3 and 4 we can see that a process can have lower coverage of Atlassian products, while having a higher maturity and vice versa. Some processes have lack of coverage and maturity (Eg: Close Project/Phase), some have more coverage and are less mature (Eg: Manage Project team) and some more mature with less coverage (Eg: Direct and Manage project work).



Graph 5: Sum of scores of all PMBOK® Processes for each Atlassian product/Add-on.

In the above graph, we can see that the Atlassian products and add-ons which can be used by PMBOK® processes. There are a lot of Atlassian products/addons but the most used Atlassian

products by PMBOK® processes are Confluence and JIRA and the most used Add-ons are Portfolio and BigPicture which can be used with JIRA.

4.2 CONCLUSION:

The PMBOK® guide is a standard for generally recognized good practices in project management. Unfortunately, misconceptions still exist regarding the type of methodologies, as outlined in the PMBOK® Guide, that can be used to implement these practices. It is perfectly fine to use an agile approach. You can do so and still be in keeping with the recommendations in the PMBOK® Guide.

From the general gap analysis made in the previous chapters indicating PMBOK® basis for traditional Project Management (waterfall methodology) and Atlassian software suit for Agile Project Management, our main finding is that, continuum is valid for 45 processes of PMBOK® 5th edition, except estimating cost and estimating activity resources. Thus, we can easily conclude that Atlassian products can be used for projects being managed using traditional waterfall project management methodology.

The most covered Knowledge area by Atlassian Software suit is Human Resource Management whereas Agile has an issue with cost that's why Cost and Resource activity estimation have zero coverage of Atlassian Software suit.

Together, traditional PM disciplines and newly emerging software development techniques along the Agile / SCRUM philosophy can help us deliver projects more quickly, with greater client satisfaction. *PMBOK® Guide* and Agile / SCRUM are NOT diametrically opposed.

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