

Nigerian Institute of Quantity Surveyors

**MANAGING CONSTRUCTION
PROJECTS IN TURBULENT
TIMES: A PROJECT
MANAGER'S PERSPECTIVE**
METHODOLOGIES FOR PLANNING & CONTROL

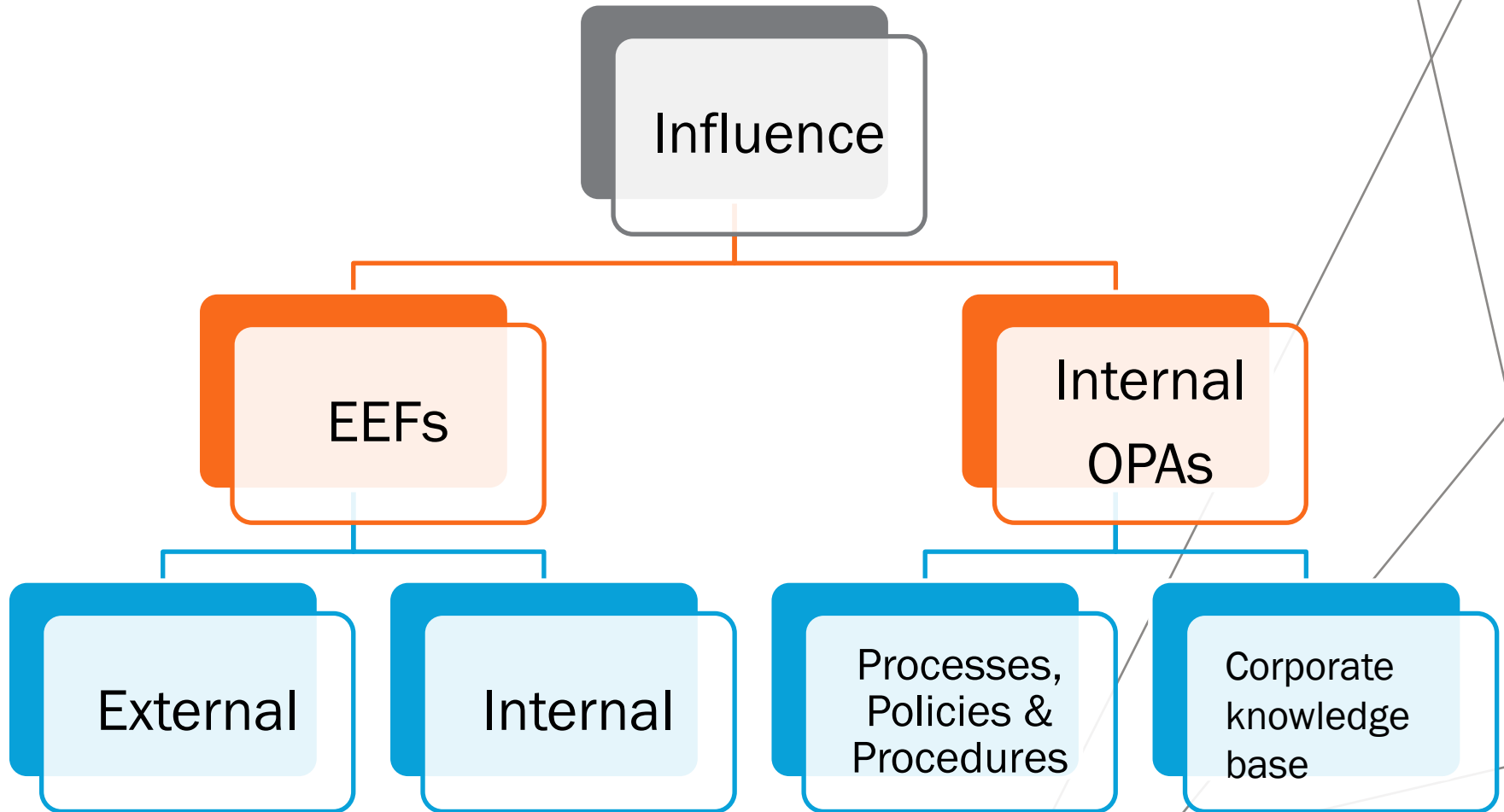
Presenter: QS Oluwatomi OGUNDARE

2-Day National Workshop at SIO Event Centre, Benin City
30th – 31st August, 2023

PRESENTATION OUTLINE

- Today's construction project environment and dynamics of project success
- PM methodologies: approaches, tools and techniques
- Application of Agile and hybrid models
- New ways of working

THE ENVIRONMENT IN WHICH PROJECTS OPERATE



ENTERPRISE ENVIRONMENTAL FACTORS

EXTERNAL FACTORS (TO PROJECT ORGANISATION)

Difficult
economic
climate

Funding/ Project
finance

Legal restrictions

Industry
databases.

Security
challenges/ deep
rooted public
issues.

Government 's
(over)regulations

Industrial crises

Market
conditions

Terrain of project
location

ENTERPRISE ENVIRONMENTAL FACTORS

INTERNAL FACTORS (TO PROJECT ORGANIZATION)

Organisational
culture

Organisational
structure and
governance

Software tools

Geographic
distribution of
facilities and
resources

Resource
availability

Employee
capability

INTERNAL ORGANIZATIONAL PROCESS ASSETS

PROCESSES, POLICIES, AND PROCEDURES

- Initiating
- Planning
- Executing
- Monitoring
- Controlling
- Closing

ORGANIZATIONAL KNOWLEDGE REPOSITORIES

- Labor hours,
- Incurred costs,
- project cost records
- Historical information and lessons learned knowledge repositories
- Defect management data repositories
- Project files from previous projects

REFLECTING ON PROJECT SUCCESS IN TURBULENT TIMES

Is it possible for a project to be successful from a scope/schedule/budget viewpoint, and to be unsuccessful from a business viewpoint?

REFLECTING ON PROJECT SUCCESS

Question 2:

Is it possible for a project to be unsuccessful from a scope/schedule/budget viewpoint, and to be successful from a business viewpoint?

CASE STUDY 1

Project type: Residential estate comprising about 500 housing units in a first choice location in Lagos state.

- **Designs and approval:** 4 bedroom detached apartment with staff quarters and gate house, and 3 bedroom semi detached apartments.
- 7 Building contractors were engaged to construct the apartments.
- 1 infrastructure scope was yet to be awarded.
- 30% Advance payment were made to all building contractors.
- **Planned funding type:** 40-60 equity to debt ratio.
- The trigger for first drawdown was – valuation at 40%
- Three banks were part of the financing scheme.
- **Turbulence:** CBN issued a new prudential guideline limiting MDB's extent of loans for construction purposes. Immediately, the three banks pulled out of the deal. Equity partners' confidence dropped. The client could not pay valuation Number 2 from the six contractors for more the three years. **What could have been done differently?**

CASE STUDY 2

A Client got approval for a 5 storey luxury hotel in a strategic location with conference and leisure facilities.

Equity to debt ratio: 36-64%

Financing agreement was in place.

Casting of the third floor was due, and it was the month for Draw Down no. 1 from the bank.

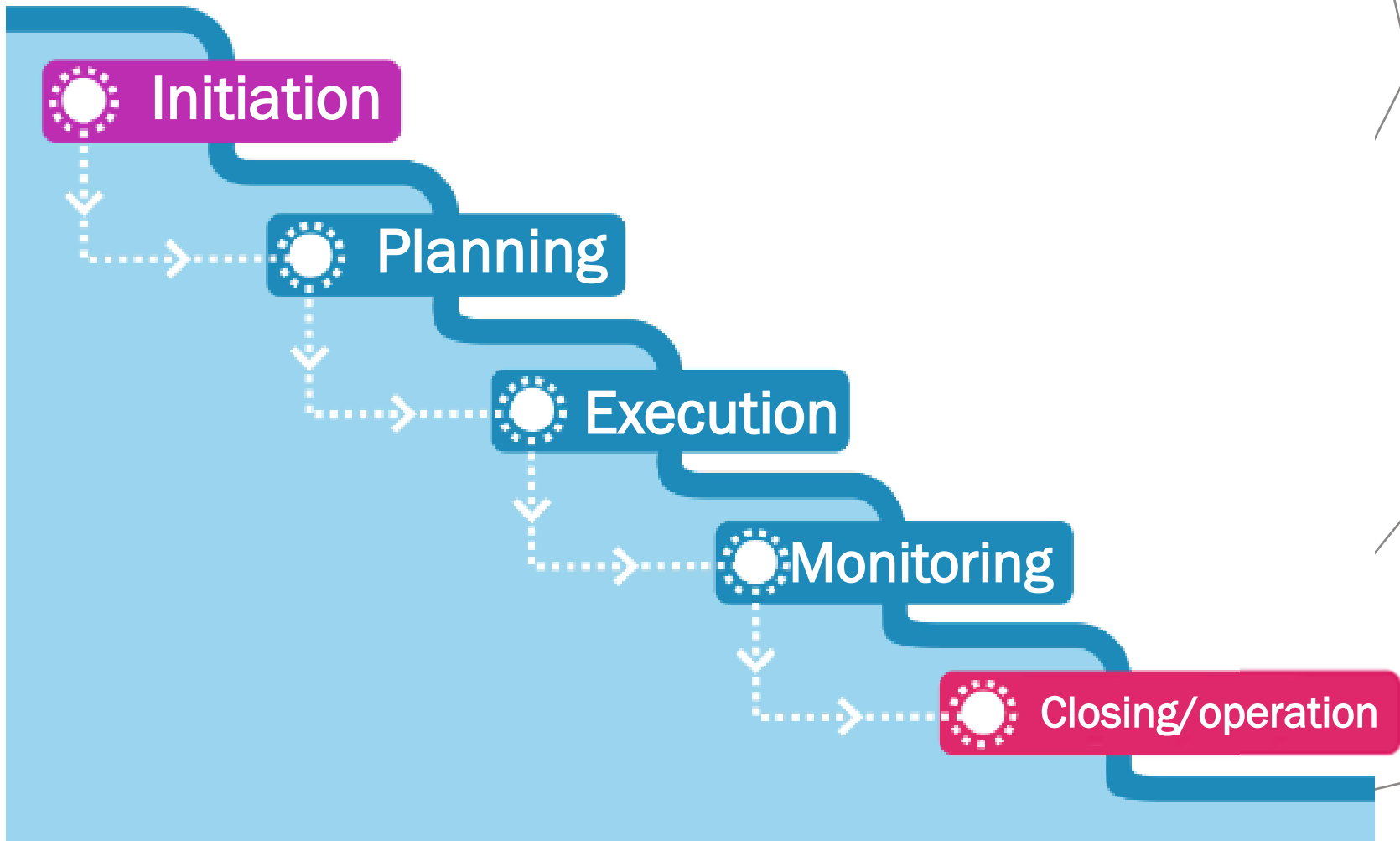
The bank was invited. During the bank's inspection of the site, the bank's official announced that the bank does not fund 'brick and mortar' works. It only funds finishes, furniture and equipment. The Client was advised to look for other funding to complete the carcass. As there were no previous agreement with other funding partners, the project was on hiatus for 6 months, with heavy exposures from the claims from contractors on site. **What could have been done differently?**

CASE STUDY 3

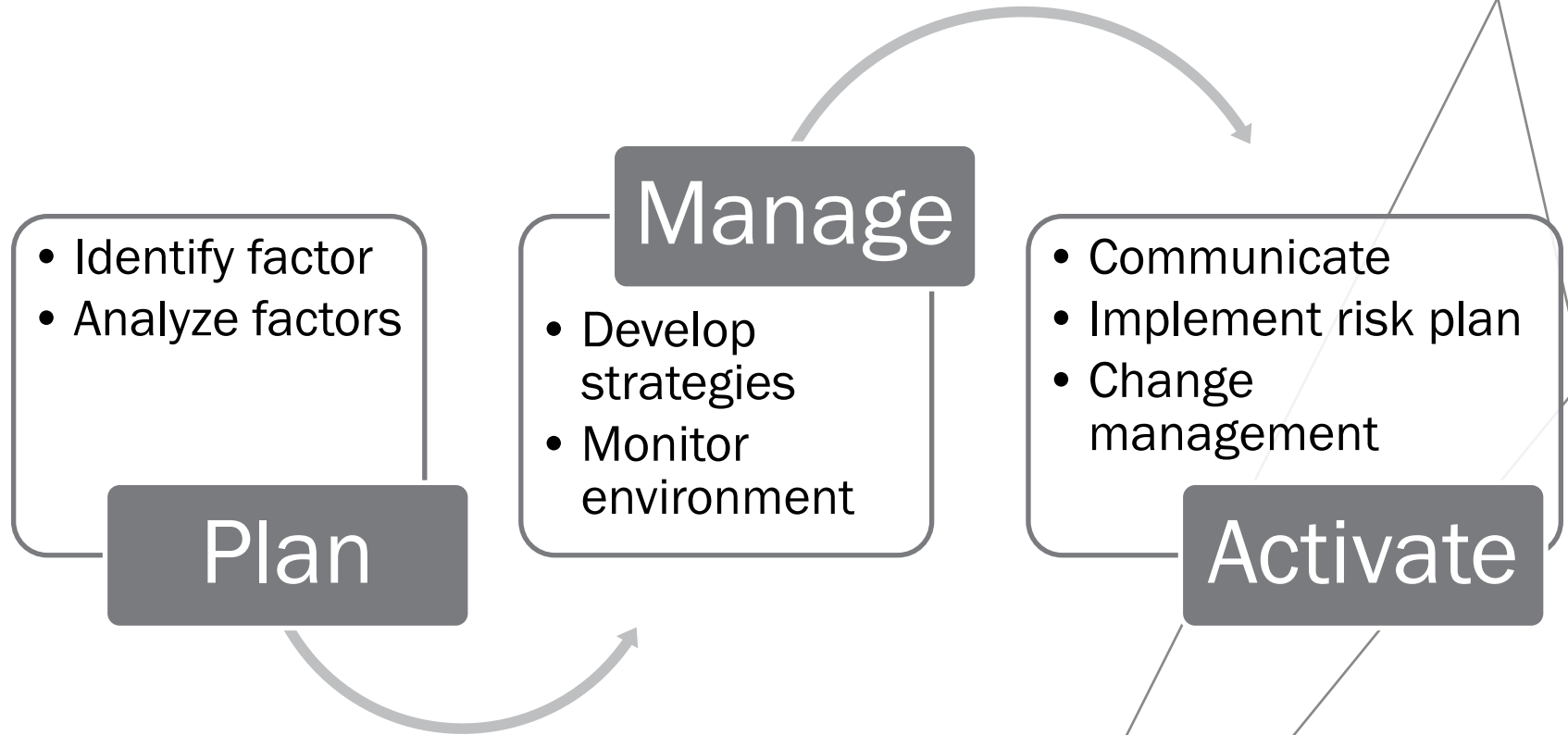
A real estate developer ventured into mall development. It was 100% owner-funded. 'If you build it, they will come'. The project was designed and constructed on time and within budget. Finishing was well supervised. It was built to design and specifications. Six months after completion, HVAC equipment were due for servicing. No single retailers sign the lease agreement template. Some complained about the location. Other enquired about the anchor tenant. But they never signed the Head of Terms agreement sent to them. The developer settled the consultants' fees. He paid all valuations to the contractors. Yet, the project did not attract the anticipated tenants/ revenue.

What could the Project manager have done differently?

WATERFALL



MANAGING IMPACT OF PROJECT ENVIRONMENTS ON THE PROJECT



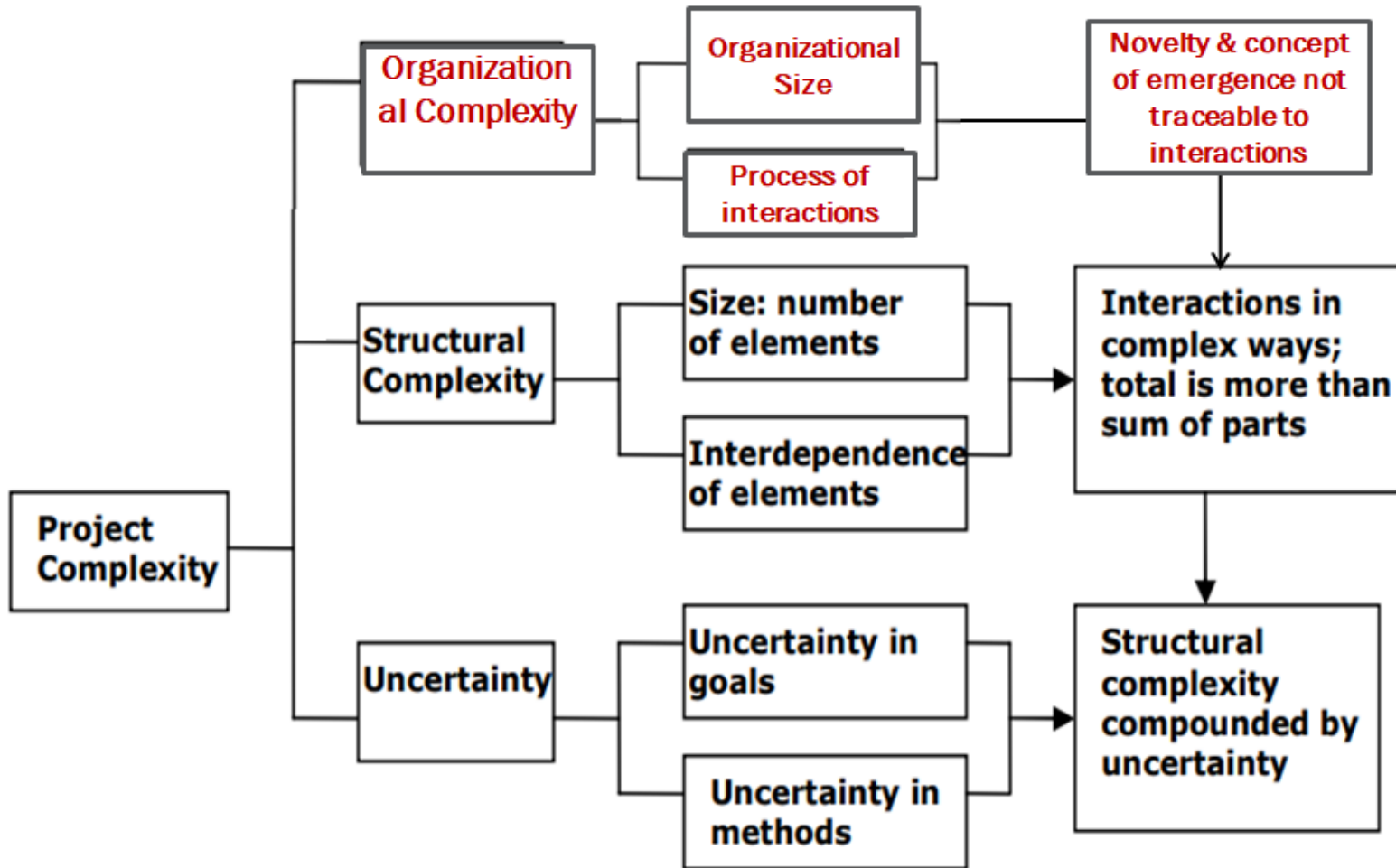
WATERFALL APPROACH & UNCERTAINTY



- Internal
- objectives of owner
 - Users need change
 - Financing disturbance
 - Poor project planning
 - Poor control

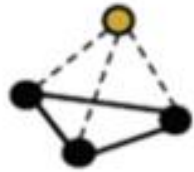
Change under waterfall approach

UNCERTAINTY, COMPLEXITY & TURBULENCE



Dimensions of project complexity (Williams, 2002) *edited*by Author*

CYNEFIN FRAMEWORK



Complex

the relationship between cause and effect can only be perceived in retrospect

probe – sense - respond
emergent practice

Complicated

the relationship between cause and effect requires analysis or some other form of investigation and/or the application of expert knowledge

sense – analyze - respond
good practice



novel practice

no relationship between cause and effect at systems level

act – sense - respond

Chaotic

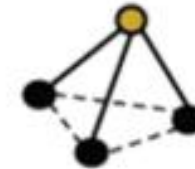


best practice

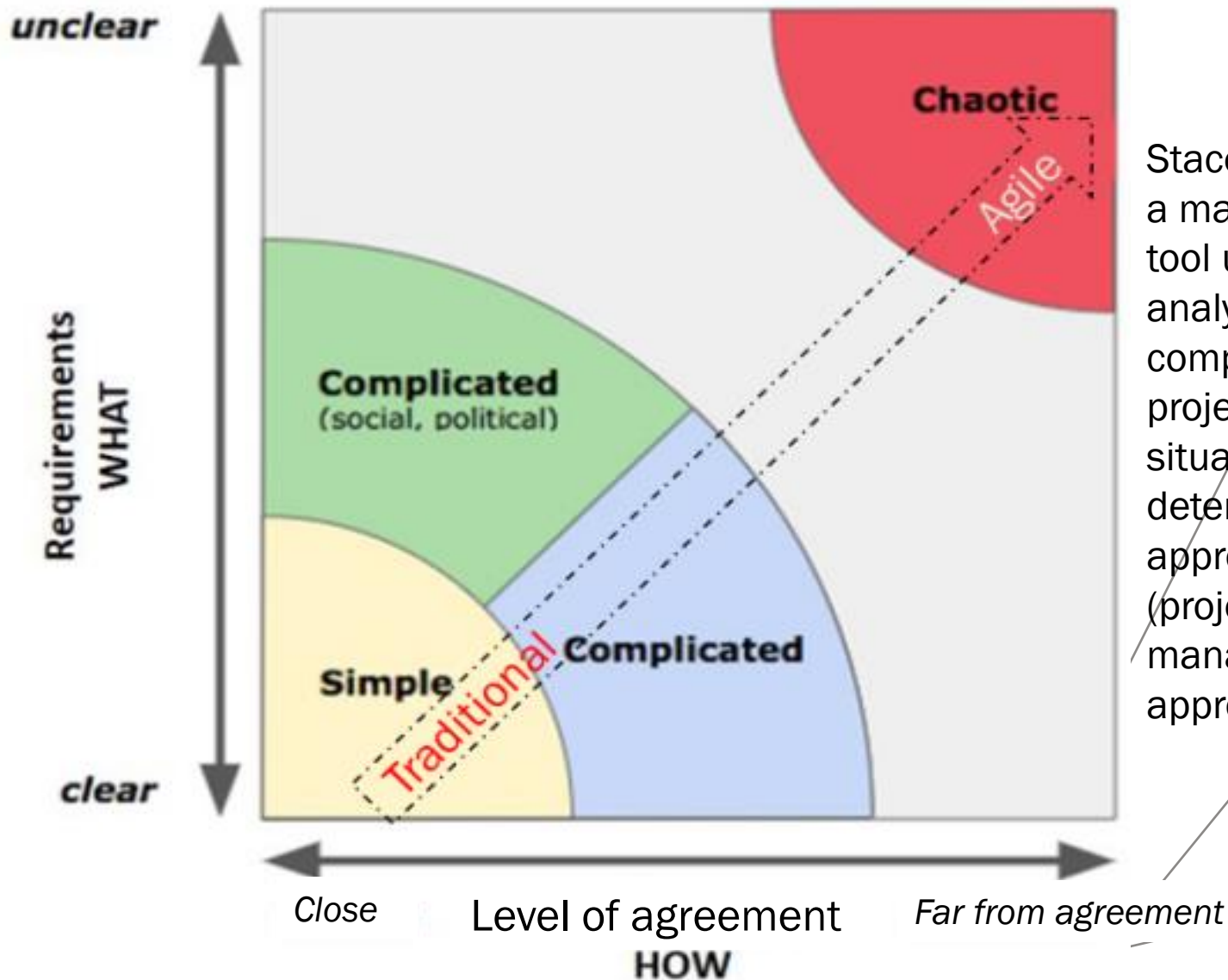
the relationship between cause and effect is obvious to all

sense – categorize - respond

Simple



DECISION-MAKING IN DYNAMIC ENVIRONMENTS



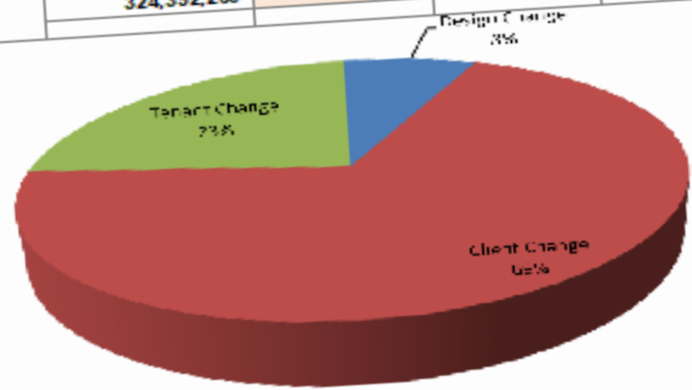
Stacey Matrix is a management tool used to analyze the complexity of a project or situation and determine the appropriate (project) management approach.

Stacey-Matrix

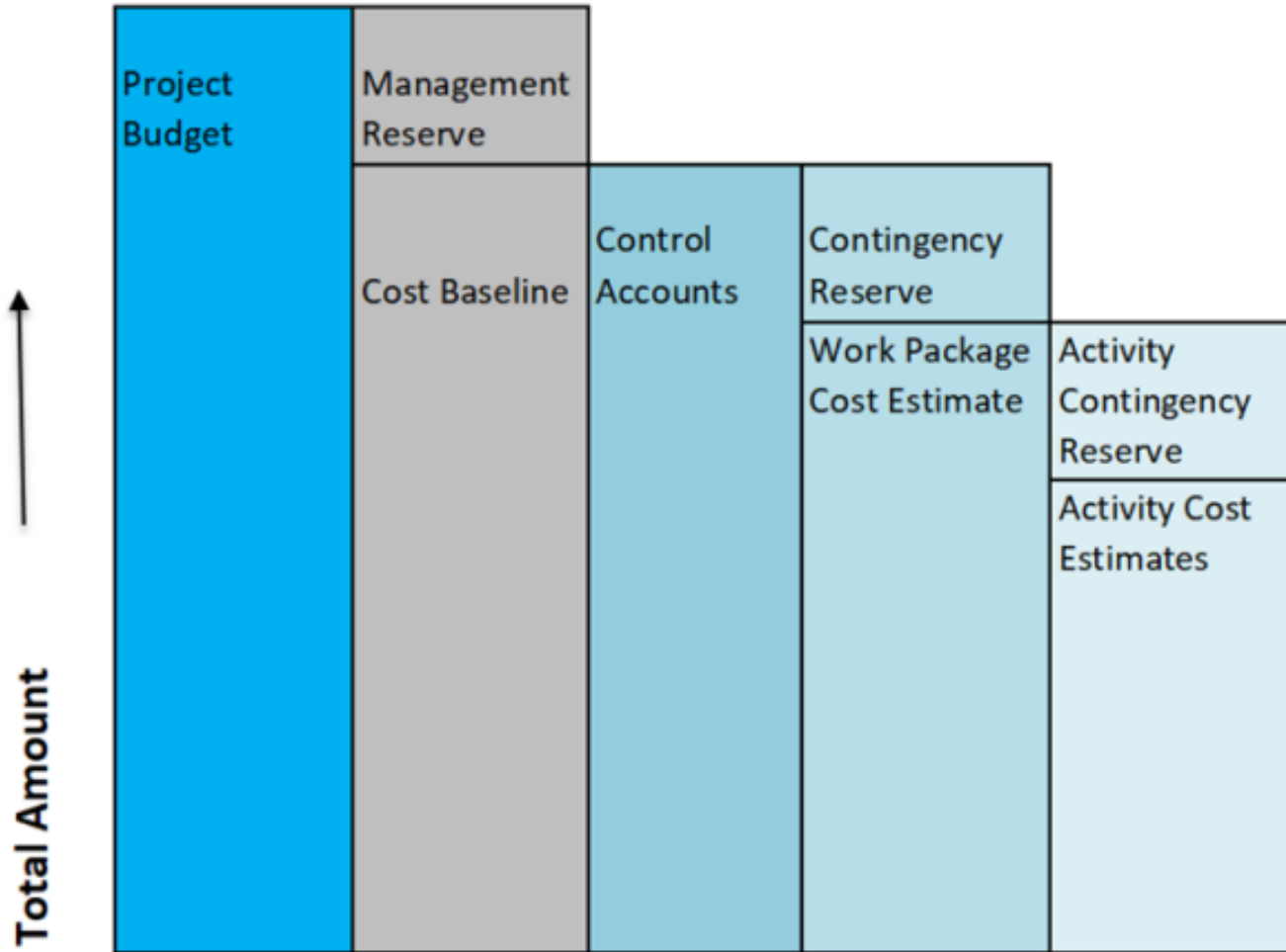
VARIATION REPORTING

3.0 APPROVED VARIATION ORDERS

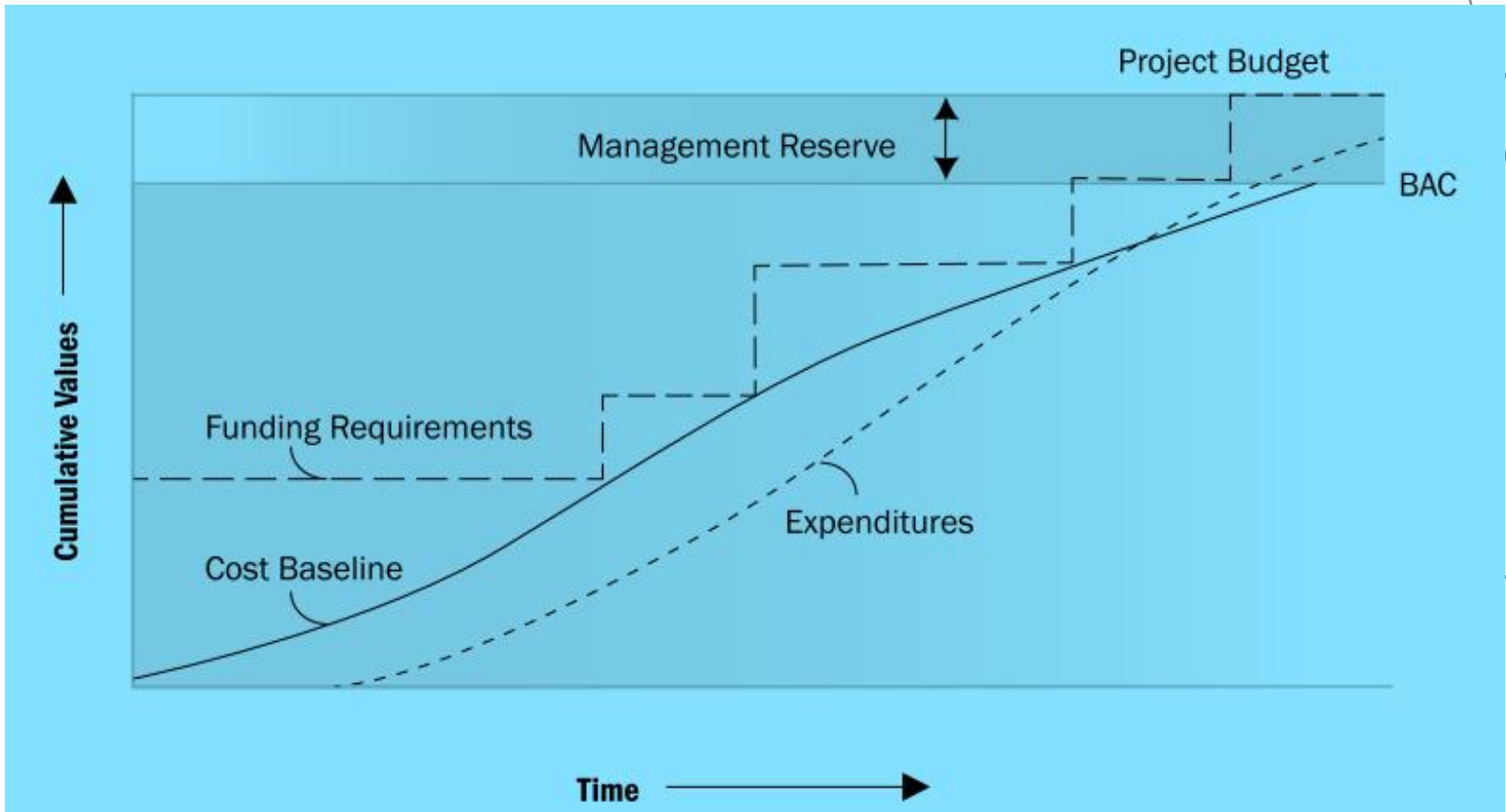
EI	Description	Variations Instructed Total Agreed (NGN)	VARIATION CATEGORY		
			Design Change	Client Change	Tenant Change
This section is for Architect/PM's Instructions		17,639,044	17,639,044		65,192,434
001	Adjustment to Milestone 1	65,192,434		148,864,567	
002	Adjustment to MEP / FC Sums Budget	148,864,567		37,314,000	
003	Underground parking (building works)	37,314,000		20,000,000	
004	Underground parking (MEP works)	20,000,000		8,000,000	
005	Accelerated preliminaries	8,000,000			
006	Retractable fencing	234,000	234,000		
007	Drop down concrete fascia (on FF)		3,645,000		
008	Extra 15kg/m2 steel on LED Support (15kg x 60m x 9m x N450)	3,645,000		1,281,004	
009	Modifications to shopfronts and aluminium windows	1,281,004			
010	Fencing (Back, front & side)	3,160,645	3,160,645		
011	External Drainage	9,298,998			
012	Cinema - Builder's works	9,762,568			9,762,568
Carried to Summary		324,392,260	24,678,689	224,758,569	74,955,002



Snapshot of Cost Report showing scope and cost changes initiated by Client, Tenants & designers.



Project Budget Components



Cost Baseline, Expenditures, and Funding Requirements

Example: A project delay resulting in 30% prolongation of construction period

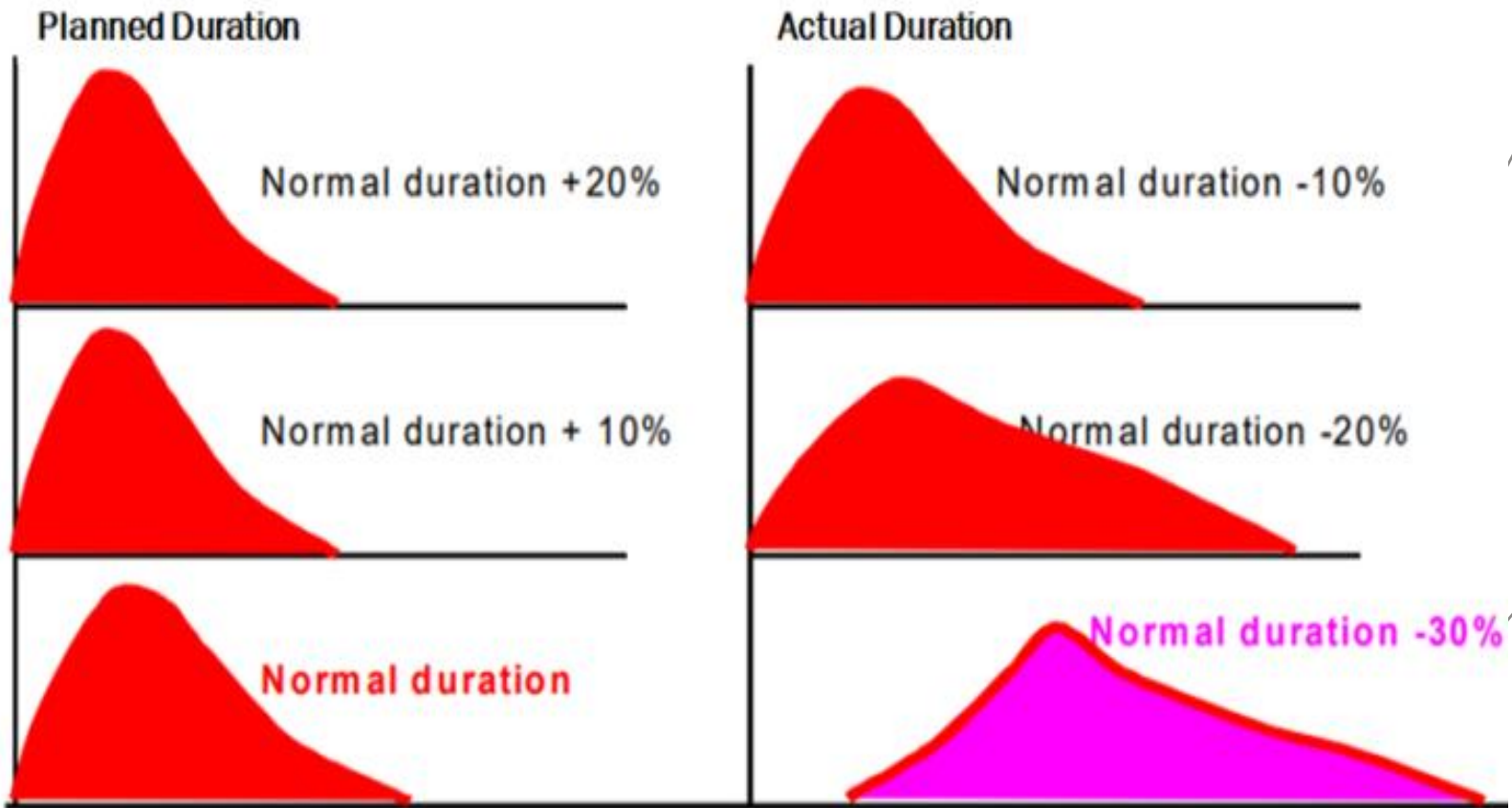


Figure 7: Buffers on Schedules

AGILE APPROACH

- Agile is about customer-based delivery on a frequent basis. That delivery creates feedback for the team. The team uses that feedback to plan and replan the next chunk of work.

- The Agile Manifesto

Individuals and interactions over processes and tools

Working software over comprehensive documentation

Customer collaboration over contract negotiation

Responding to change over following a plan

- Agile techniques and approaches effectively manage disruptive technologies.

- The first principle of agile places customer satisfaction as the highest priority.

- Rapid and transparent customer feedback loops are readily available with the widespread use of social media.

- To stay competitive and relevant, organizations now focus outwardly to the customer experience

QUICK GUIDE TO CHOOSING CORRECT APPROACH

Project Element	Agile	Waterfall
Firm requirements and regulations		✓
High involvement from product owner	✓	
New, or experimental, product	✓	
Single point of authority (i.e. project manager)		✓
Firm deadline		✓
Flexible budget	✓	

Waterfall versus Agile

Some keywords in agile are:

- **Stories**, also called “user stories’ i.e. user requirements
- **Epics** are large bodies of work that can be broken down into a number of smaller tasks (called stories).
- **Initiatives** are collections of epics that drive toward a common goal.

VALUE OF AGILE PRINCIPLES AND PRACTICES

Indicators of application of agile principles and practices:

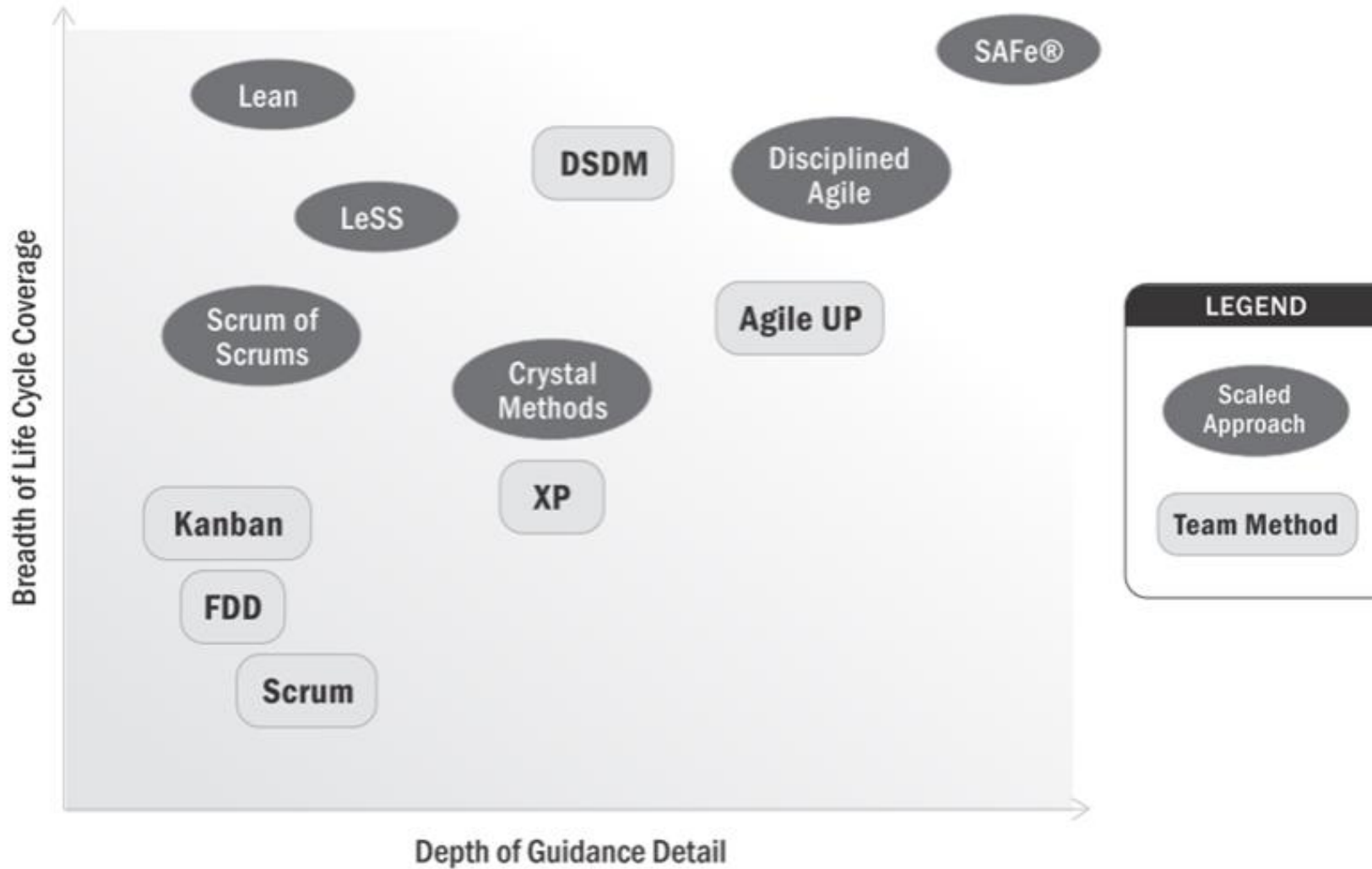
- Early, measurable return on investment through defined, iterative delivery of product increments
- High visibility of project progress, allows early identification and resolution or monitoring of problems
- Continuous involvement of the customer through the product development cycle
- Empowerment of the business owner to make decisions needed to meet goals
- Adaptation to changing business needs, giving more influence over requirement changes
- Reduced product and process waste

CHARACTERISTICS OF PROJECT LIFE CYCLES

Characteristics				
Approach	Requirements	Activities	Delivery	Goal
Predictive	Fixed	Performed once for the entire project	Single delivery	Manage cost
Iterative	Dynamic	Repeated until correct	Single delivery	Correctness of solution
Incremental	Dynamic	Performed once for a given increment	Frequent smaller deliveries	Speed
Agile	Dynamic	Repeated until correct	Frequent small deliveries	Customer value via frequent deliveries and feedback

Characteristics of Four Categories of Life Cycles

QUICK GUIDE TO CHOOSING CORRECT APPROACH



SCRUM

Scrum is a single-team process framework used to manage product development. The Scrum Framework, in its pure form, is best suitable for highly independent, one team green field or brown field projects. It is a method for doing tasks as a team in tiny steps with ongoing experimentation and feedback loops to learn and get better as you go.

Essential Roles in Scrum

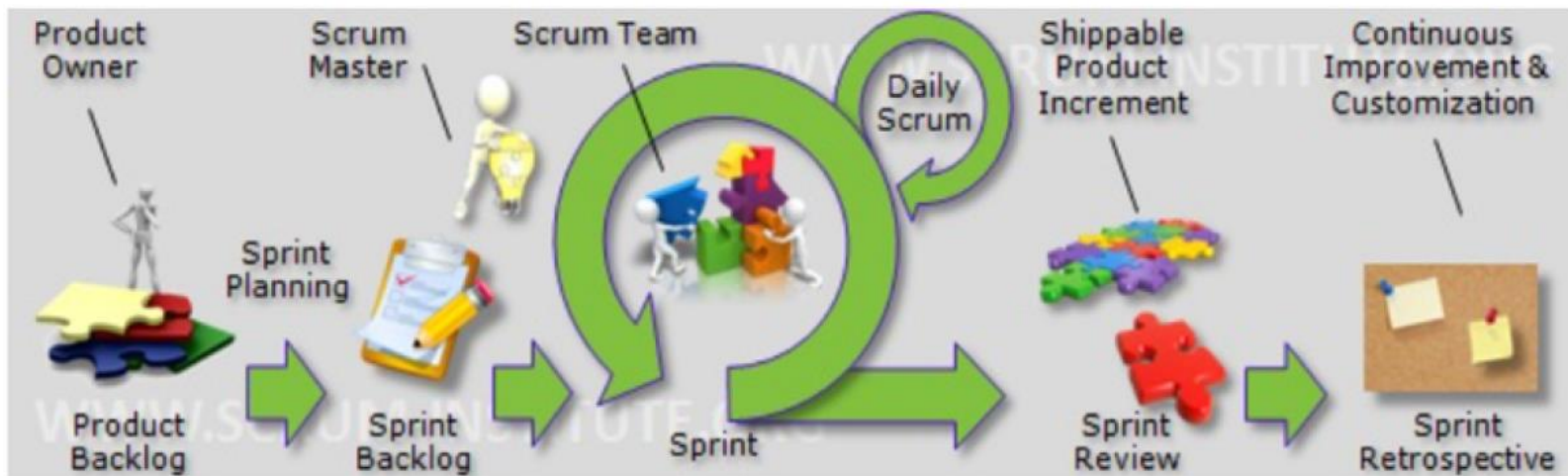
- Scrum master/ Use expertise to assist the team be as effective as possible.
- Coaching, teaching, facility and mentoring
- Owner- maximize product possible
- Developer are team members



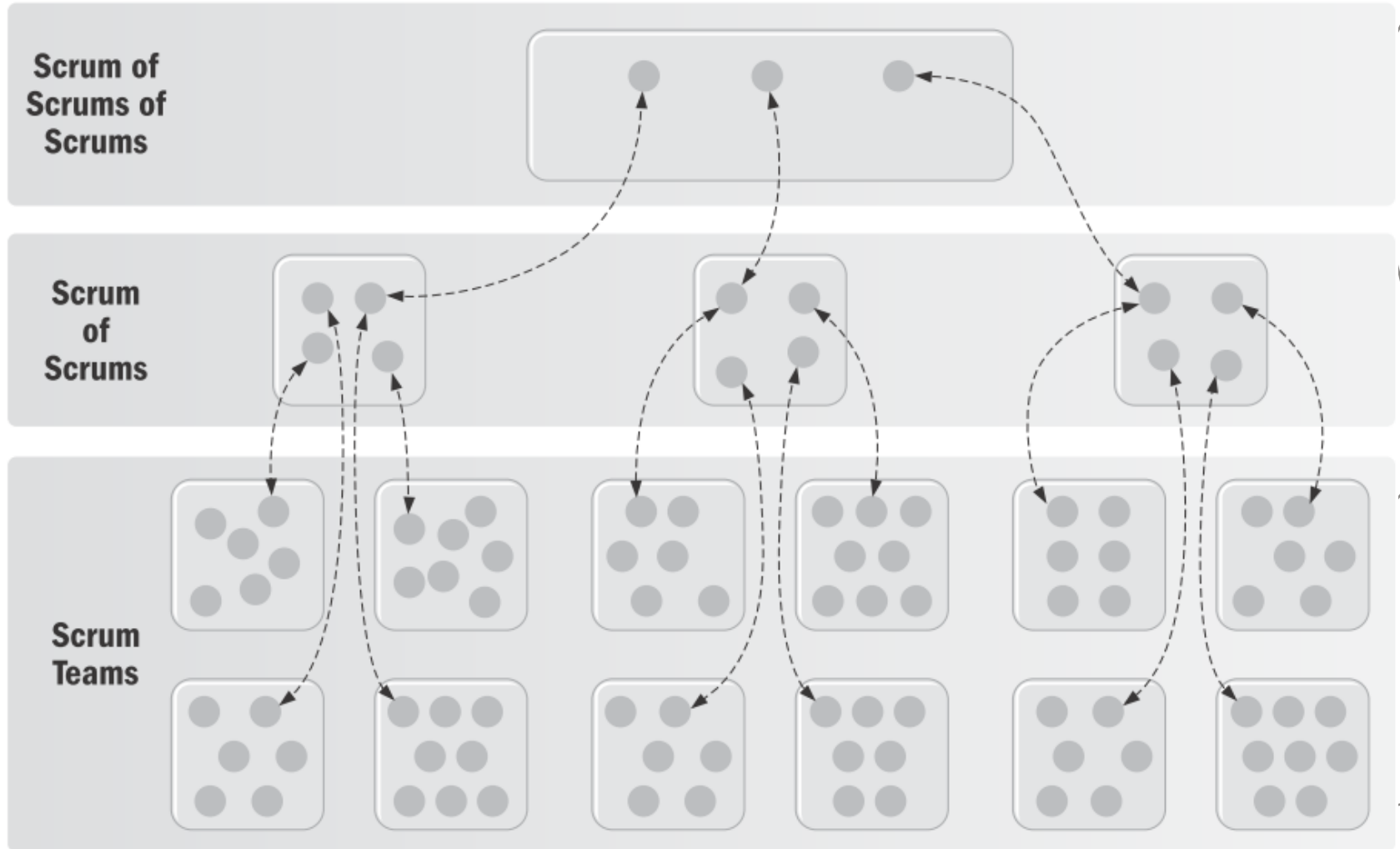
Scrum Master
The Scrum Master keeps
the team focused

THE MAIN COMPONENTS OF SCRUM FRAMEWORK

- **Three Scrum Roles:** The Scrum Product Owner, the Scrum Team, and the Scrum Master.
- **Five Scrum Events (Scrum Rituals) or Ceremonies:** Scrum Grooming (Backlog Refinement) Meeting, Sprint Planning Meeting, Daily Scrum Meeting, Sprint Review Meeting, and Sprint Retrospective Meeting.
- **Product Backlog (Scrum Backlog) or Scrum Product Backlog:** An artifact that is used to manage and prioritize all of the known requirements of a Scrum project.
- **Sprints:** Cycles of work activities to develop shippable product or service increments.
- **Sprint Backlog:** An artifact to keep track of requirements committed by the Scrum teams for a given Sprint.

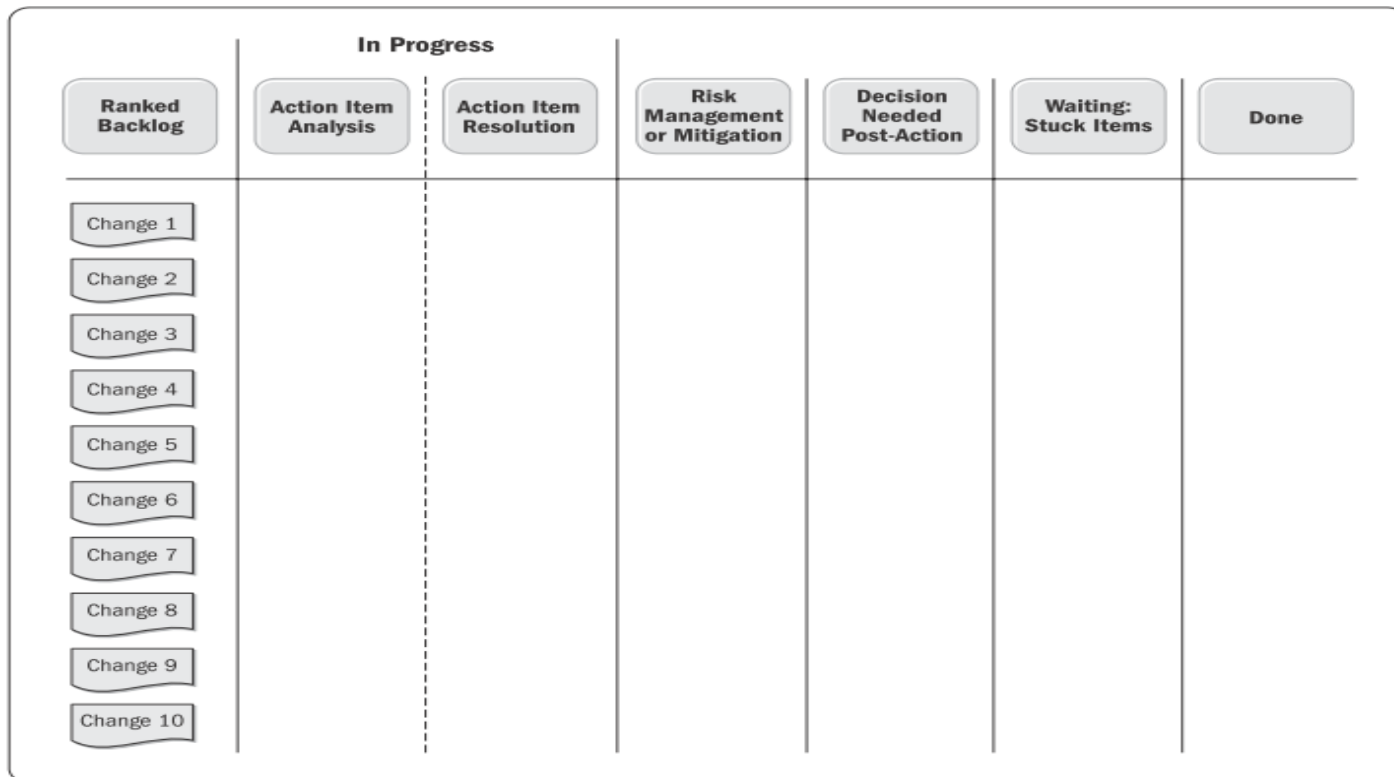


SCALING NETWORKS- SCRUM OF SCRUMS



KANBAN

Kanban in lean manufacturing is a system for scheduling inventory control and replenishment. The Kanban Method is derived from lean thinking principles. Kanban boards provide clear insight to workflow, bottlenecks, blockers, and overall status. Additionally, the board acts as an information radiator to anyone who sees it, providing up-to-date information on the status of the work of the team. In the Kanban Method, it is more important to complete work than it is to start new work.



Backlogs on Kanban board

KANBAN BOARD IN USE

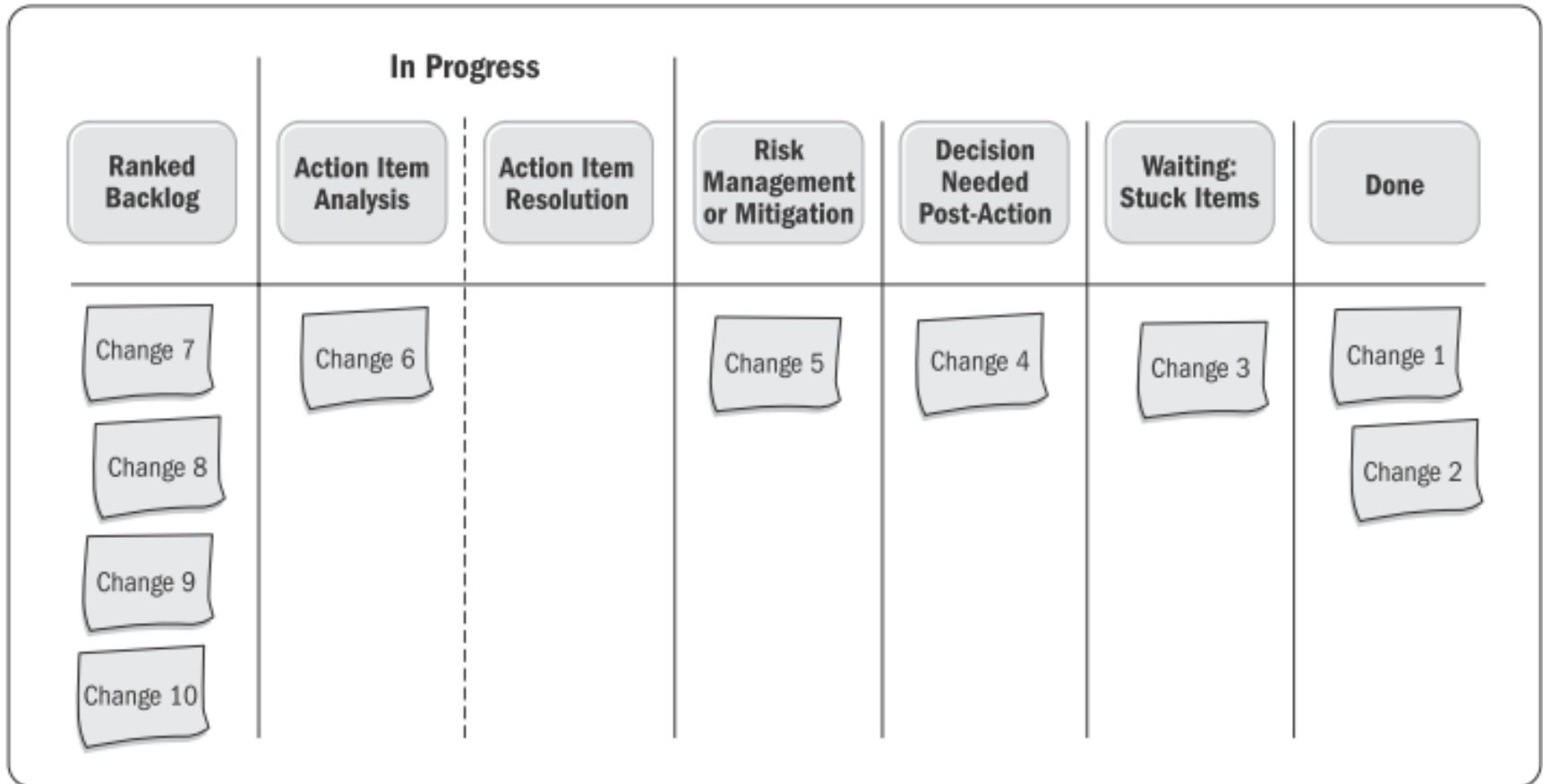


Figure xxx: Kanban Boards being used to Organize and Track Change Work

VIEW OF KANBAN BOARD ON JIRA APPLICATION

The screenshot displays a Jira Kanban board for 'Tomi Projects Construction Projects'. The board is organized into three columns: 'TO DO 5', 'IN PROGRESS 5', and 'DONE 8'. Each column contains three work items. The left sidebar shows navigation options like Backlog, Board, Reports, Releases, Components, Issues, Repository, Add item, and Settings. The top right has a 'Release' button and a menu icon. Each work item card includes a title, a project type label (e.g., 'PROPOSED OFFICE FIT-OUT'), status icons (checkmark, up arrow, down arrow, etc.), a count, a key (e.g., TIS-25), and an assignee's profile picture.

Column	Item Count	Task Description	Project Type	Status Icons	Count	Key	Assignee
TO DO	5	Place order for precision Air-conditioning units	PROPOSED OFFICE FIT-OUT	✓ ↑	5	TIS-25	[Profile]
	5	Install studs for acoustic walls in the enclosed offices area	PROPOSED OFFICE FIT-OUT	↑ ⚡	9	TIS-12	[Profile]
	5	Complete formwork to column footings	PROPOSED TURNKEY PROJECT	↑ ↑	3	TIS-17	[Profile]
IN PROGRESS	5	Apply 4.5mm thick felt on the lower roof	PROPOSED MIXED-USE	📄 ↑	3	TIS-8	[Profile]
	5	Construct steel support to bulk filer areas	PROPOSED OFFICE FIT-OUT	✓ ↑	4	TIS-15	[Profile]
	5	Reduce headroom to 4.2m high	PROPOSED OFFICE FIT-OUT	👉 ↑	4	TIS-15	[Profile]
DONE	8	Level and compact bottom of excavation to receive concrete	PROPOSED TURNKEY PROJECT	📄 ↑		TIS-68	[Profile]
	8	Carefully remove existing ceiling boards for re-use	PROPOSED OFFICE FIT-OUT	📄 ↑	5	TIS-23	[Profile]
	8	Decommissioning of existing services	PROPOSED OFFICE FIT-OUT	✓ ↑		TIS-15	[Profile]

Kanban requires real-time communication of capacity and full transparency of work. Work items are represented visually on a kanban board, allowing team members to see the state of every piece of work at any time, all in a single view.

BURNDOWN CHART

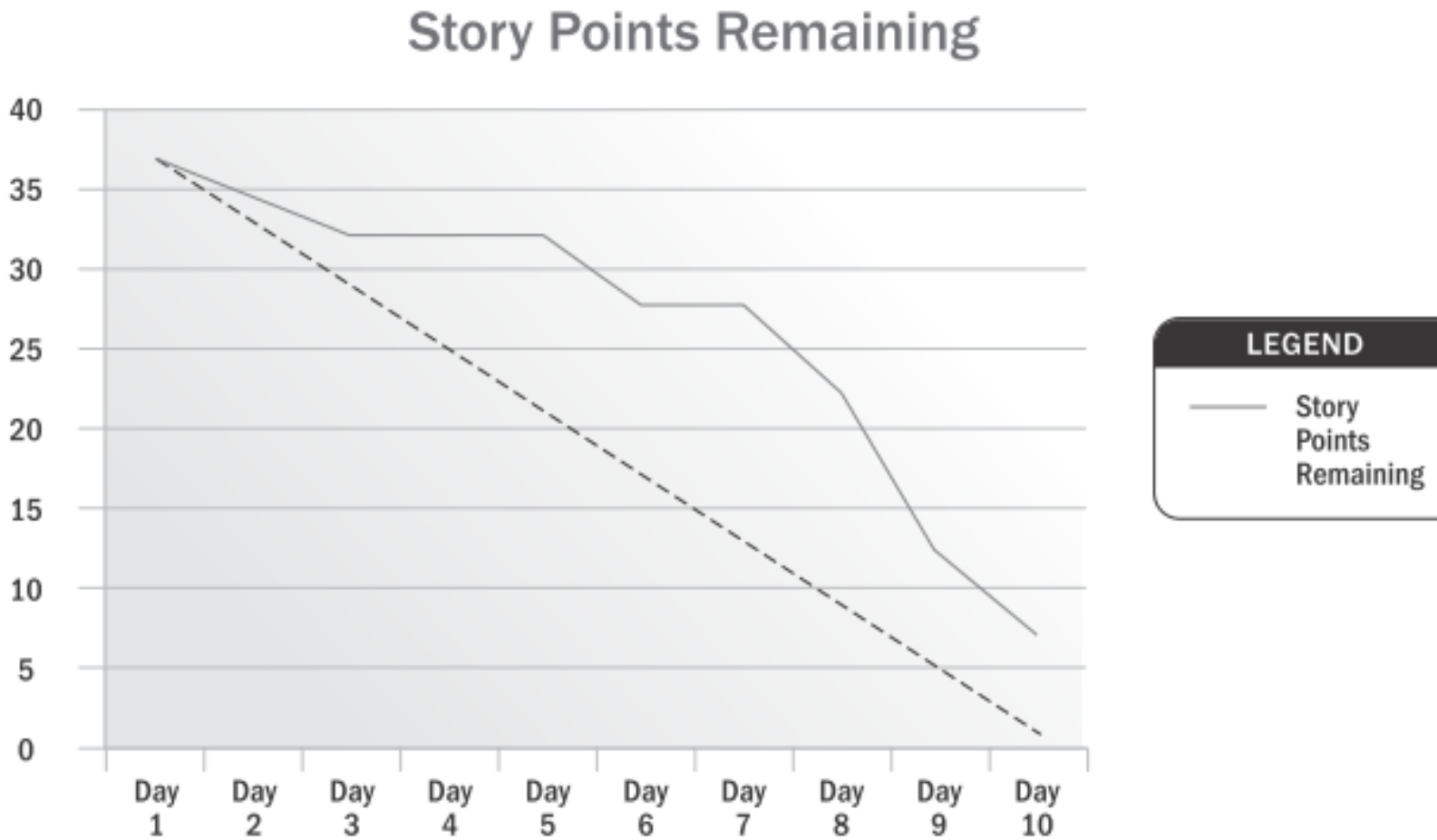


Figure 5-1. Burndown Chart for Remaining Story Points

BURNUP CHART

Story Points Done

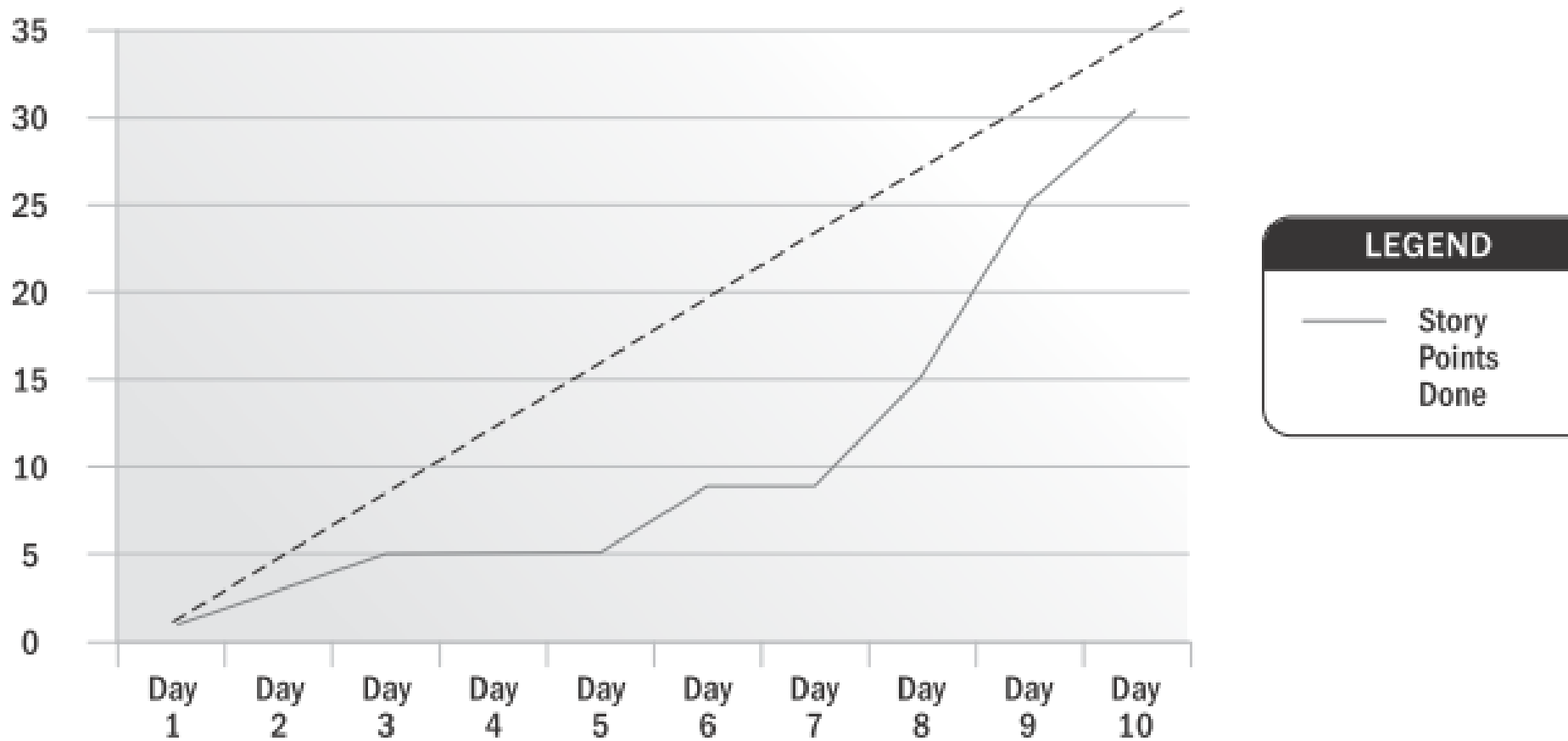
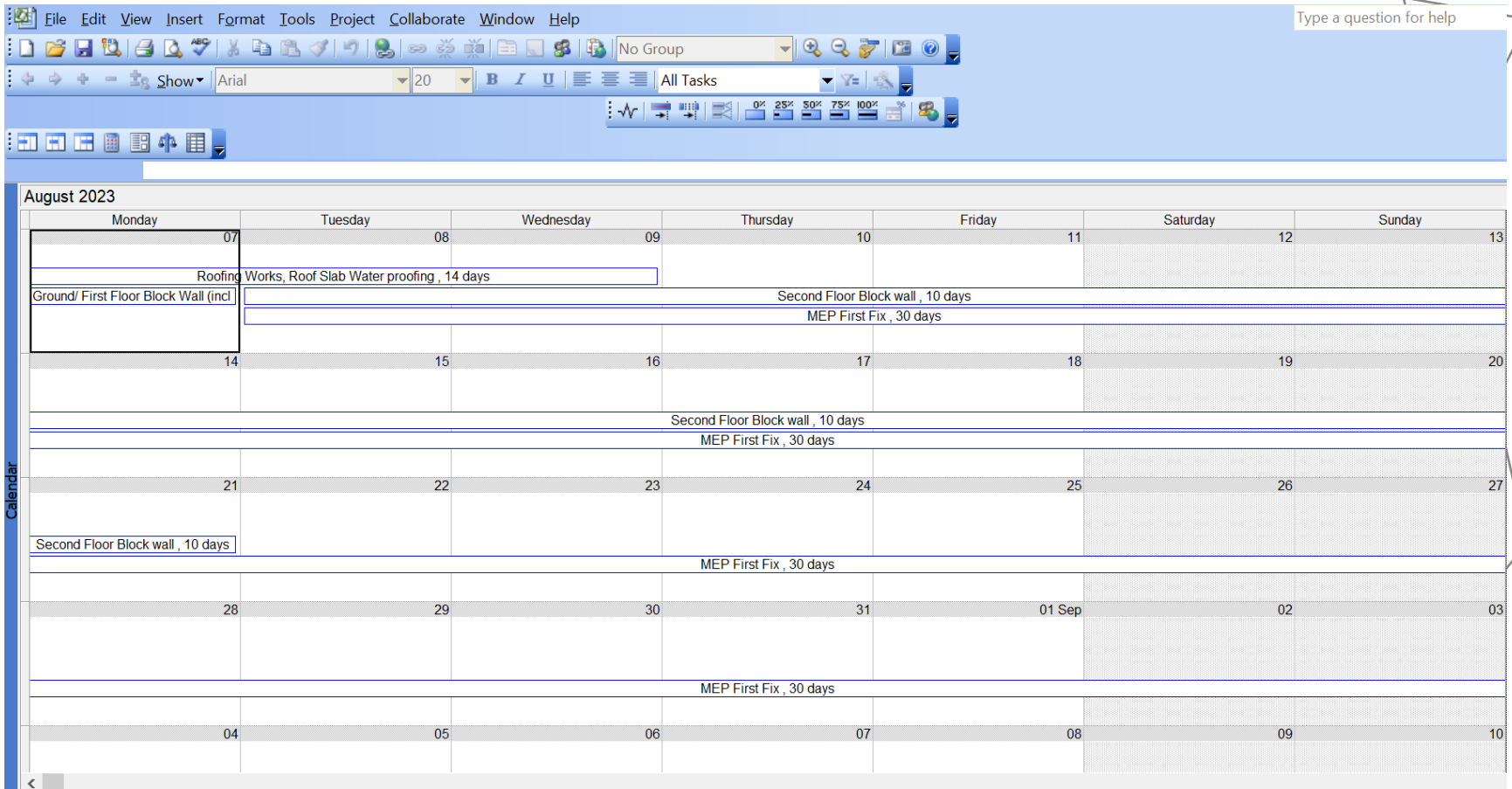


Figure 5-2. Burnup Chart for Showing Story Points Completed



Viewing Project schedule using calendar view offer some visibility advantages in programme tracking (on waterfall projects).

SCRUMBAN

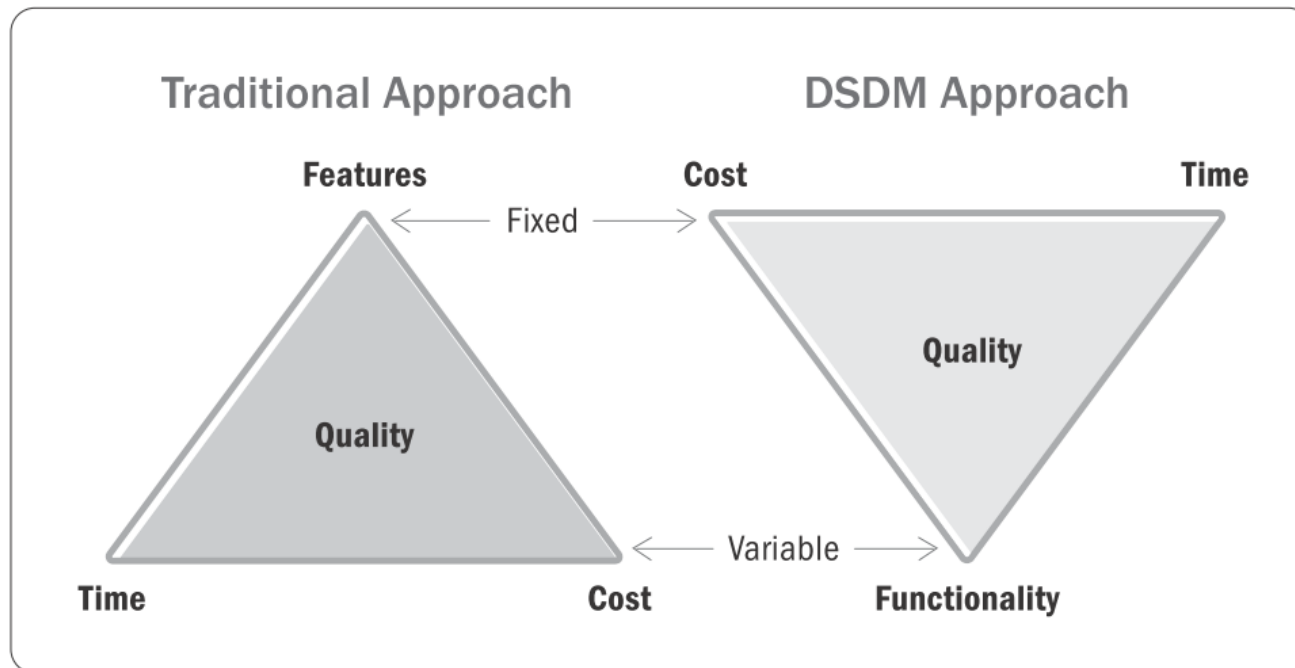
Scrumban is an agile approach originally designed as a way to transition from Scrum to Kanban. As additional agile frameworks and methodologies emerged, it became an evolving hybrid framework in and of itself where teams use Scrum as a framework and Kanban for process improvement.

In Scrumban, the work is organized into small “sprints” and leverages the use of kanban boards to visualize and monitor the work. The stories are placed on the kanban board and the team manages its work by using work-in-progress limits. Daily meetings are held to maintain the collaboration between the team and to remove impediments.

A planning trigger is set in place for the team to know when to plan next, typically when the work-in-progress level is lower than a predetermined limit. There are no predefined roles in Scrumban—the team retains their current roles.

DYNAMIC SYSTEMS DEVELOPMENT METHOD

Dynamic Systems Development Method (DSDM) is an agile project delivery framework initially designed to add more rigor to existing iterative methods popular in the 1990s. It was developed as a noncommercial collaboration among industry leaders. DSDM is known best for its emphasis on constraint-driven delivery.



CRYSTAL METHODS

Crystal is a family of methodologies. Crystal methodologies are designed to scale, and provide a selection of methodology rigor based on project size (number of people involved in the project) and the criticality of the project. The family of methodologies use different colors based on “weight” to determine which methodology to use. The use of the word crystal comes from the gemstone where the various “faces” represent underlying core principles and values.



The diagram shows a matrix of Crystal Methodologies. On the left, a vertical blue arrow labeled 'Criticality of the Project' points upwards. To its right is a blue box with a crown icon and four categories: Life (L), Essential Money (E), Discretionary Money (D), and Comfort (C). The main matrix has a dark blue header 'Crystal Methodologies' and five columns: Clear, Yellow, Orange, Red, and Maroon. The rows correspond to the categories L, E, D, C, and a bottom row for 'Number of people involved in the Project'. The cells contain codes like L6, E6, D6, C6, L20, E20, D20, C6, L40, E40, D40, C20, L80, E80, D80, C80, L200, E200, D200, C200, and ranges of people (1 to 6, 7 to 20, 21 To 40, 41 to 80, 81 to 200).

		Crystal Methodologies				
		Clear	Yellow	Orange	Red	Maroon
Criticality of the Project ↑	Life (L)	L6	L20	L40	L80	L200
	Essential Money (E)	E6	E20	E40	E80	E200
	Discretionary Money (D)	D6	D20	D40	D80	D200
	Comfort (C)	C6	C6	C20	C80	C200
		1 to 6	7 to 20	21 To 40	41 to 80	81 to 200
		Number of people involved in the Project				

Methods that are color-coded indicate the danger to human life

Crystal Sapphire is for projects that may risk human life, whereas Crystal Clear is for programs that do not pose such a risk

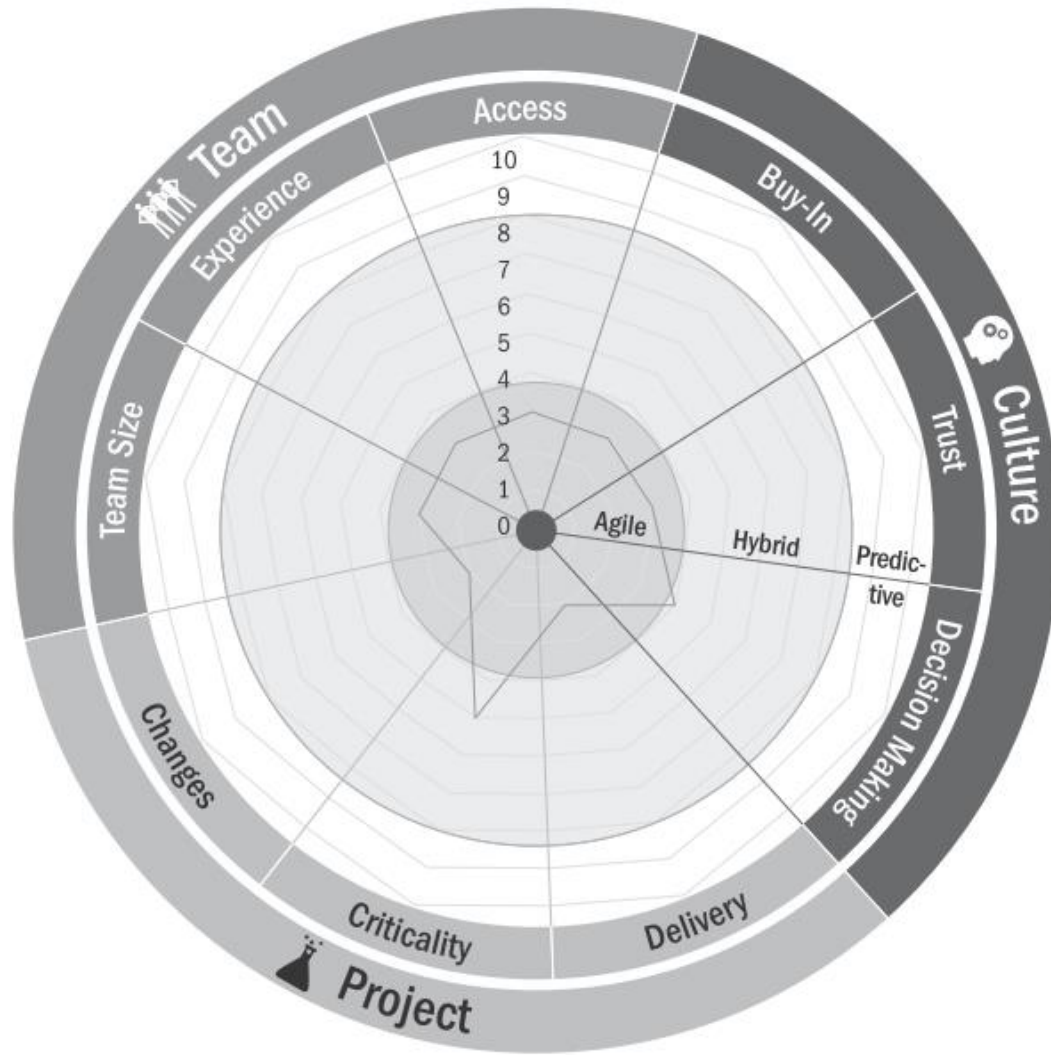
People, interaction, community, communication, skills, and abilities are the six major things that Crystal concentrates on

Frequent delivery, reflective improvement, osmotic communication, and simple access to experienced users are seven overall qualities of Crystal that imply a better chance of success

MIXING AGILE APPROACHES

Agile teams rarely limit their practices to one agile approach. Each project context has its own peculiarities, such as the varied mix of team member skills and backgrounds; the various components of the product under development; and the age, scale, criticality, complexity, and regulatory constraints of the environment in which the work takes place.

Most common blends in widespread use involves a coordinated use of the Scrum framework, the Kanban Method, and elements of the eXtreme Programming (XP) method. Scrum provides guidance on the use of a product backlog, a product owner, scrum master, and a cross-functional development team, including **sprint planning, daily scrum, sprint review, and sprint retrospective sessions**. A kanban board helps the team to further improve its effectiveness by **visualizing the flow of work, making impediments easily visible**, and allowing flow to be managed by adjusting work in process limits. In addition, XP-inspired engineering practices such as use of **story cards, continuous integration, refactoring, automated testing**, and test-driven development further increase the effectiveness of the agile team. In summary, the blend of practices from these various sources produces a synergistic result of higher performance than each individual component in isolation.



Model for Suitability of Agile Approach

THE PMBOK'S SHIFT TO VALUES OUTCOMES

There has been a gradual transition in project management concepts over the last decade. Views such as defining success as meeting scope, schedule, and budget objectives have transitioned to measuring value and the outcomes (not the outputs) of the project.

PMBOK 6

10 PM knowledge areas :

1. Integration
2. Scope
3. Schedule
4. Cost
5. Quality
6. Resource
7. Communications
8. Risk
9. Procurement
10. Stakeholder

PMBOK 7

- Tailoring,
- models, methods, & artifacts,
- eight performance domains.

The eight performance domains :

1. Team
2. Stakeholders
3. Life cycle
4. Planning
5. Uncertainty and ambiguity
6. Delivery
7. Performance
8. Project work

Focus on value to the organization and stakeholders through the project delivery.

The background of the slide features several thin, light gray lines that intersect to form various geometric shapes, including triangles and quadrilaterals. These lines are positioned primarily on the right side of the slide, creating a modern, minimalist aesthetic.

What do projects managers do differently when managing uncertainty and complexity in turbulent environments?

CONCLUSION

Global trends are disrupting traditional business models and transforming products and services. Traditional success criteria are inadequate under high uncertainty.

- 1, **Value Delivery Landscape**- maintain awareness of the project context and changing delivery landscape in assessing project success or failure. Help the client to see the benefit not just the cost.
- 2, **Project Management Approach** (Traditional, Adaptive, Hybrid Approach) – PM should consider selective adoption of hybrid methodology where customer value is the goal and not necessarily firm cost.
- 3, **Form of Contract Delivery (partnering or adversarial)**- adversarial approach has no place in collaborative approaches.
4. **Buildability analysis**: Design-related activities are a significant source of uncertainty. It's important to assess the product and process complexity.
5. **Payment Currency** : Naira-based contracts should be short term.
6. **Process vs. Principle (Method vs Value)**- In high uncertainty projects, customer value is the goal. Outcome, not output. E.g. shorten procurement period due to market volatility. Configure BoQs into Milestones rather than elemental.
7. **Stakeholder matrix**- Analyze your stakeholders. Clear communication is key in turbulent times.
8. **Planned strategy Vs, emergent Strategy**: Modify PM plan according to the perceived consequences on project. Focus is value, not documented plan.
9. **Managing Trust and Confidence** – Agile approach requires sincere efforts from the team. Shun corruption.