Murdoch
UNIVERSITY

IT Project Management

Topic 11

Installation/ Implementation & Closing

READING

Schwalbe - Various Sections

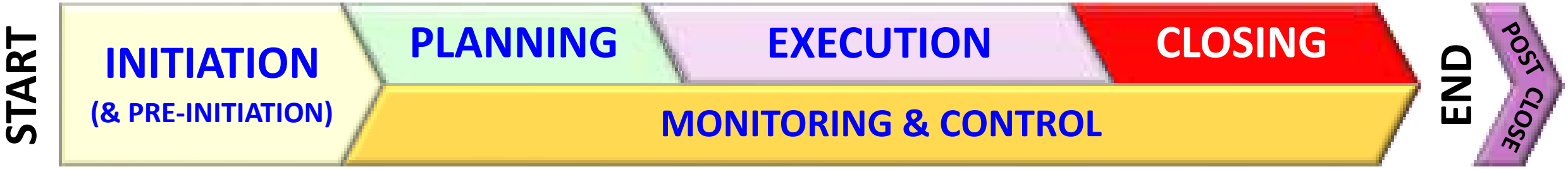
LEARNING OBJECTIVES

At the end of this topic you should be able to:

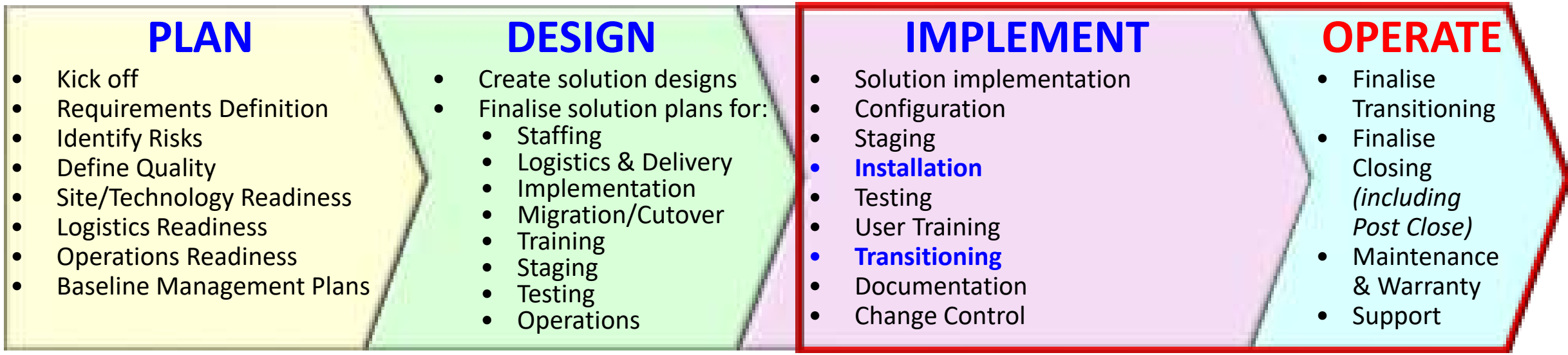
- ✓ **Explain** some of the approaches to IT system implementation/ installation and compare some the advantages and disadvantages
- ✓ **Discuss** the processes associated with project closure, to help ensure that the project is closed in an orderly manner
- ✓ **Describe** some of the different project evaluations and reviews

WHERE DOES THIS FIT?

These fit into the PMBoK Process Groups



But are best illustrated by a different view of the processes



TODAY'S SESSION IS IN 3 PARTS

FINALISING IMPLEMENTATION
(Discussing Installation & Implementation issues)

PROJECT CLOSING

WHAT WE HAVE ACHIEVED

FINALISING IMPLEMENTATION

DISCUSSING INSTALLATION & IMPLEMENTATION ISSUES

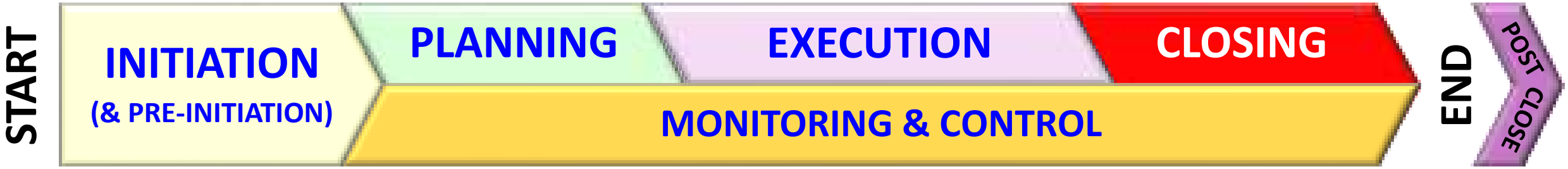
FINALISING IMPLEMENTATION
(Discussing Installation & Implementation issues)

PROJECT CLOSING

WHAT WE HAVE ACHIEVED

FINALISING IMPLEMENTATION

In this part of the session we will focus on…



PLAN

- Kick off
- Requirements Definition
- Identify Risks
- Define Quality
- Site/Technology Readiness
- Logistics Readiness
- Operations Readiness
- Baseline Management Plans

DESIGN

- Create solution designs
- Finalise solution plans for:
  - Staffing
  - Logistics & Delivery
  - Implementation
  - Migration/Cutover
  - Training
  - Staging
  - Testing
  - Operations

IMPLEMENT

- Solution implementation
- Configuration
- Staging
- **Installation**
- Testing
- User Training
- **Transitioning**
- Documentation
- Change Control

OPERATE

- Finalise Transitioning
- Finalise Closing *(including Post Close)*
- Maintenance & Warranty
- Support

WHAT IS INSTALLATION?

These are a critical element of project implementation

Installation can include:

- ✓ Installing Software/Firmware (e.g. BIOS, operating systems, applications, updates – local/remote installations)
- ✓ Data Installation (normalised/migrated databases, user parameters/low level settings – local/remote installations)
- ✓ Hardware elements (e.g. from chips to servers, routers, firewalls, networking, etc. – requires on-site/in-situ installation)
- ✓ Systems and Facilities (from a data rack to a global system – May be done with a mixture of remote/on-site/in-situ installation)

Sources: Kim et al. (2012); Capilla, Bosch & Kang (2013)

INSTALLATIONS

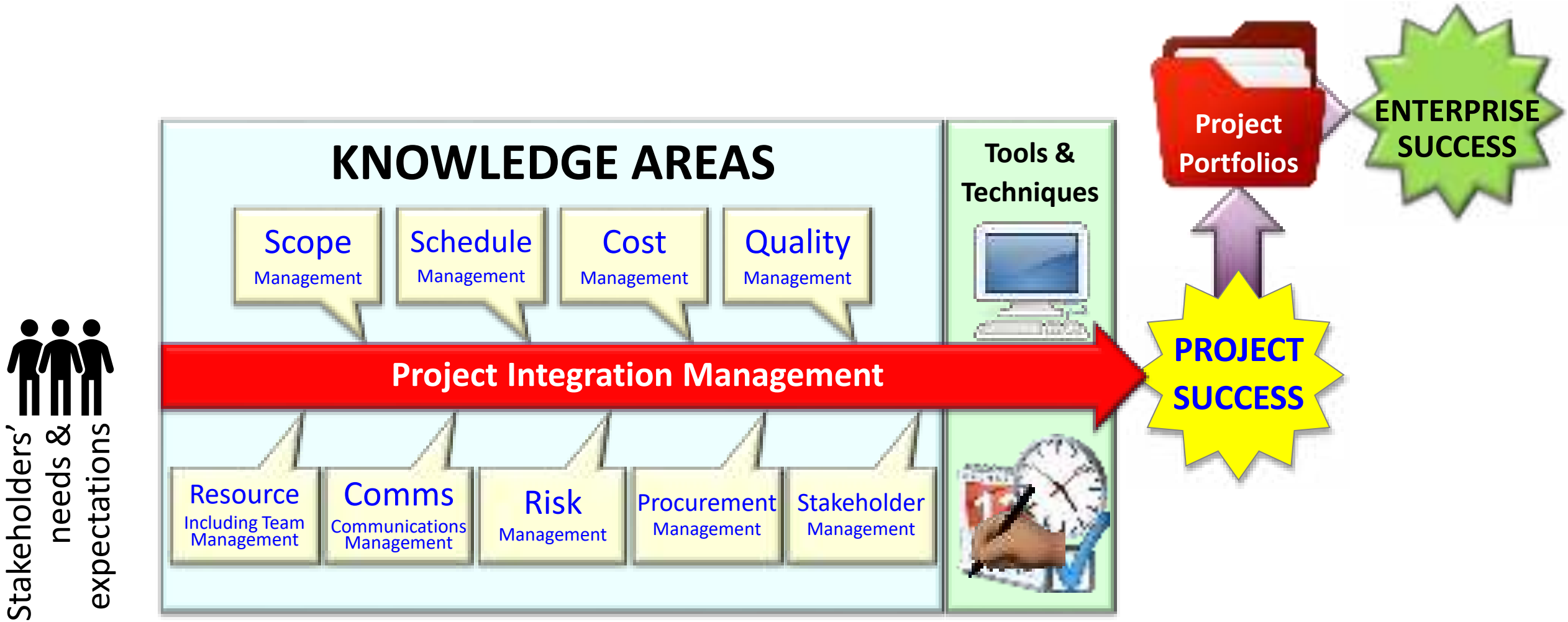
They need to take into account:

- ✓ The types and scope of the installation **(hardware, software, firmware, systems, facilities)**
- ✓ Installation methods **(on-site, in-situ, remote)**
- ✓ The location of the installation/s **(in-own-facility, local, distributed – distance is a key issue)**
- ✓ Who will be doing the installation **(our staff, contractors, other third parties – control is a key issue)**
- ✓ Limitations on installation **(security, access, interruptions to operations, timing, etc. – limitations can be profound)**
- ✓ Testing **(including system & acceptance testing – How can this be achieved prior to going operational)**

These have huge implications for:

- Cost
- Schedule
- Risk
- Scope Control
- Procurement
- Quality
- Resourcing
- Stakeholders
- Communications

IT IS THEREFORE A CRITICAL PART OF INTEGRATION MANAGEMENT



Source: Adapted from Schwalbe (2018) p. 10

SO GREAT CARE IS ESSENTIAL

The devil is in the detail…

- ✓ You need to plan early and thoroughly (make sure the stakeholders are involved in planning)
- ✓ Keep all stakeholders well informed (more regular briefings, keep comms open)
- ✓ Manage the steps very carefully (even more than usual)
- ✓ Be very flexible (small issues can create huge changes during some installations)

Carefully coordinate the Transitioning

WHAT IS TRANSITIONING?

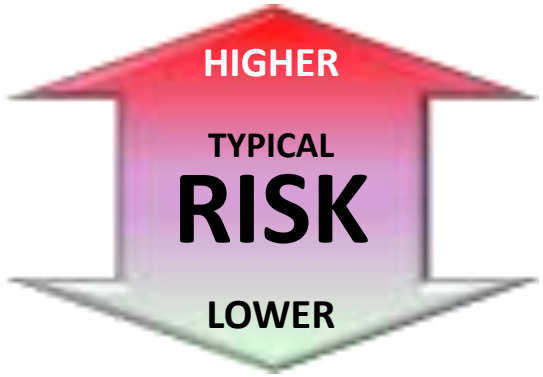
Let's explain each of these strategies

Transitioning is:

- ✓ The process of rolling out, deploying or migrating ICT elements, so the new system/s and/or services can be used.

There are four standard strategies

- ✓ Direct Cutover
- ✓ Phased Operation
- ✓ Parallel Operation
- ✓ Pilot Operation



General profile, but the Risk for each will also be dependent on the type of implementation

Sources: Nageldinger (2015); Clegg & Heinemann (2018); Reim (2015); Fhang & Swamy (2018)

PILOT OPERATION

- ✓ Implement a complete system at a selected location **(node/pilot site)**
- ✓ Sometimes existing systems continue to operate in parallel
- ✓ Existing systems at other sites continue normal operation
- ✓ The new pilot site system is rigorously tested **(system/acceptance testing)**
- ✓ Problems are rectified/user recommended changes are introduced
- ✓ Processes are streamlined/evolved as required **(based on user feedback)**
- ✓ Once the system is fully tested/modified it can be rolled out across the rest of the organisation **(Phased, Parallel or Cutover Strategies)**

This can be implemented as a **low risk approach**

PARALLEL OPERATION

- ✓ Old and new elements continue operations together during the transition
- ✓ Once the new system is proven to be working properly transition out the old system (often done as a cutover)
- ✓ Requires users to work on two systems at once in many cases **(can cause user discontent)**

This can provide **low technical risk** – but can cause numerous personnel/procedural problems and is **typically the most costly approach**

PHASED OPERATION

- ✓ Sub-elements of the system are deployed in phases/stages (like putting individual pieces of a puzzle into place one after the other)
- ✓ The phasing approach can be based on location/functionality
- ✓ Risk is controlled by which modules/elements are deployed (and how they are installed)

This can be a **low to moderate risk approach – but can be more expensive than pilot operation or cutover**

DIRECT CUTOVER

- ✓ Changeover from the old to the new system is done rapidly (typically on a weekend/night)
- ✓ This requires extensive compatibility and other tests to be completed beforehand
- ✓ Cutover is really only appropriate if the hardware/software/systems/services can be implemented in a very short timeframe

This is often the **lowest cost approach – but can present the highest technical/procedural risks**

DON'T FORGET THE FOLLOWING

No transition is done in isolation – you need to account for:

- ✓ Training (users must be able to understand how to use the new system – unless it is highly intuitive)
- ✓ Processes and Human Systems (make sure that the solution is properly aligned to people's needs – otherwise you get *transition blowback*)
- ✓ Ensuring that processes are implemented using integrated Change Management (with consistent stakeholder involvement)
- ✓ Providing the appropriate post transition support systems (Service Desk (Level 1, 2, or 3), warranty support systems, etc.)

DON'T FORGET THE FOLLOWING

Remember – most of the time, what we are doing has an impact on real people – **These are critical issues**!

You should not move on to Project Closing until these issues have been properly addressed

PROJECT CLOSING

FINALISING IMPLEMENTATION
(Discussing Installation & Implementation issues)

PROJECT CLOSING

WHAT WE HAVE ACHIEVED

WHAT IS PROJECT CLOSING?

Let's look at the 5 key reasons & 4 triggers

Closing a project (or phase) is:

- ✓ The process of finalising all activities
- ✓ Not like switching something off – it needs to be a controlled wind-back
- ✓ Triggered by the following events (reasons/triggers)

Sources: Whitaker (2016); Vermano & Martin-Cruz (2019); Cook (2005); Gomes & Oliveira (2016); Fitsilis (2008)

REASONS FOR CLOSING

1. **Normal**
   - ✓ Project is completed as planned or with some agreed variance
   - ✓ The project is successfully transitioned to the operational state
2. **Premature**
   - ✓ The project is terminated without supplying all of the deliverables
   - ✓ This can be initiated for various reasons **(technical, admin, cost, etc.)**
3. **Changed Priorities**
   - ✓ Business or client priorities/objectives change
   - ✓ Can be driven by many factors **(cost, technology, business, user needs, etc.)**
4. **Failed**
   - ✓ Project is cancelled **(due to various reasons: cost, deliverables, etc.)**
   - ✓ Causes can be very different & need to be properly defined
5. **Perpetual**
   - ✓ Some projects take on a life of their own & become perpetual
   - ✓ Rather than a specific project they become service delivery

Source: Larson & Gray (2013)

THESE TRIGGER...

1. **Normal** → **Integration**
   - ✓ Deliverables integrated into operations
   - ✓ Project resources released/reallocated

2. **Premature** → **Starvation**
3. **Changed Priorities** → **Starvation**
   - ✓ Budget is decreased significantly
   - ✓ Resources are released or reallocated

4. **Failed** → **Extinction**
   - ✓ Project is no longer funded
   - ✓ Resources are released or reallocated

5. **Perpetual** → **Addition**
   - ✓ Brought into new or existing business unit
   - ✓ Resources moved as necessary

Source: Larson & Gray (2013); Schwalbe (2018)

WHICHEVER WAY IT IS INITIATED…

The Project Manager must initiate Closing Processes

Which can be defined in terms of:

- ✓ Operational/Technical/Contractual Closing
- ✓ Administrative Closing

} These are done in parallel as an integrated approach

During the Closing Phase implement the following processes:

- ✓ Complete all transitioning activities
- ✓ Ensure that all tasks are finished properly **(including all reconfigurations and Change Management activities)**
- ✓ Ensure all deliverables are up-to-date and finalised
- ✓ Complete formal acceptance & handover as necessary **(acceptance must be signed off by Project Sponsor and/or the client)**

CONDUCTING FORMAL ACCEPTANCE

It should never be this type of acceptance process

CONDUCTING FORMAL ACCEPTANCE

Acceptance should be based on:

- ✓ Developing agreed acceptance standards
  (for systems & ancillaries such as services/documents)
- ✓ Building a clear Acceptance Test Plan **(based on the agreed standards/requirements)**
- ✓ Rigorously testing the system/ancillaries
- ✓ Rectifying any problems if some are found
  (do not leave problems to be found only at this stage – sort them out early)

Once agreed - formally hand over the system
(to the client and/or the operations team)

OPERATIONAL/TECHNICAL/CONTRACTUAL

Additionally implement the following processes:

- ✓ Perform an audit and assessment of the project **(in line with the project success/failure criteria detailed in contract/project documents)**
- ✓ Check that all contractual obligations have been met **(yours and those of other stakeholders)**
- ✓ Close all contracts formally **(letter of termination/ finalisation or negotiations if required)**
- ✓ Capture lessons learnt & feedback from stakeholders **(collect and apply ideas for improving processes, procedures, systems, etc.)**

OPERATIONAL/TECHNICAL/CONTRACTUAL

During the Closing Phase implement the following processes:

- ✓ Conduct performance reviews **(for your staff and contractors (as required) – this is a good opportunity to also collect feedback that goes into the closing deliverables)**
- ✓ Reallocate staff and release/reallocate contractors **(as required)**
- ✓ Relocate and/or reallocate equipment and facilities **(as necessary)**

Conduct the **Administrative Closure** processes in parallel with these activities

ADMINISTRATIVE CLOSING

During the Closing Phase also do the following:

- ✓ Update all organisational assets & documents **(including policies, procedures, and other documents – take into account stakeholder feedback)**
- ✓ Develop Lessons Learnt **(these should be evolved throughout the project and through stakeholder feedback)**
- ✓ Archive materials so they are available to inform future projects/activities **(ideally link them in a document management system with a search engine)**
- ✓ Initiate knowledge sharing and transfer **(actively push out to stakeholders so the information can be shared effectively)**

ADMINISTRATIVE CLOSING

During the Closing Phase also do the following:

- ✓ Deal with excess project materials/assets **(redeploy, sell, dispose of them, etc.)**
- ✓ Ensure that all costs/bills/payments are finalised & reconciled **(close the books)**
- ✓ Initiate any litigation/recovery activities that are required **(e.g. unpaid bills, etc. – Pass this on to the business to resolve)**

And in addition to this - provide the following key deliverables

KEY PROJECT CLOSING DELIVERABLES

Firstly – the Postmortem Review, which includes an analysis of:

- ✓ Key aspects of planning **(how well were aspects such as scope, schedule, WBS, etc. defined)**
- ✓ How effectively was the project managed/ coordinated?
- ✓ How efficiently was the project implemented?
- ✓ How well were quality management issues achieved?
- ✓ How well did the systems/stakeholders work **(to provide both explicit/implicit support that was required)**?

This analysis informs the following deliverables

KEY PROJECT CLOSING DELIVERABLES

Next – the Lessons Learnt, which identifies:

- ✓ Project processes, strategies and approaches that were sub-optimal **(where improvement is needed)**
- ✓ Clear recommendations for future improvements **(define these in terms of processes)**
- ✓ Ancillary information, such as preferred contractors (explaining why they are preferred)

This is shared with all of the other Project Managers – It is recommended that you **read them – they can be enlightening**

KEY PROJECT CLOSING DELIVERABLES

A Project Audit is sometimes implemented:

- ✓ This should be done by objective third parties
- ✓ They should review the preceding documents
- ✓ Then conduct further analysis as required **(they should not just read the other reports and consider this finalised)**
- ✓ Stakeholder interviews should typically be conducted as a minimum **(to confirm information)**

Many organisations do not do this, but it can be a very helpful exercise

KEY PROJECT CLOSING DELIVERABLES

From the preceding – update the organisation's documents:

- ✓ Policy/Procedures documents
- ✓ Standard templates for project documents
- ✓ Forms that are utilised
- ✓ Boilerplate contractual documentation
- ✓ Other boilerplate documents

Make sure your organisation gives time for this to be implemented – it saves lots of time later

KEY PROJECT CLOSING DELIVERABLES

The last is the Project Final Report *(and presentation)*

- ✓ Delivered to the project stakeholders
- ✓ To explain the project history and final status and explain what really happened **(what, when, how, why things were delivered)**
- ✓ Lists any ongoing actions required **(e.g. unfinished deliverables, contractual issues, etc.)**
- ✓ The formats may be specifically mandated by the organisation

KEY PROJECT CLOSING DELIVERABLES

There are many templates, but most include:

- ✓ Project Summary **(description & outline)**
- ✓ Comparison of planned vs actual outcomes
- ✓ An acknowledgement of contributions
- ✓ A listing of any outstanding issues
- ✓ Project documentation/ancillaries listing
- ✓ Details of lessons learnt **(in particular - what should be done differently in future)**
- ✓ An acknowledgement of the transition/sign-off

KEY PROJECT CLOSING DELIVERABLES

The best way to develop these is …

- ✓ Talk to people and listen to their concerns **(throughout the project)**
- ✓ Use the personnel reviews and other feedback systems **(ensure people are happy to provide feedback)**
- ✓ Hold Closing Meetings **(e.g. post mortem meetings)**
- ✓ Draw on expert judgement/guidance
- ✓ Start drafting early (dot points) and then apply yourself during the post-handover closing phase

POST CLOSE REVIEW

Finally, a Post-Close review is often useful

- ✓ This can be conducted 1 to 6 months after the end of the project
- ✓ It is best done through stakeholder meetings/reviews **(but can also use feedback forms)**

Many organisations don't do this, but it provides some great benefits

POST CLOSE REVIEW

The benefits include:

- ✓ You find out things that have happened after delivery **(this is particularly important if you are not providing support)**
- ✓ You get useful insights that are often missed in the rush to close the project
- ✓ You identify changes/enhancements required by the users **(which can provide additional work)**

Therefore – Post Close Reviews are recommended

WHAT WE HAVE ACHIEVED

FINALISING IMPLEMENTATION
(Discussing Installation & Implementation issues)

PROJECT CLOSING

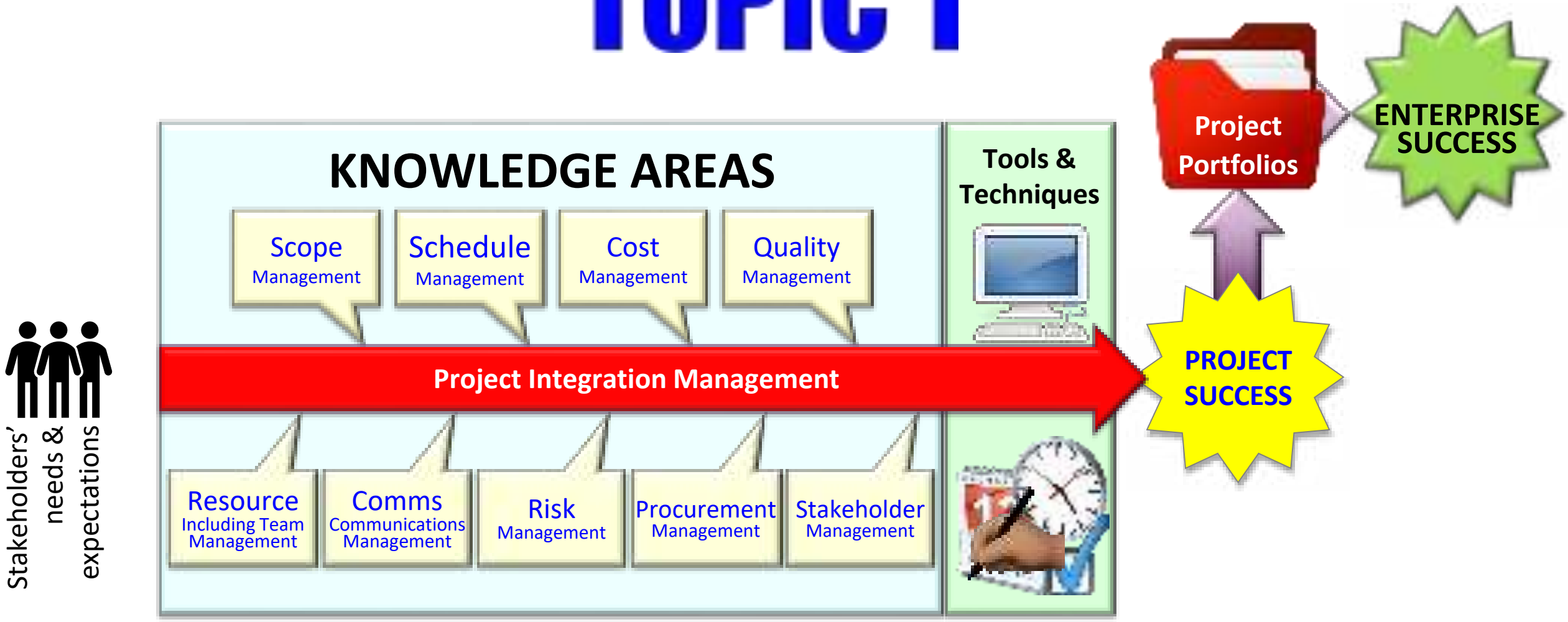
WHAT WE HAVE ACHIEVED

WHAT HAVE WE ACHIEVED?

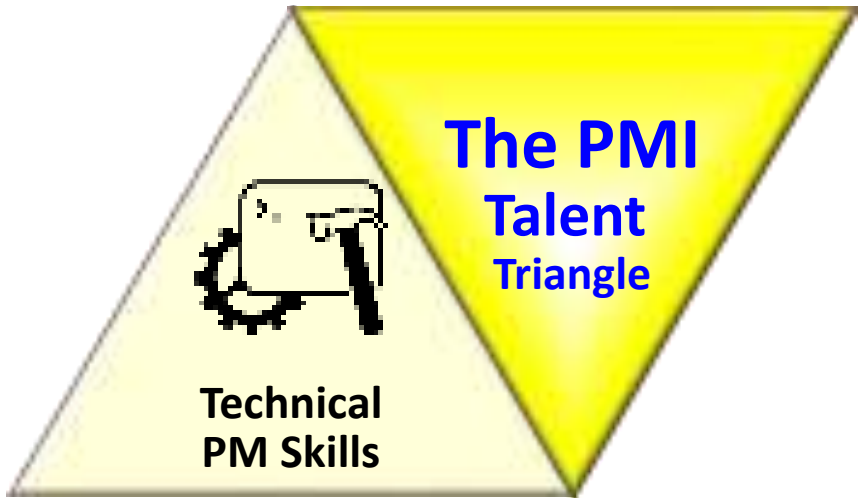
What steps did we take to reach closing?

We can answer this by reviewing previous topics

TOPIC 1



THE PMI TALENT TRIANGLE



TECHNICAL: DOMAIN EXPERTISE (Certified & Non-Certified)

- ✓ Risk, Schedule, Scope & Cost Management
- ✓ Data gathering & modelling
- ✓ Requirements & Traceability management
- ✓ Governance (project, program, portfolio)
- ✓ Lifecycle management
- ✓ Performance management
- ✓ Earned Value Management
- ✓ Agile practices

Source: Section 3: PMBoK 6th Edition

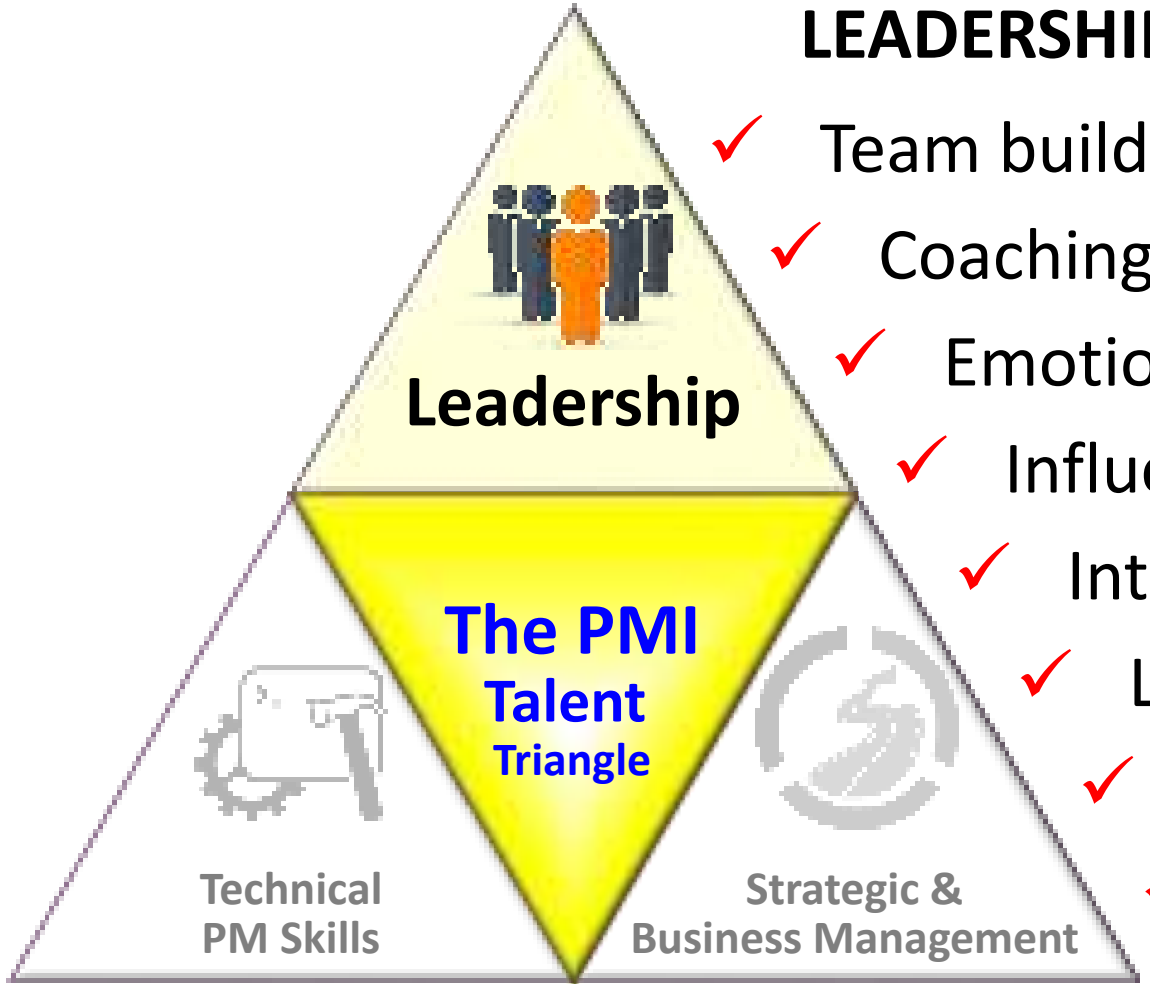
THE PMI TALENT TRIANGLE

STRATEGIC & BUSINESS MANAGEMENT

- ✓ Business acumen **(model, structure, practical)**
- ✓ Benefits management & realisation
- ✓ Customer relationships & satisfaction
- ✓ Legal & regulatory compliance
- ✓ Operational functions (finance, marketing, etc.)
- ✓ Strategic planning analysis & alignment
- ✓ Market & Business awareness
- ✓ Competitive analysis

Source: Section 3: PMBoK 6th Edition

THE PMI TALENT TRIANGLE



LEADERSHIP: ***MONITORING, GUIDING & MOTIVATING***

- ✓ Team building
- ✓ Coaching and Mentoring
- ✓ Emotional Intelligence
- ✓ Influencing
- ✓ Interpersonal skills
- ✓ Listening **(active listening)**
- ✓ Negotiation
- ✓ Problem solving

And most Importantly…

Source: Section 3: PMBoK 6th Edition

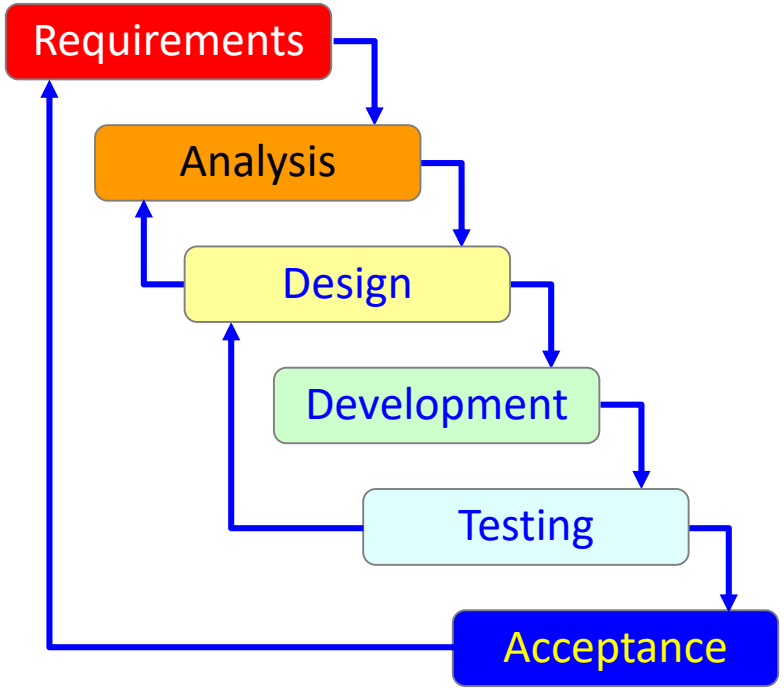
YOU MUST LOOK AT THE BIGGER PICTURE

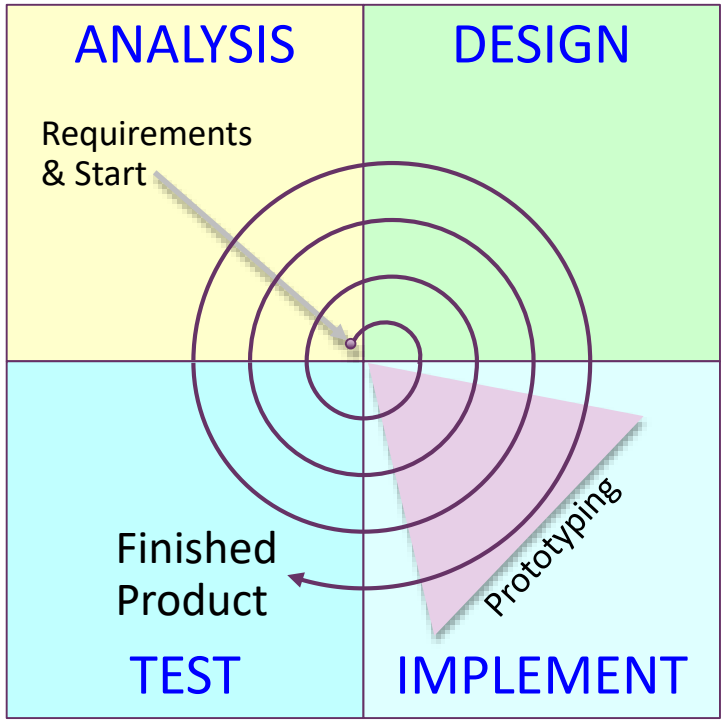
KEY CHARACTERISTICS

- ✓ Be flexible and focused
- ✓ Be comfortable with change
- ✓ Understand the technologies, tools & processes **(Hard Skills)**
- ✓ Understand the organisations they work in and with **(politics, business imperatives, etc.)**
- ✓ Be able to work with other people **(Soft Skills)** **(ICT work is not a solitary activity)**

SDLC MODELS

- **Waterfall** : Has well-defined, linear stages of systems development and support

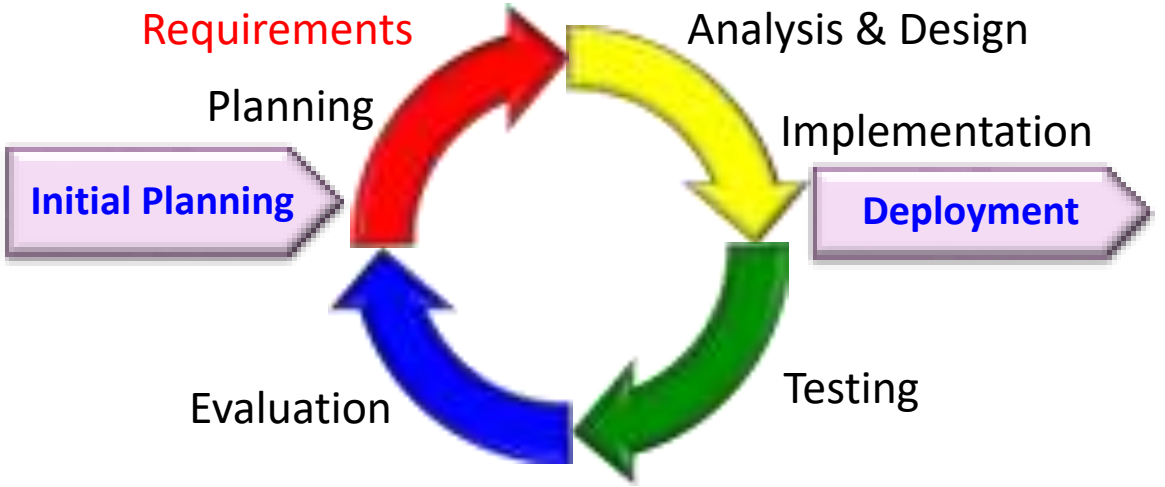


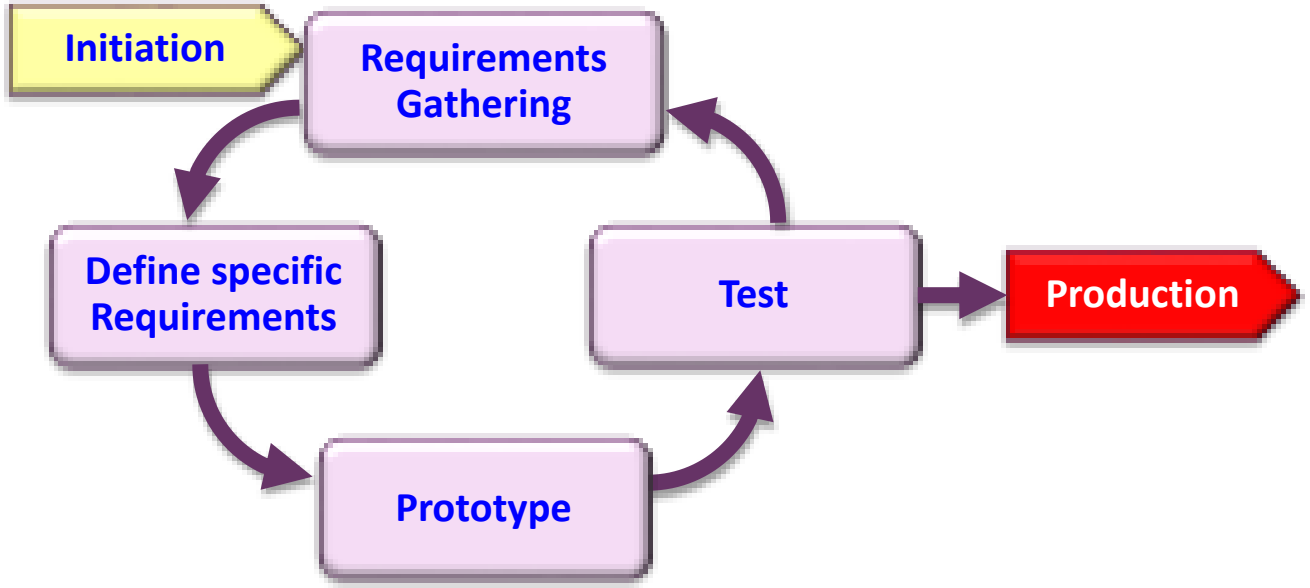


- **Spiral**: Shows that software is developed using an iterative or spiral approach rather than a linear approach **(typically based on a iterative prototyping)**

SDLC MODELS

- **Incremental build**: Cyclical iterative builds (often used for software)

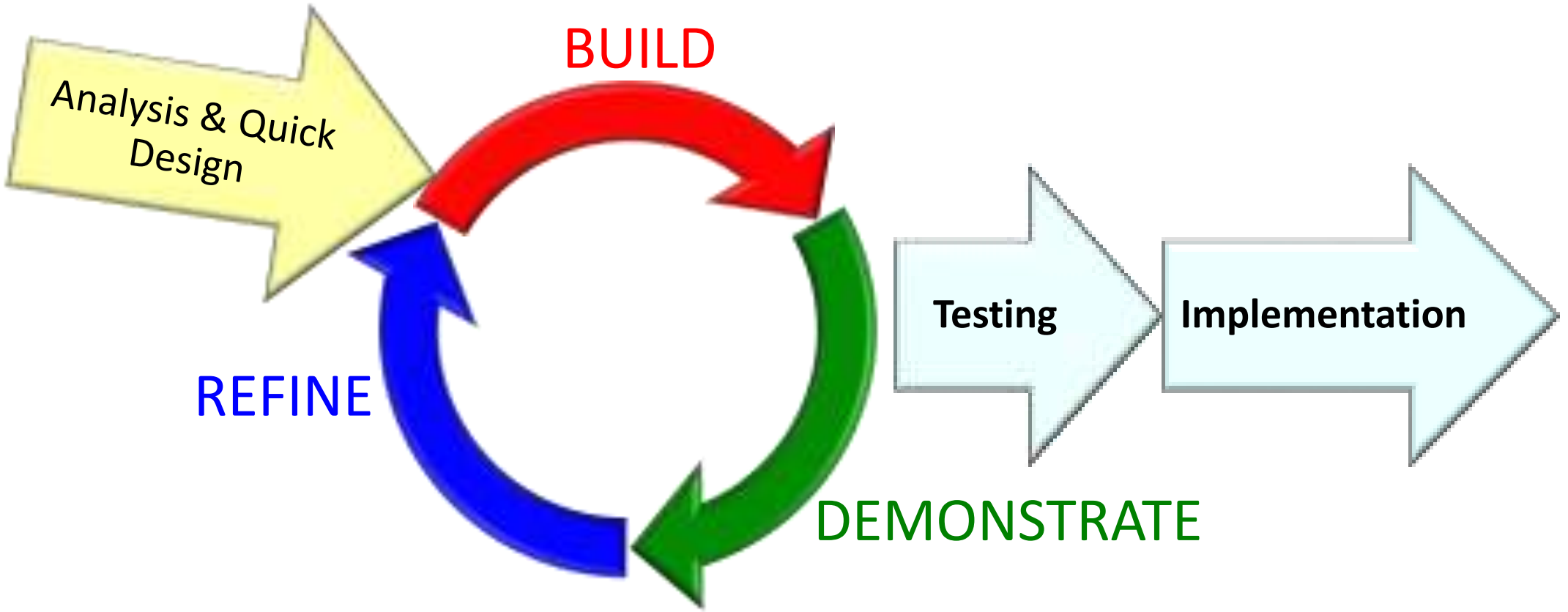




- **Prototyping**: Used for developing prototypes to clarify user requirements

SDLC MODELS

- **Rapid Application Development (RAD)**: Develops a system from an evolving prototype



AN EXAMPLE SCRUM APPROACH

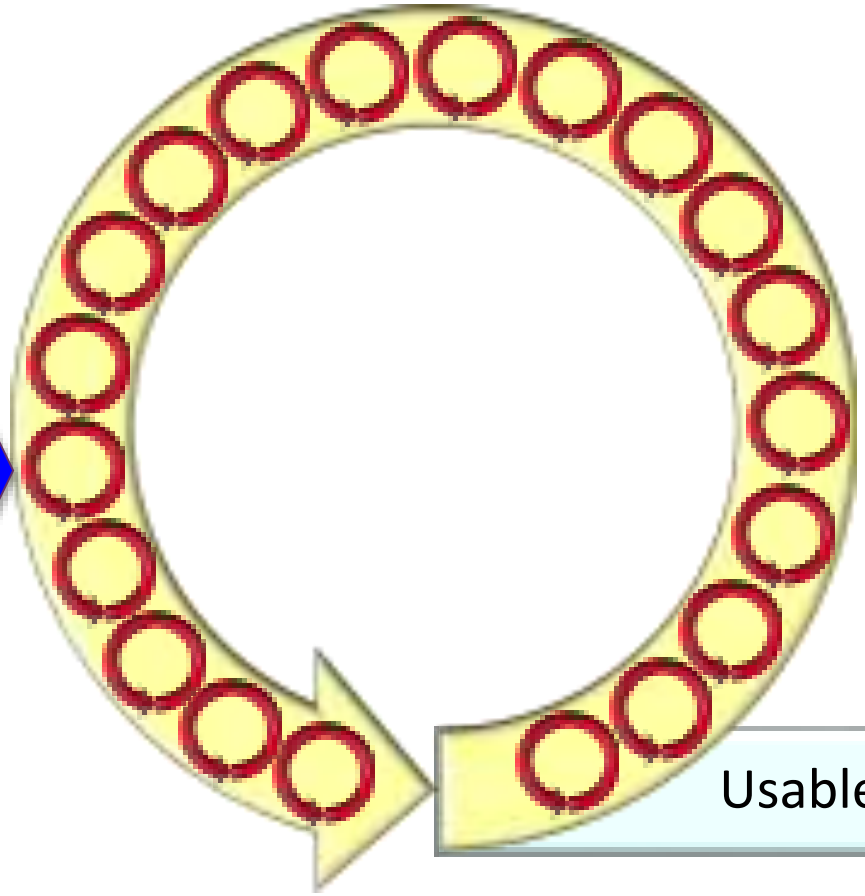
PRODUCT BACKLOG
(PRIORITISING)

Prioritised list of all identified scope items/ deliverables

SPRINT BACKLOG
(PLANNING)

Select high priority items & identify likely solutions

SPRINTS
(DAILY & 2-4 WK SCRUMS)



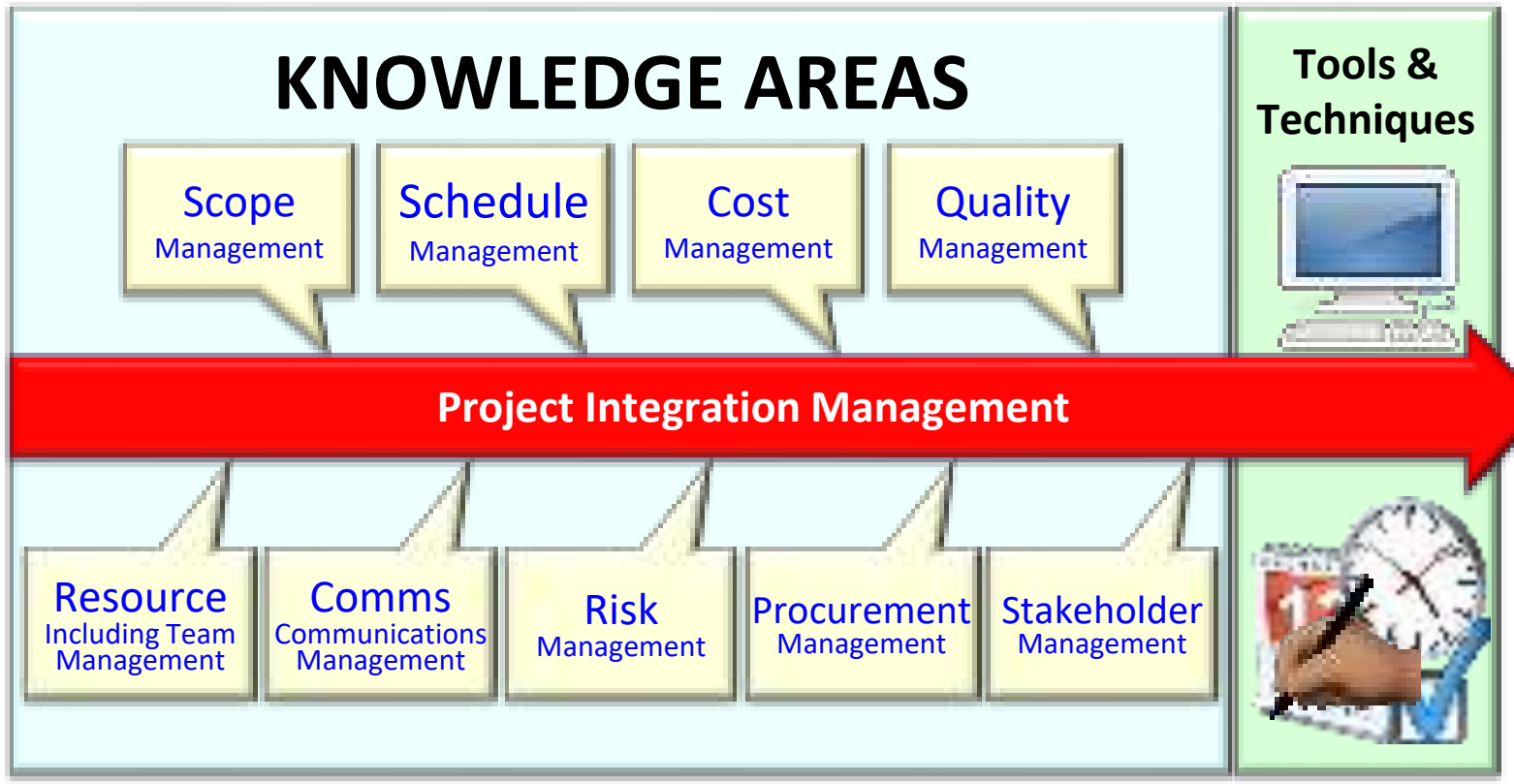
Sprint planning, execution, reviews, testing/retrospective

Usable Product

Sprint Review

TOPIC 2

INTEGRATION MANAGEMENT



Stakeholders' needs & expectations

Project Portfolios

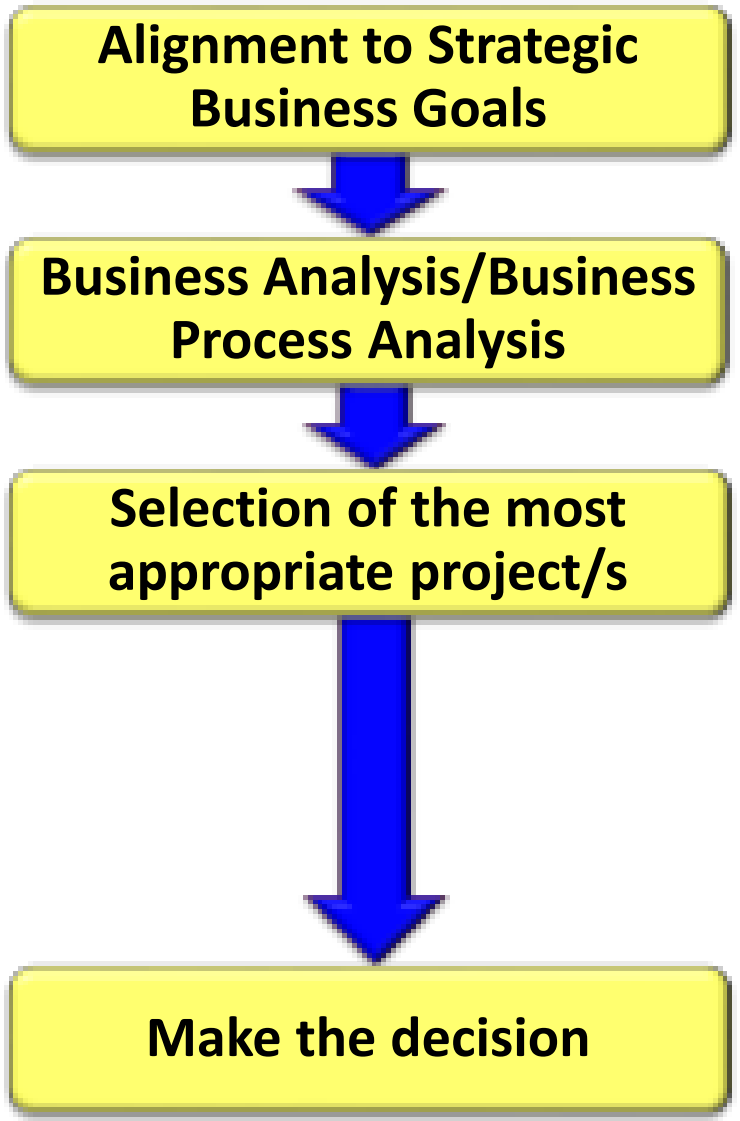
ENTERPRISE SUCCESS

PROJECT SUCCESS

PIM DELIVERABLES IN THE PROCESS GROUPS

Source: Adapted from Schwalbe (2018)

INITIATION PROCEDURES



What is the general business case?

3 Spheres **(Business, Technology, Organisation)**

4 Frames **(Structural, HR, Political, Symbolic)**

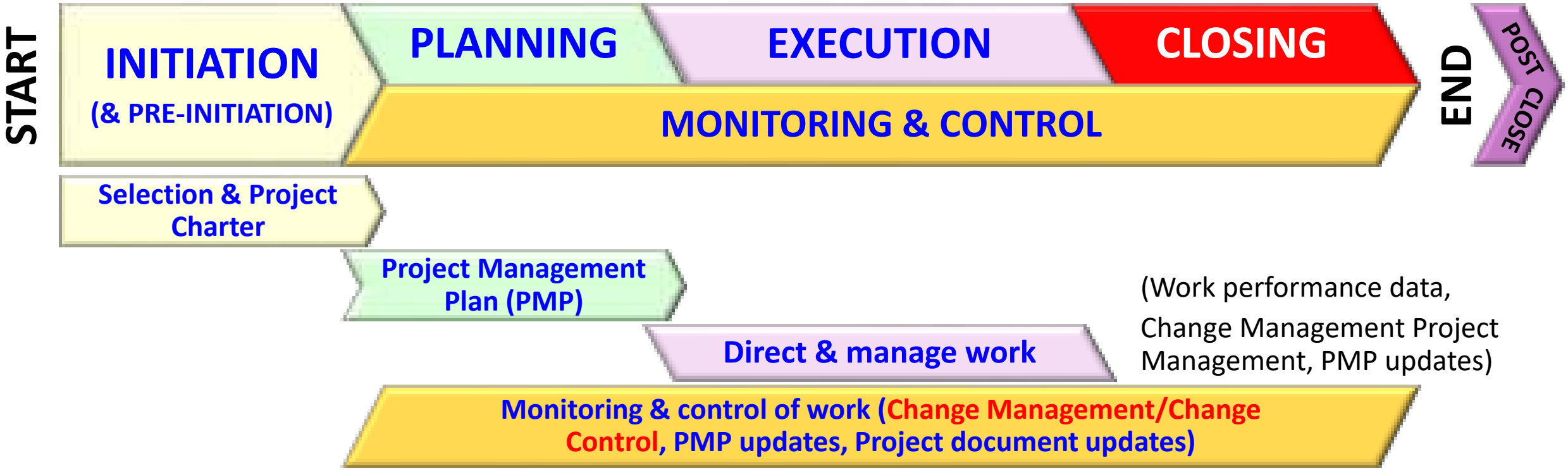
Understand the options benefits/risks

Using a range of approaches

- Categorisation ***(Problems, Opportunities, Directives)***
- SWOT **(Strengths, Weaknesses, Opportunity, Threat)**
- Weighted Analysis **(Importance/Effect)**
- Balanced Scorecard
- Financial Analysis **(NPV/IRR/Payback)**

Make an educated/balanced decision

PIM DELIVERABLES IN THE PROCESS GROUPS



Source: Adapted from Schwalbe (2018)

THE CHANGE CONTROL PROCESS

Change Request

Triggers include:

- ✓ Service Requests
- ✓ Problem Management
- ✓ Vendor Changes
- ✓ Hardware Changes
- ✓ Software Change Request
- ✓ Facility Change Requests
- ✓ Project
- ✓ Process Changes

Review of Request

- ✓ Preliminary review
- ✓ Authorization of Changes
- ✓ Multilevel review
- ✓ Disapproval of requests
- ✓ Prioritization of work
- ✓ Coordination of multiple
- ✓ Changes (sequencing, etc.).

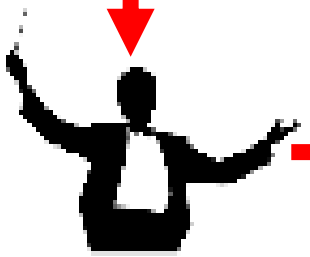
Submission of Change

- ✓ Documentation

Change Control Board

- ✓ Approval to implement
- ✓ Control of production baseline
- ✓ Control of systems documentation

IF APPROVED



Coordinate Change

- ✓ Perform Quality Assessment
- ✓ Obtain Clearances
- ✓ Review Implementation Schedule
- ✓ Assemble Finalised Schedule

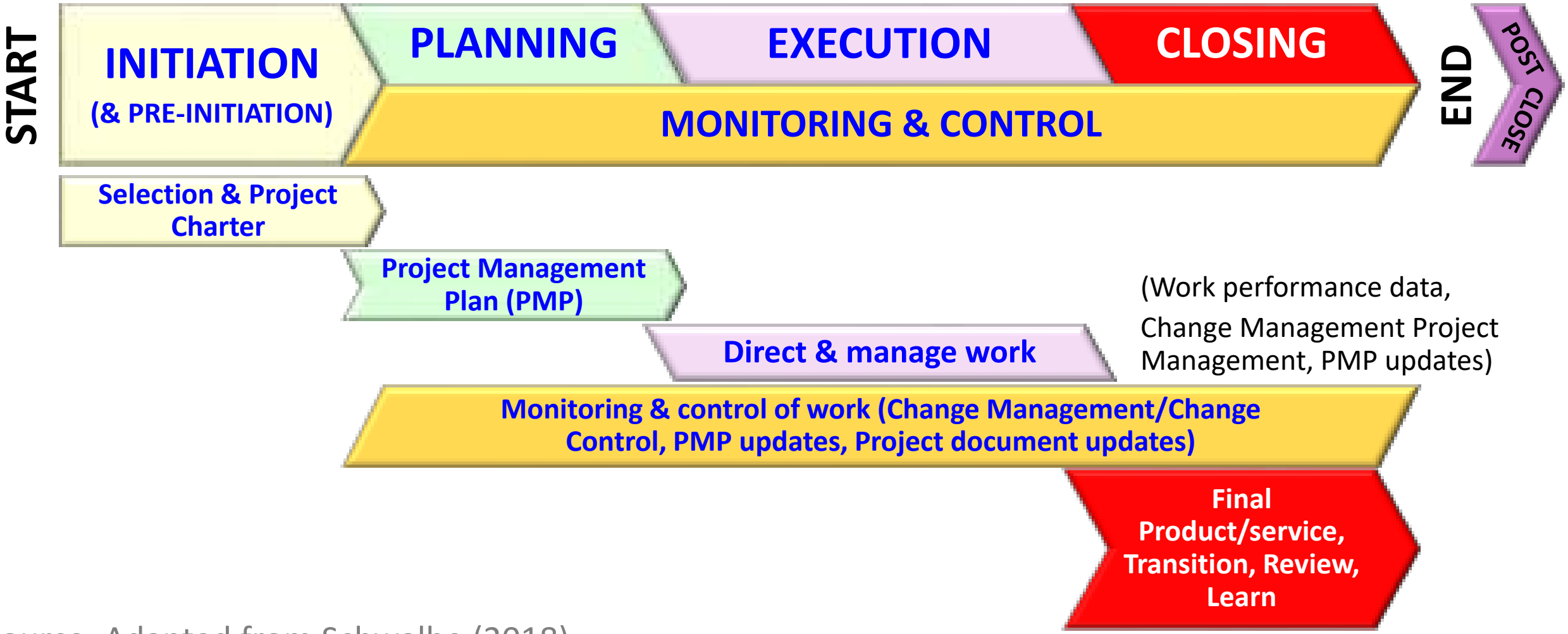
Implement Change

- ✓ Conduct required tasks
- ✓ Client liaison/verification

Measure Results

- ✓ Post Implementation Review
- ✓ Audit Process
- ✓ Generate Change Metrics
- ✓ Distribute Reports

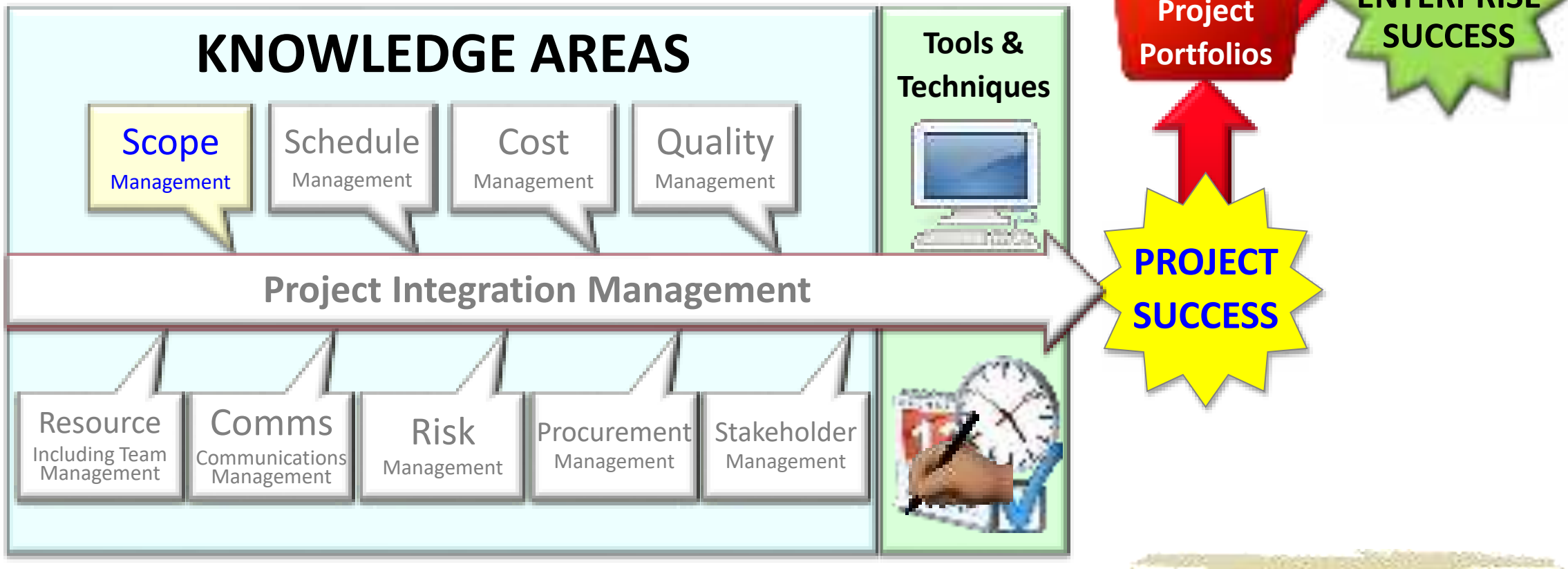
PIM DELIVERABLES IN THE PROCESS GROUPS



Source: Adapted from Schwalbe (2018)

TOPIC 3

SCOPE MANAGEMENT



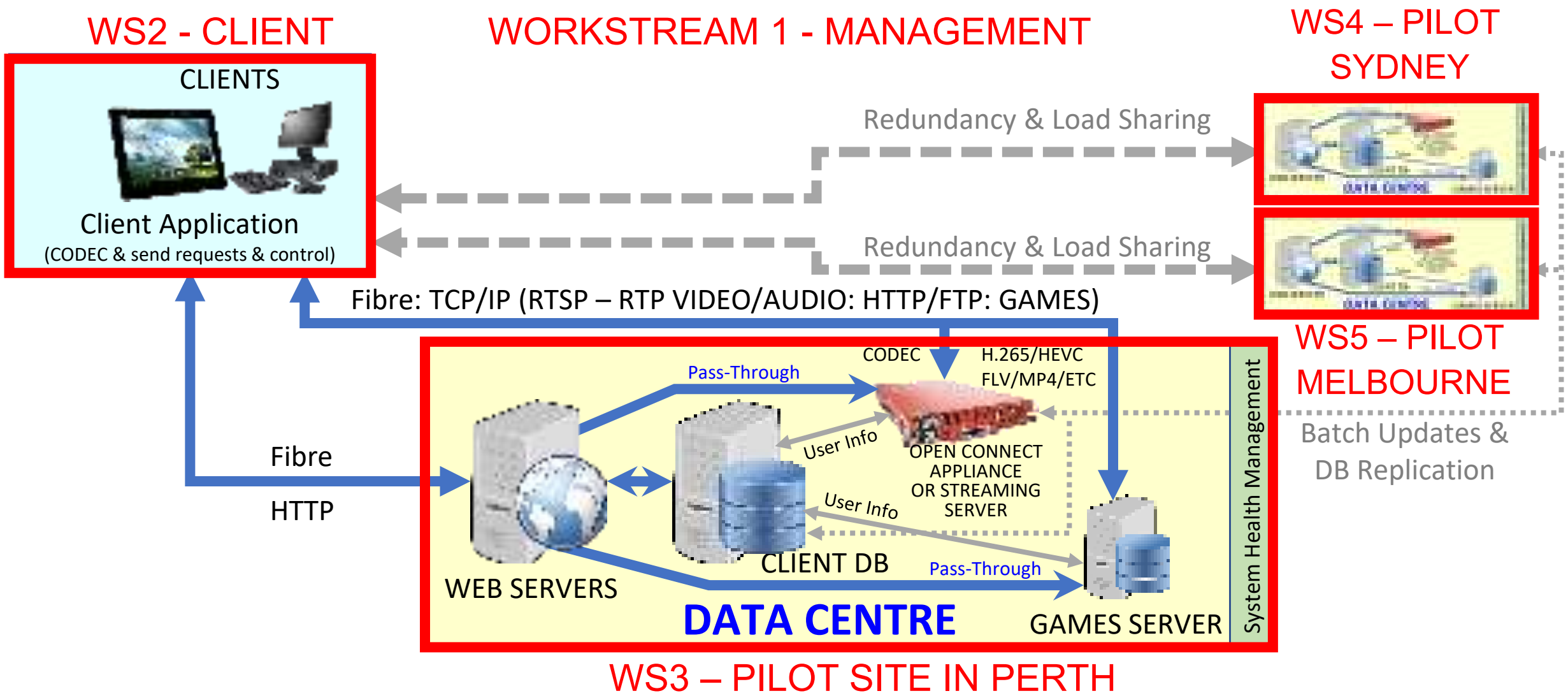
SCOPE MANAGEMENT DEFINED

- ✓ **Scope** refers to *all* the work involved in creating the products / services of the project **(known as the deliverables)**

- ✓ **Deliverables** can include many things **(an example: a cup of tea)**

- ✓ **Scope** of work identifies the elements needed to *deliver* the project successfully (e.g. provide water, tea, kettle, power, sugar, tea cup, saucer, spoon, tea pot?, milk, cream?, lemon?, tray, **processes,** etc.)

EDUSTREAM TECHNICAL ARCHITECTURE



SOME OF THE SCOPE OF WORK

3. Workstream: **Pilot 1 (Perth)**

3.2 Web Server

3.2.1 Hardware (of appropriate specification)

- 3.2.1.1 Identify hardware requirements (Spec Design)
- 3.2.1.2 Procure the hardware
- 3.2.1.3 Test the hardware (Unit)
- 3.2.1.3 Test the hardware/software (Integration)

Sequential (Precedence) Activities

Parallel Activities

3.2.2 Software (Pass through/web interface)

- 3.2.2.1 Design the software
- 3.2.2.2 Development & Prototyping
  - 3.2.2.2.1 HCI/GUI
  - 3.2.2.2.2 Database interfaces
  - 3.2.2.2.3 Test the software (Integration)
  - 3.2.2.2.4 Develop the Interfaces
    - 3.2.2.2.4.1 OCA
    - 3.2.2.2.4.2 Client Database
    - 3.2.2.2.4.3 Games Database

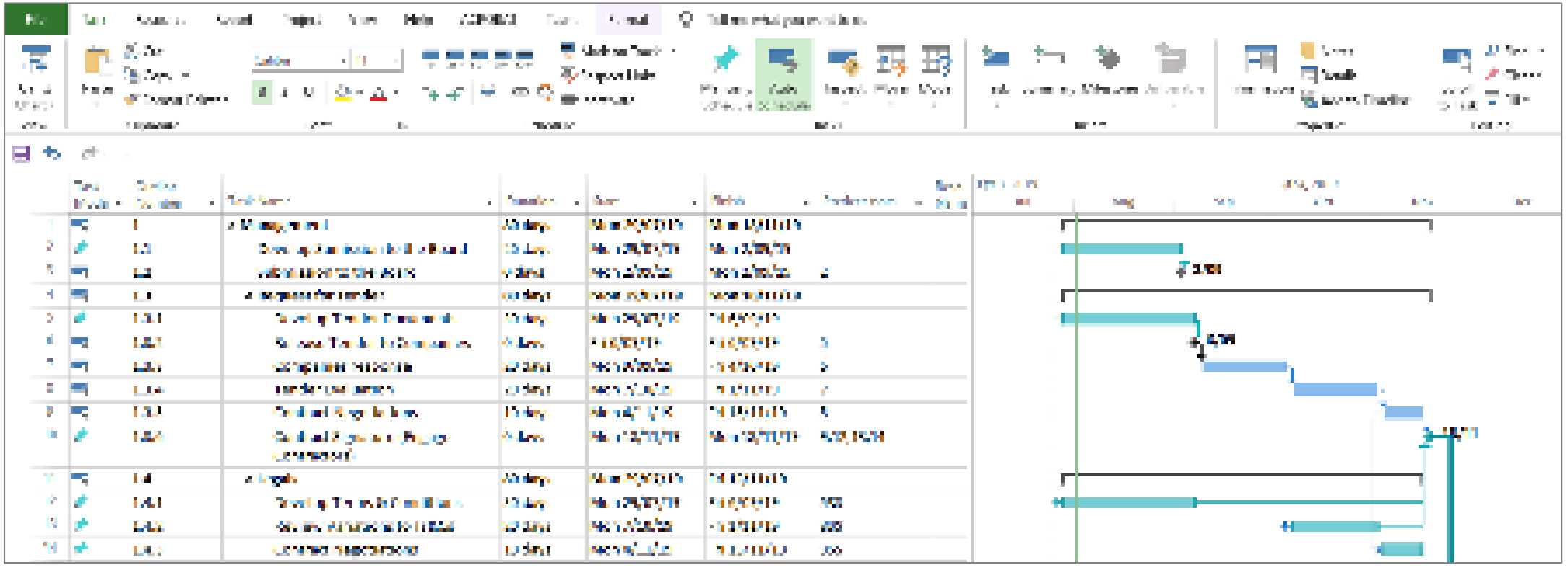
There are relationships & dependencies

THIS IS DEFINED IN OUR WORK BREAKDOWN STRUCTURE

- ✓ A Work Breakdown Structure (WBS) is a **key tool** for organising the project team's work so it is defined in manageable sections.
- ✓ According to the PMBok it is a 'deliverable oriented hierarchical definition of the work to be executed by the project team'.
- ✓ The WBS defines the work in a **coherent structure**, so it is clear which tasks are associated with each deliverable

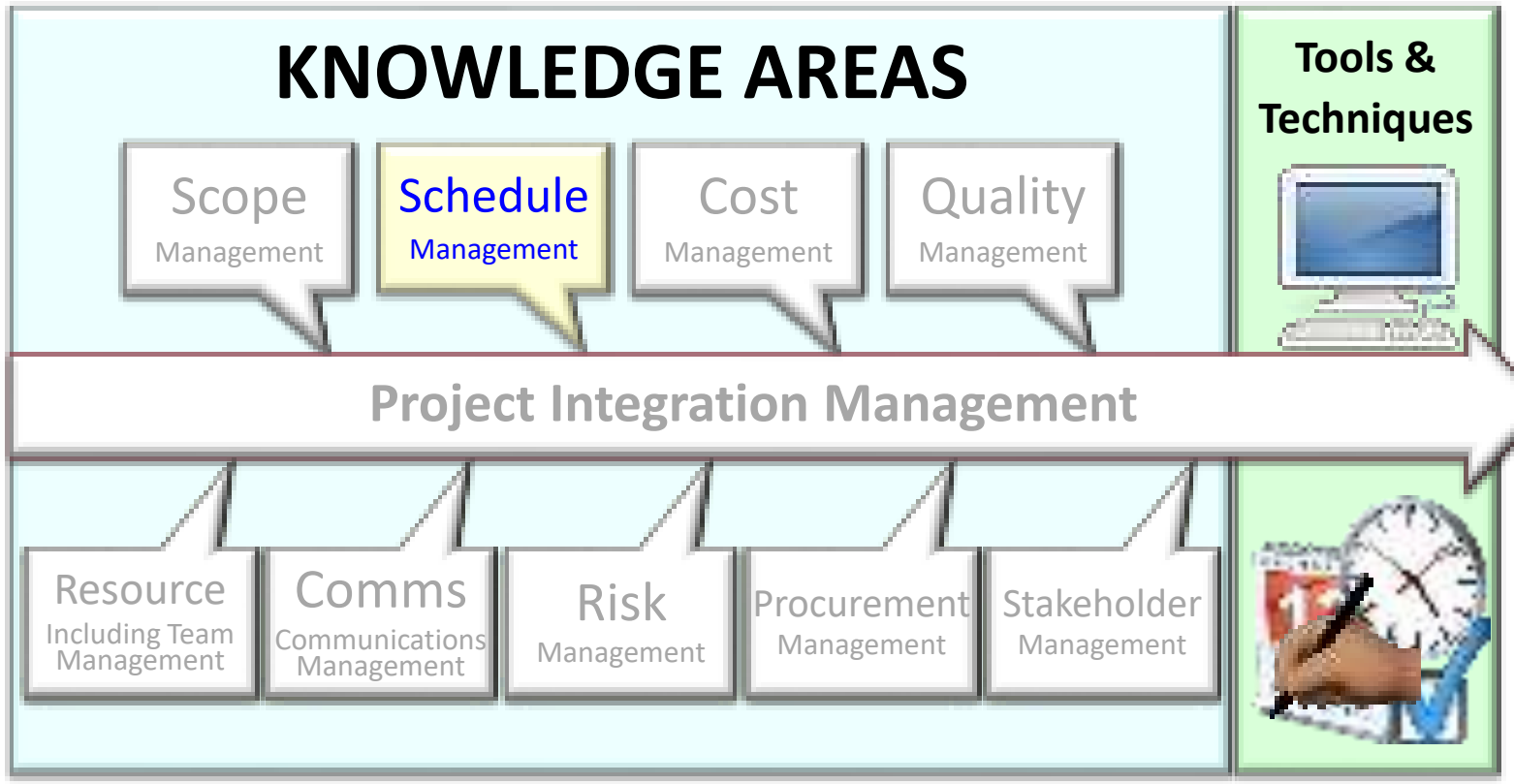
TO HELP WITH THIS WE INTRODUCED YOU TO COMMON PM SOFTWARE

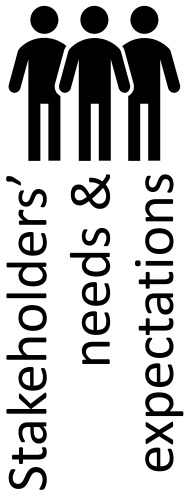
- ✓ By explaining some of the key elements of MS Project



TOPIC 4

SCHEDULE MANAGEMENT





WE INTODUCED THE CONCEPTS OF…

- ✓ An **activity** or **task** - is an element of work normally found in the WBS that has an expected duration, a cost, and resource requirements
- ✓ Which has the following attributes:
  - predecessors/successors
  - logical relationships
  - leads and lags
  - resource requirements
  - constraints/imposed dates
  - assumptions

WE INTODUCED THE CONCEPTS OF…

- A **milestone** is a significant event that normally has no duration
- Milestones are useful for setting schedule goals and monitoring progress (typically takes numerous Activities to complete a milestone – Think about Hard/Soft wall)
- Examples include completion and customer sign-off on key documents and completion of specific deliverables

These should be designed in line with SMART

MILESTONES

S **Specific**: Be clear and give basic knowledge of the issues

M **Measurable**: Help determine the degree to which the project is progressing

A **Achievable**: Must be realistic, practical & attainable

R **Relevant:** Tied to priorities designed to deliver the required outcome

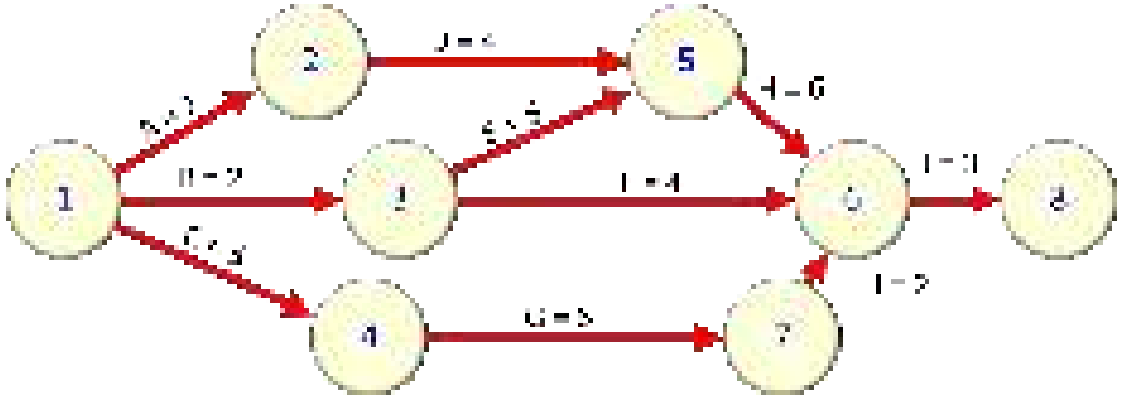
T **Time-Bound:** Should provide clear deadlines

Refined in Sequence

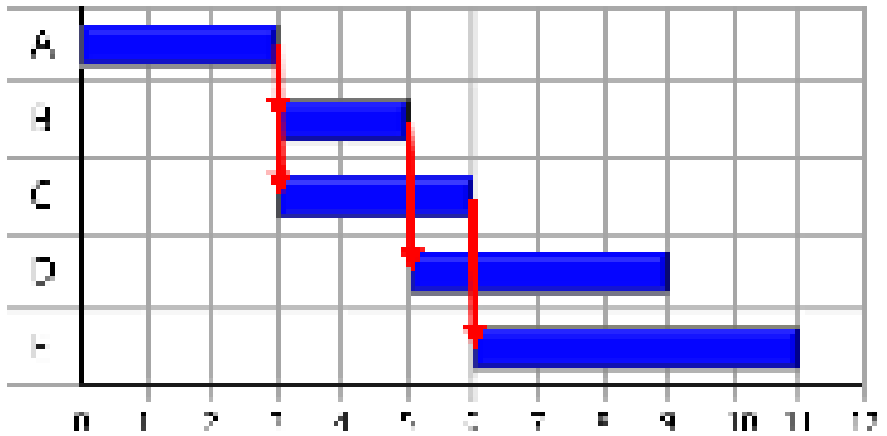
DEFINED THROUGH…

- ✓ **Network diagrams** which shows the logical relationships among, or sequencing of, project activities

- ✓ Two main formats are the:
  - ➢ *Arrow Diagramming Method (ADM)*

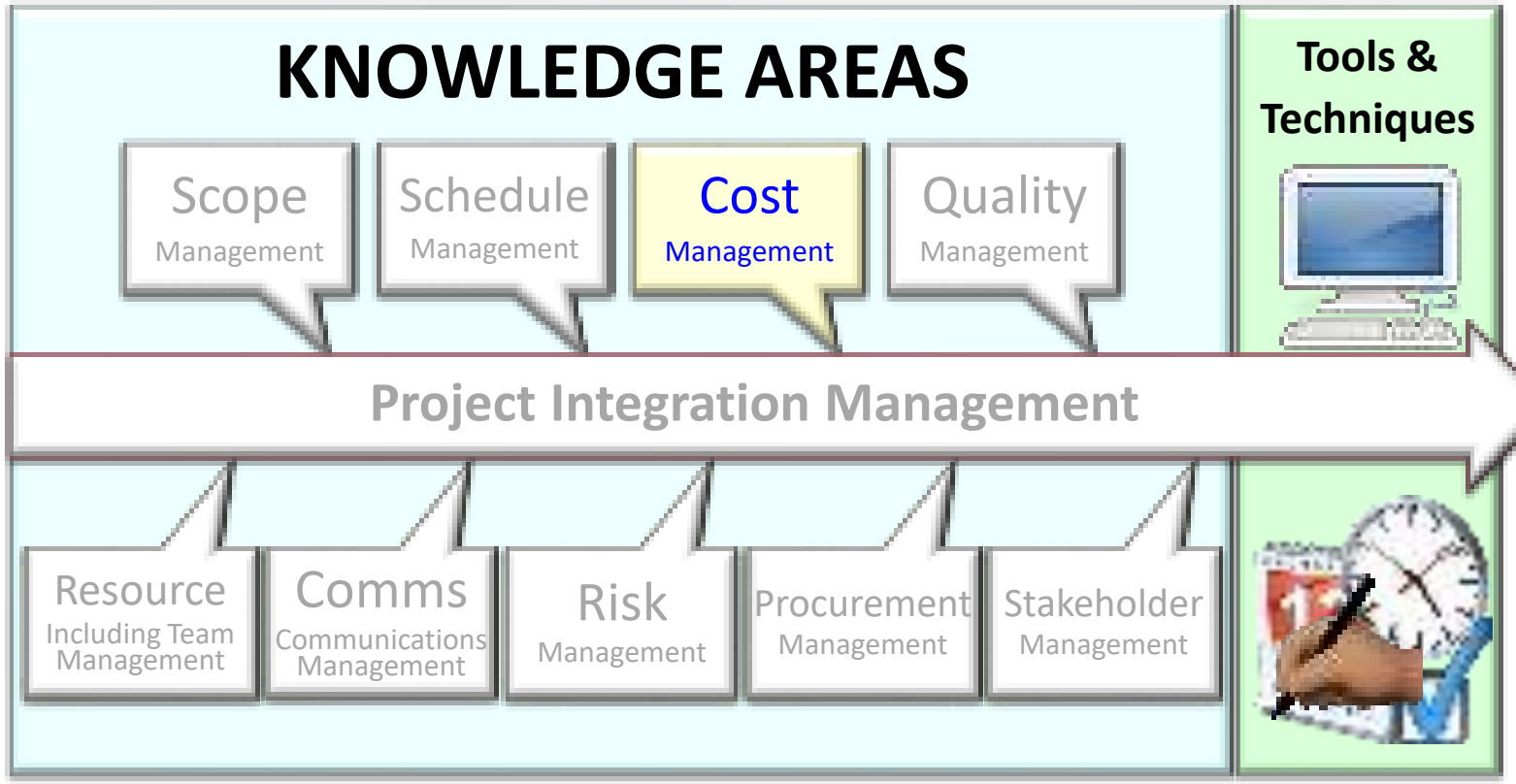


  - ➢ *Precedence Diagramming Method (PDM)* ***(like the ones used for EVM & in Gantt Charts)***



TOPIC 5

COST MANAGEMENT



Stakeholders' needs & expectations

Project Portfolios

ENTERPRISE SUCCESS

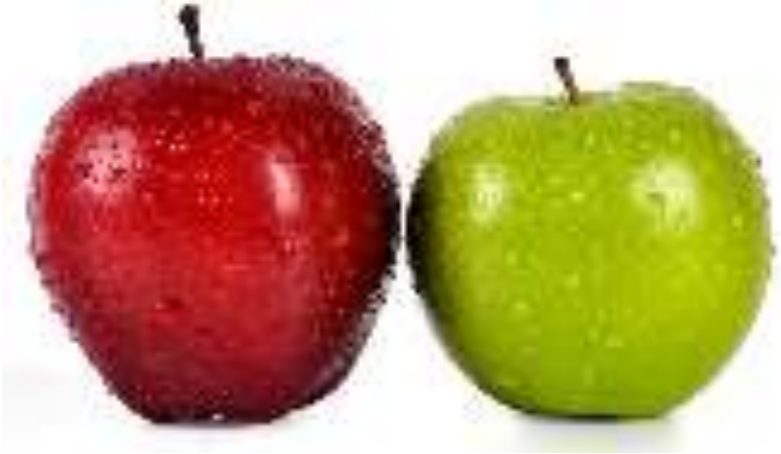
PROJECT SUCCESS

In this we would apply

TECHNIQUES FOR ESTIMATION

There are a range of techniques used - including:

- ✓ **Analogous** **(Top Down Estimates)**
  - Use cost information from previous projects
  - Can provide useful insights **(but only if good records are kept)**
  - **Be careful** – small differences can have major cost implications



TECHNIQUES FOR ESTIMATION

There are a range of techniques used - including:

- ✓ **Bottom up estimates**
  - Identify likely costs for individual Work Packages (WP)
  - Aggregate these into a common estimate
  - **Be careful** – can include duplication of effort, but it is commonly used

TECHNIQUES FOR ESTIMATION

There are a range of techniques used - including:

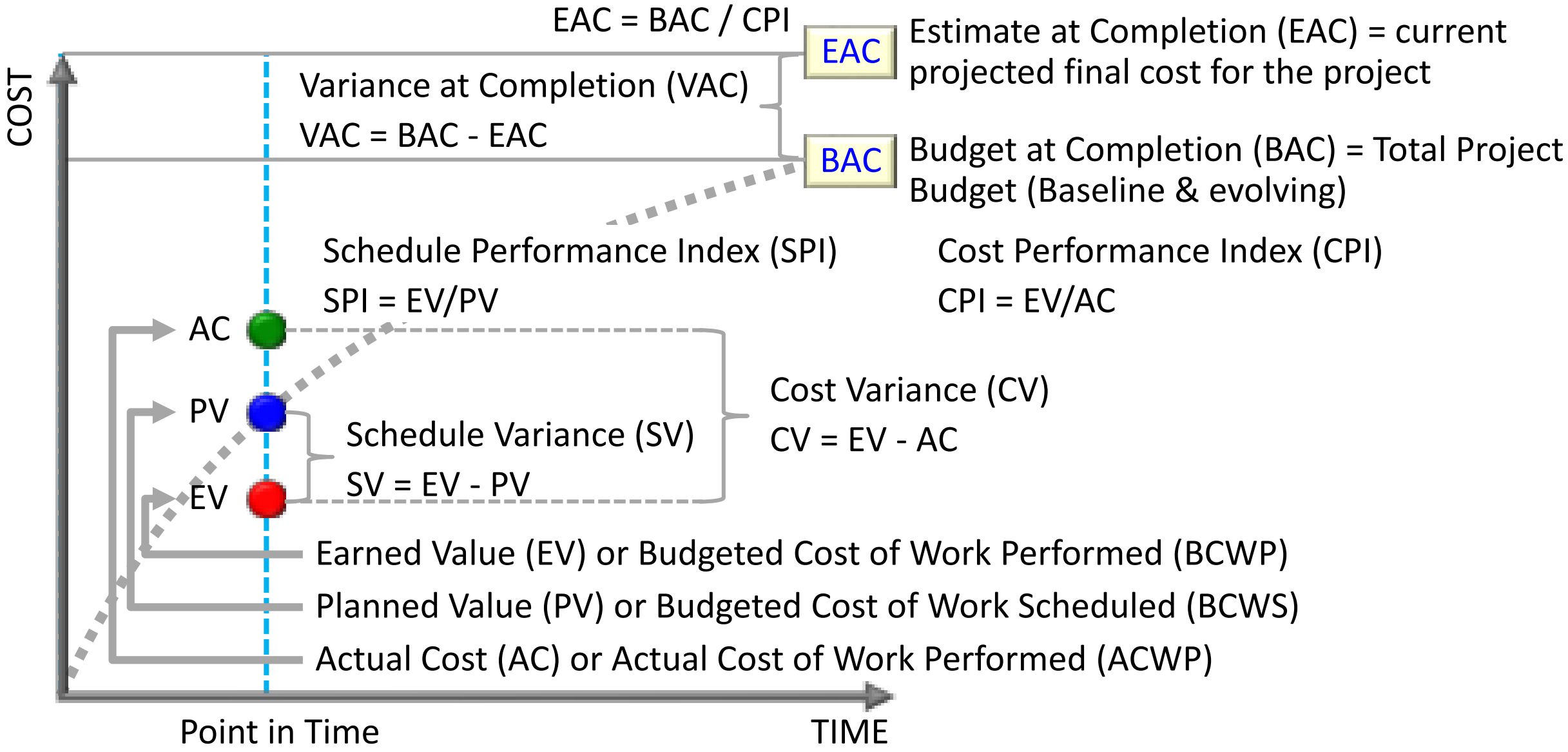
- ✓ **Parametric modelling**
  - There are a range of different parametric models
  - Examples include Function Points (FP), Source Lines of Code (SLOC) and the Constructive Cost Model (COCOMO)

TECHNIQUES FOR ESTIMATION

Whichever approach you apply:

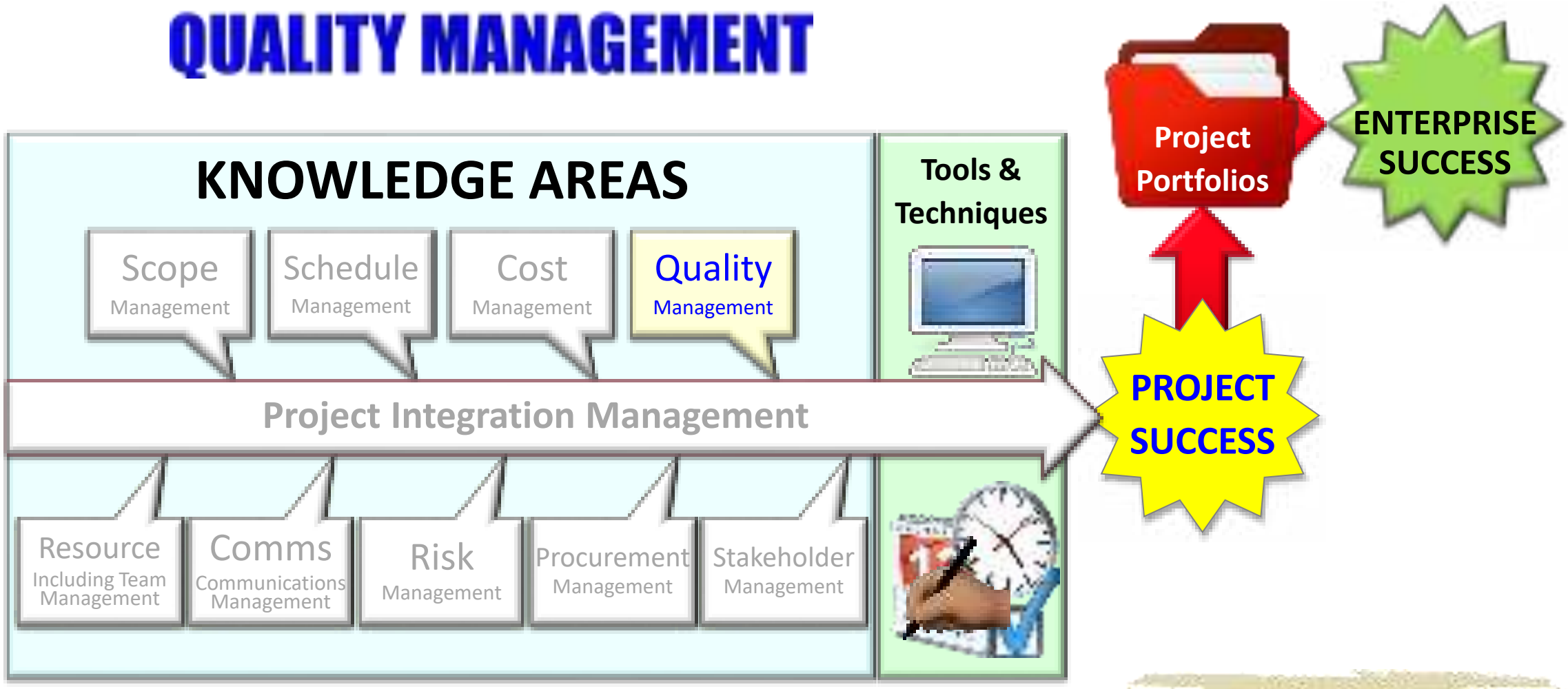
- ✓ Implement mixed methods as appropriate
- ✓ Use previous examples as benchmarks **(make sure that you are assessing Apples & Apples)**
- ✓ Leverage computerised tools **(Excel, MS Project, Parametric Calculators)**
- ✓ Remember the GIGO Concept (Garbage-in-Garbage-out) – so be careful with analysis/assumptions
- ✓ **Make sure you draw on expert advice**
- ✓ Apply weighting using techniques like PERT (Three Point Analysis)

UNDERSTANDING EVM KEY TERMS



TOPIC 6

QUALITY MANAGEMENT



QUALITY MANAGEMENT

It is a series of integral processes designed to ensure that 'all project activities necessary to design, plan and implement a project are effective and efficient' and…

… ensures that deliverables will:

- ✓ conform to requirements, and
- ✓ be fit for use

QUALITY MANAGEMENT

- ✓ **Quality Assurance (QA).** QA aims to optimise processes and methods. In other words, the goal is to make sure that the team is doing the right things the right way *(Process Focus/Measures)*
- ✓ **Quality Control (QC).** QC is focussed on ensuring that what is provided as deliverables will meet the required standards *(Outputs Focus/Measures)*

QUALITY MANAGEMENT

- ✓ These focus on ensuring conformance to key standards:
  - *Technical*
  - *Procedural*
  - *Management*
  - *Legal*

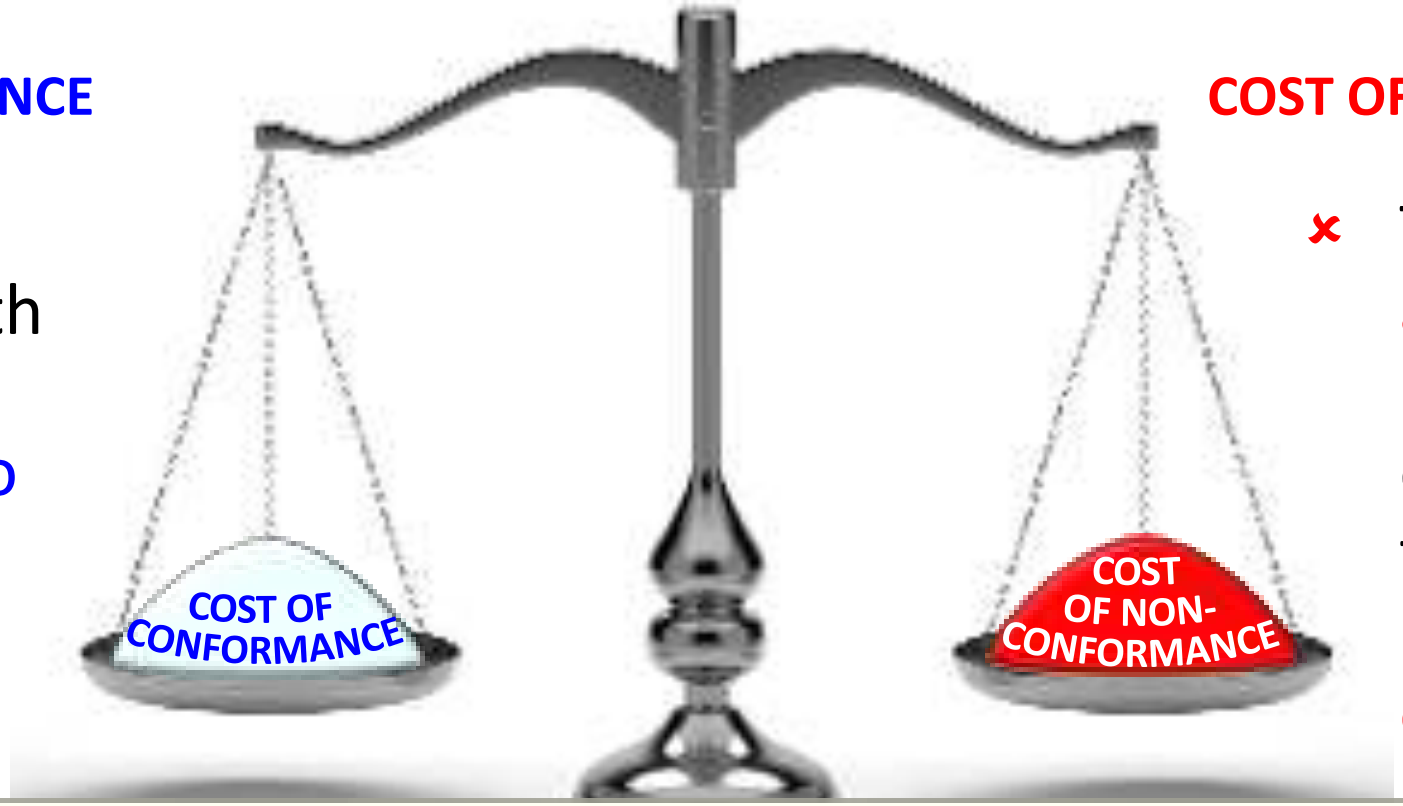
So the systems will be compliant & integrated

COST OF QUALITY

- ✓ This encapsulates the need to find the right balance between…

COST OF CONFORMANCE

- ✓ The costs associated with providing the deliverables to the required standards



COST OF NON-CONFORMANCE

- ✗ The costs associated with providing deliverables that do not meet the quality expectations

IMPLEMENT THE QA/QC TASKS THAT REFLECT THE REQUIRED BALANCE

TYPES OF QC TESTING

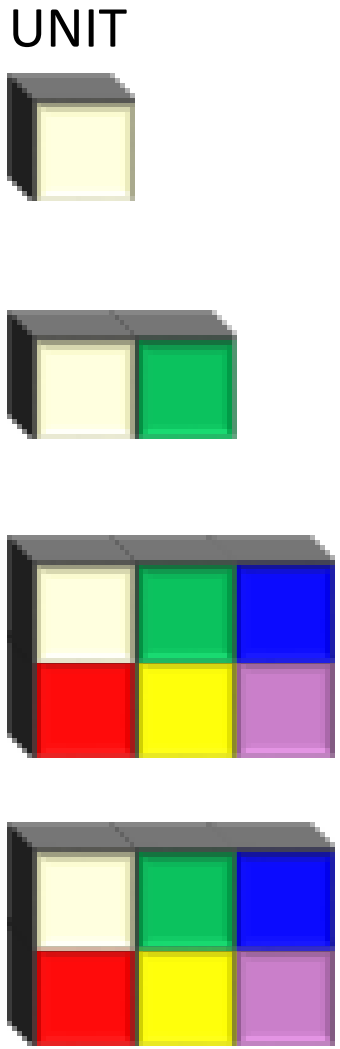
There are two broad categories of Testing, which are:

THESE ARE INTEGRAL & OFTEN INTEGRATED

- ✓ **Functional Testing.** **Testing behaviour/execution – what it does – e.g.**
  - **Functionality** is the degree to which a system performs its intended function
  - **Features** are the system's special characteristics
- ✓ **Non-Functional Testing.** **Tests how well it does it – for example:**
  - **Performance** addresses how well a product or service performs the users' requirements (e.g. how well does it perform in their real-world)
  - **Reliability** is the ability of a product or service to perform as expected under normal conditions
  - **Maintainability** addresses the ease of performing maintenance on a product

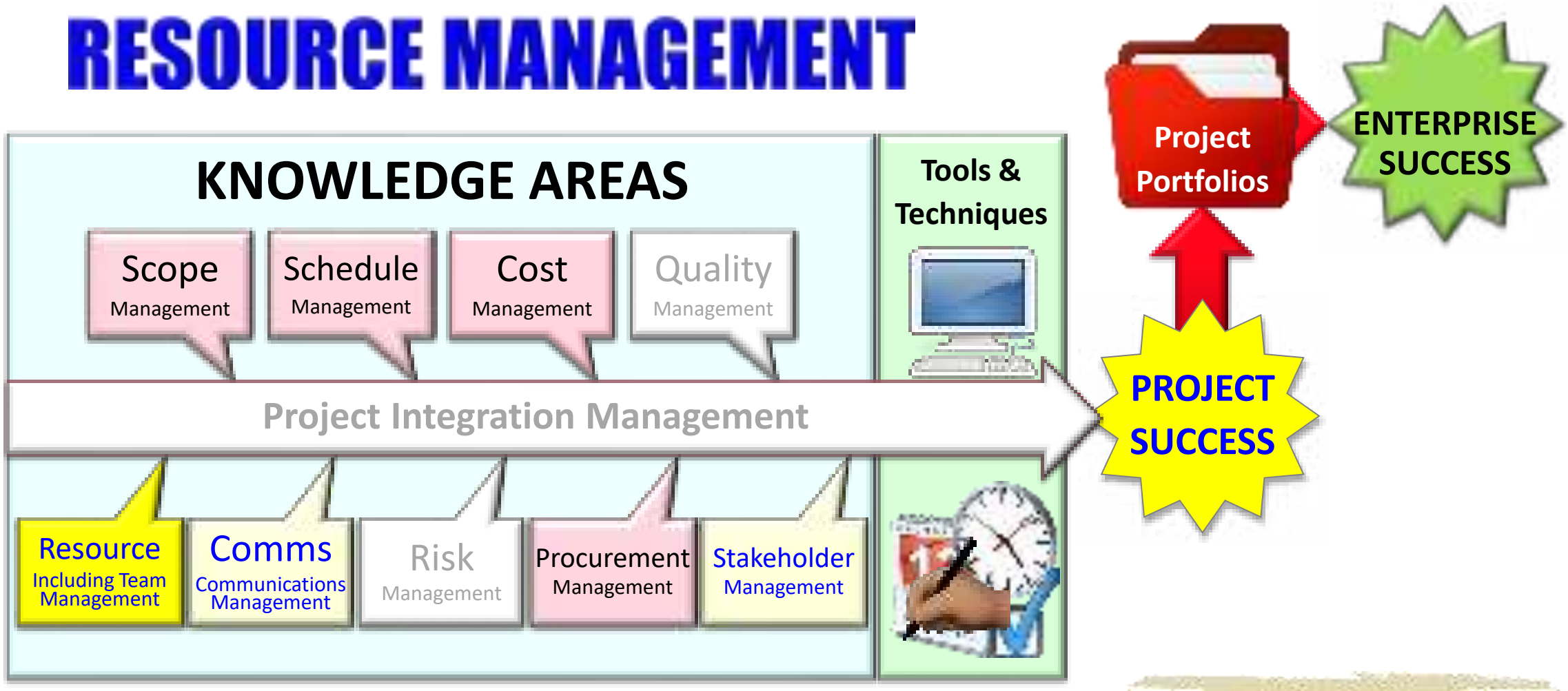
WITHIN A QC FRAMWORK

- ✓ Linked to key **Functional Tests**, which are:
  - ➢ **Unit Testing.** *This involves the testing of individual units (e.g. software, hardware, etc.)*
  - ➢ **Integration Testing.** *This is where individual units are integrated and tested together to make sure they work as designed/required*
  - ➢ **System Testing.** *This is a full system test that includes all of the required elements*
  - ➢ **Acceptance Testing.** *This is a full systems test against acceptance criteria (handover-UAT)*



TOPIC 7

RESOURCE MANAGEMENT



THE 2 INTERLINKED SIDES

✓ *People*

- *With the right knowledge & skills*
- *With the availability to do the job*
- *Who can do the work within the budget (what do they cost?)*
- *Who can work well with the rest of the team (this is critical)*
- *Who can apply the other resources as they become available*

They must be managed together

✓ *Materials/Other Resource*

- *Hardware*
- *Facilities*
- *Software*
- *Services/Support*
- *Money*

Source: Developed from information in Huemann, et al. (2018); Brown, et al. (2016); Adziz, et al. (2016) and Turner (2016)

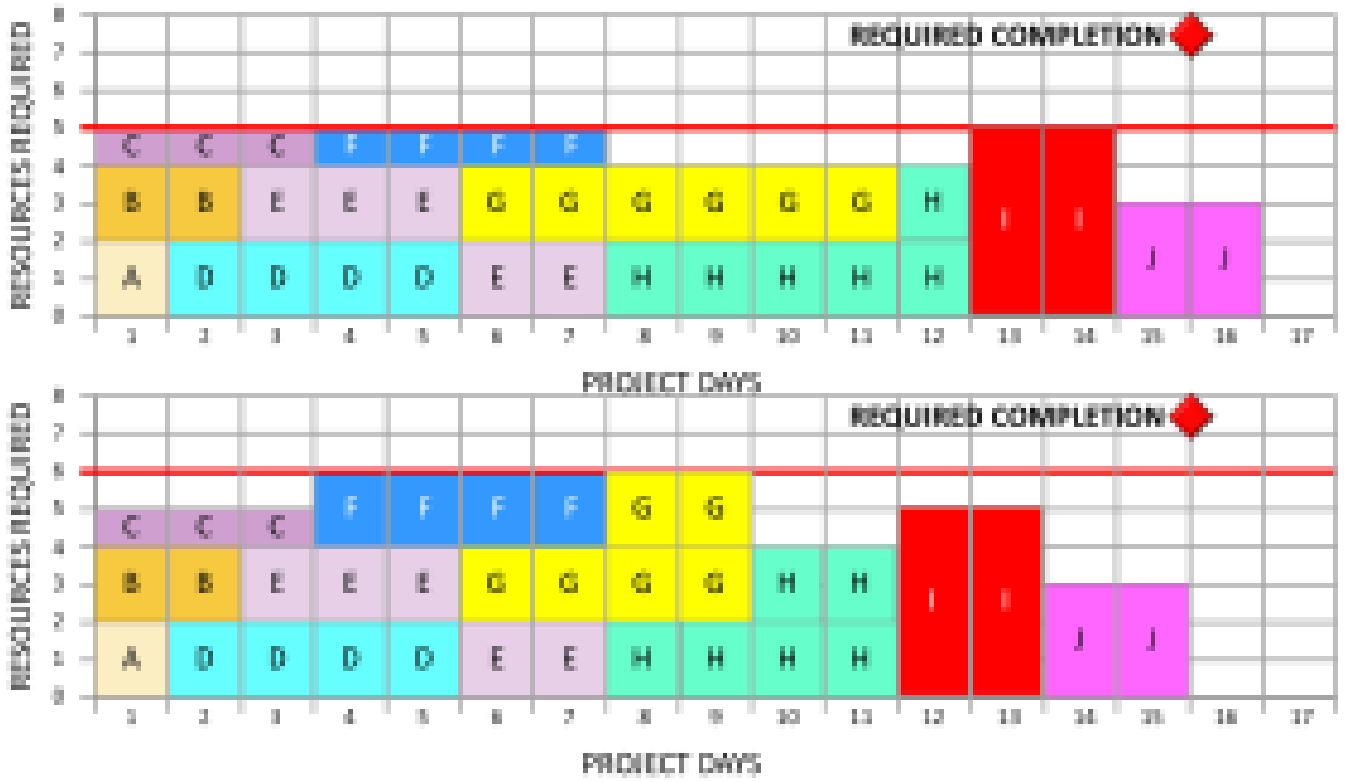
APPLYING RESOURCE LEVELLING/SMOOTHING

- ✓ **Resource levelling** is a technique for resolving resource conflicts by shifting tasks **(start/end dates may be adjusted to balance demand)**
- ✓ **Resource Smoothing** is used when time is more important than resources **(therefore tasks are moved around/reallocated & resources acquired)**

LEVELLING

&

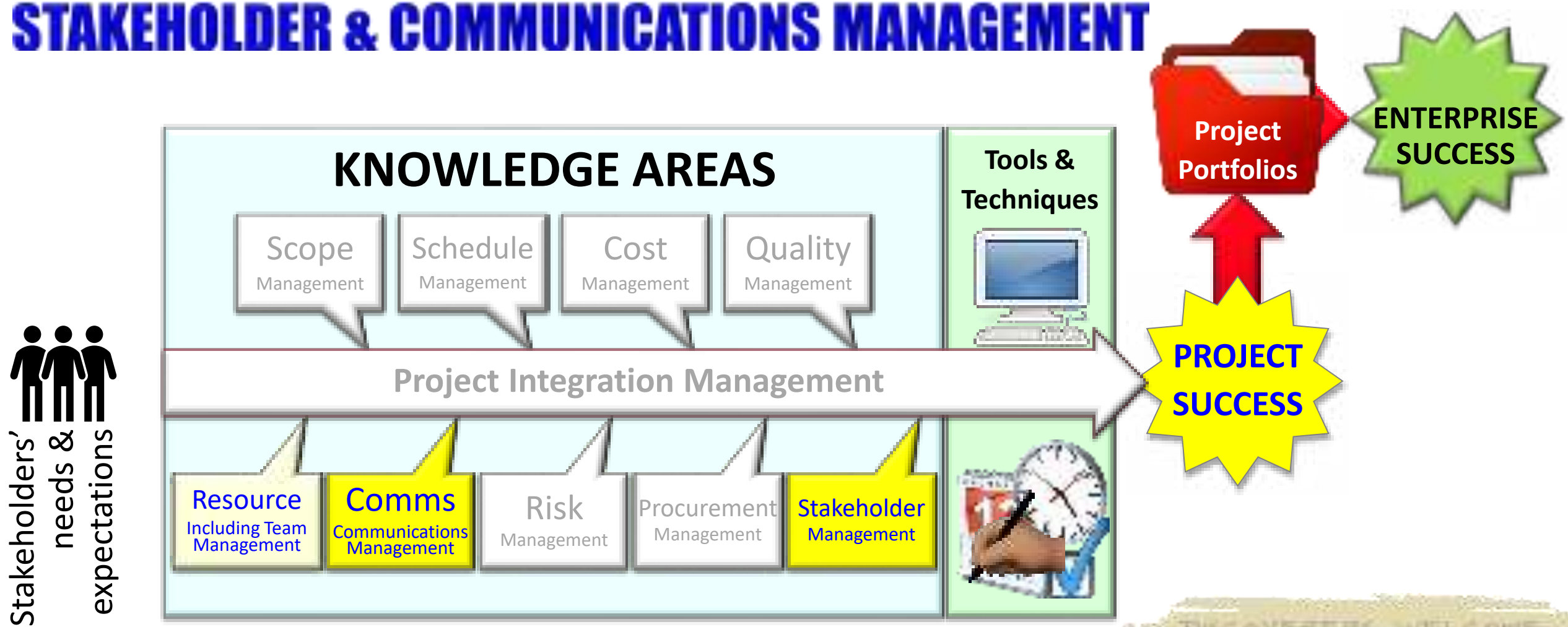
SMOOTHING



Source: https://www.izenbridge.com/blog/underlining-the-differences-between-resource-leveling-and-resource-smoothing/

TOPIC 8

STAKEHOLDER & COMMUNICATIONS MANAGEMENT

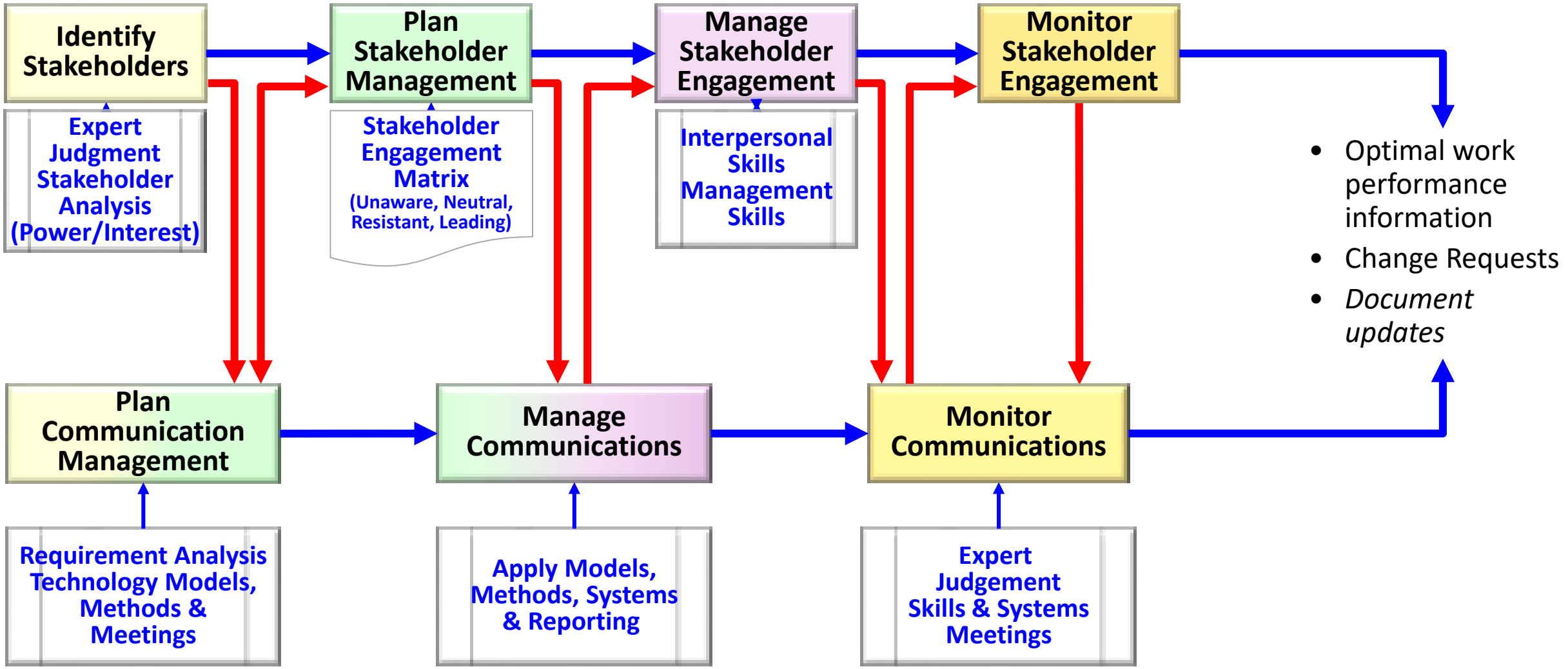


THESE ARE CRITICAL FOR SUCCESS

- ✓ By identifying the various stakeholders
- ✓ Defining their needs and expectations
- ✓ Working out the best way to engage them
- ✓ Identifying the optimal approach for communicating with them
- ✓ Implementing a strategic approach to engagement and communication
- ✓ Closely managing and monitoring this approach to enhance engagement and coordination

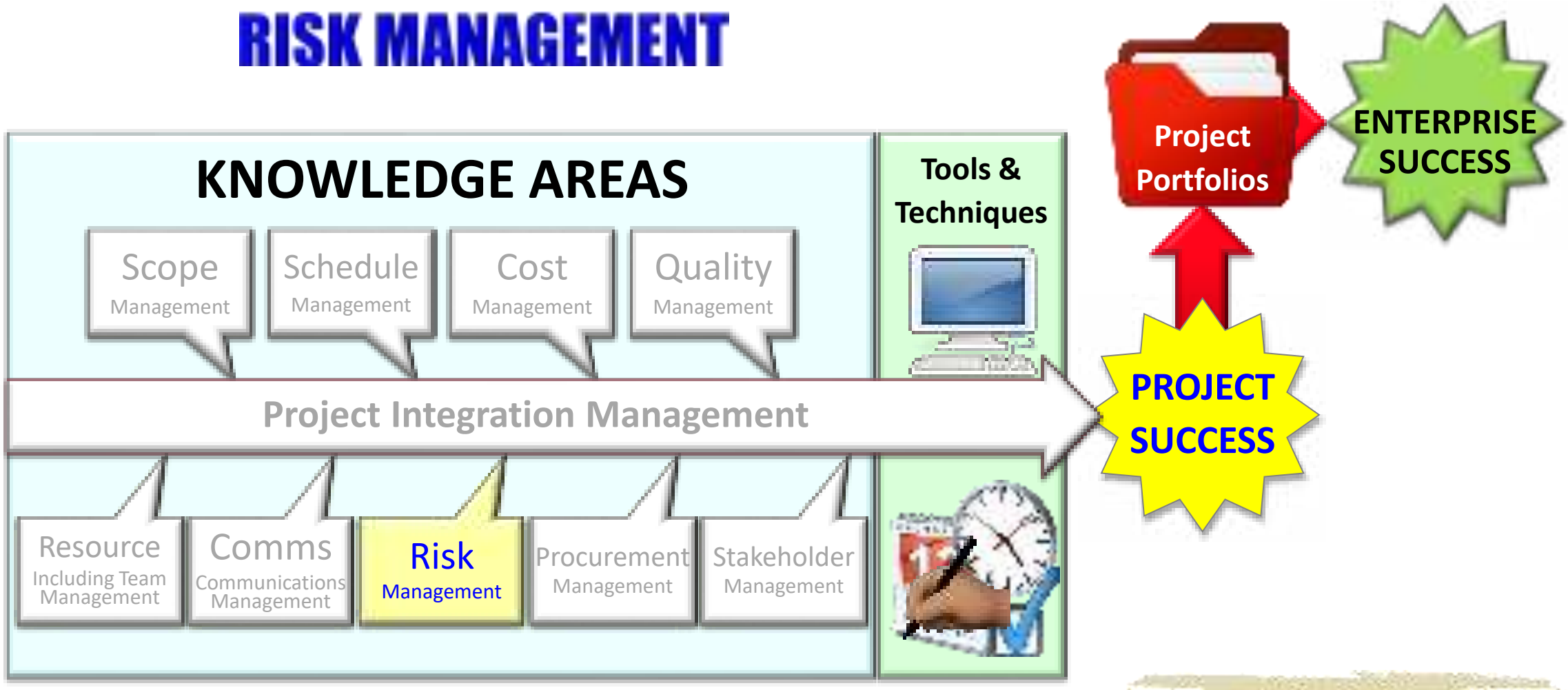
These can be achieved through an integrated approach

IT IS MANAGED THROUGH…

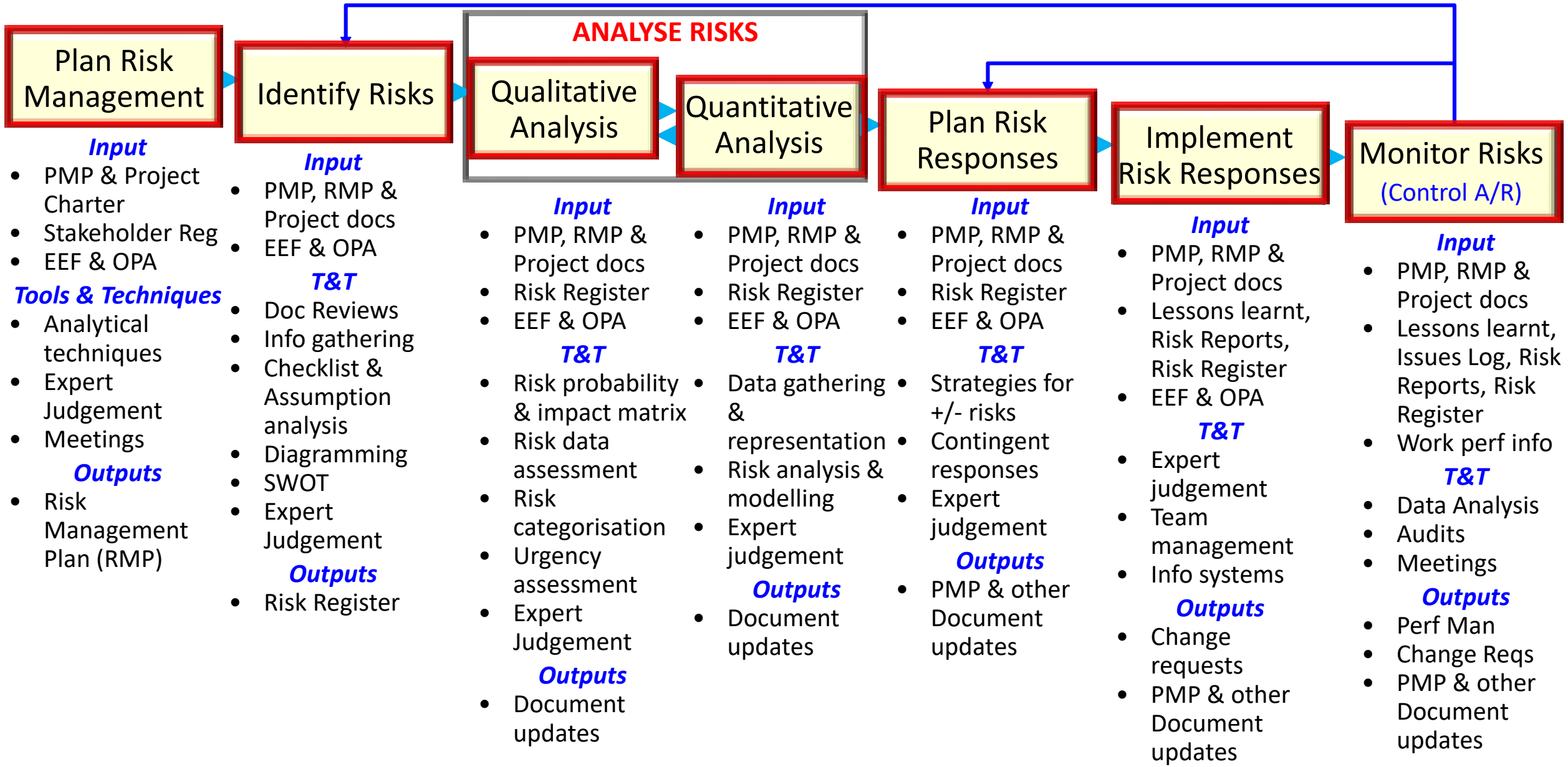


TOPIC 9

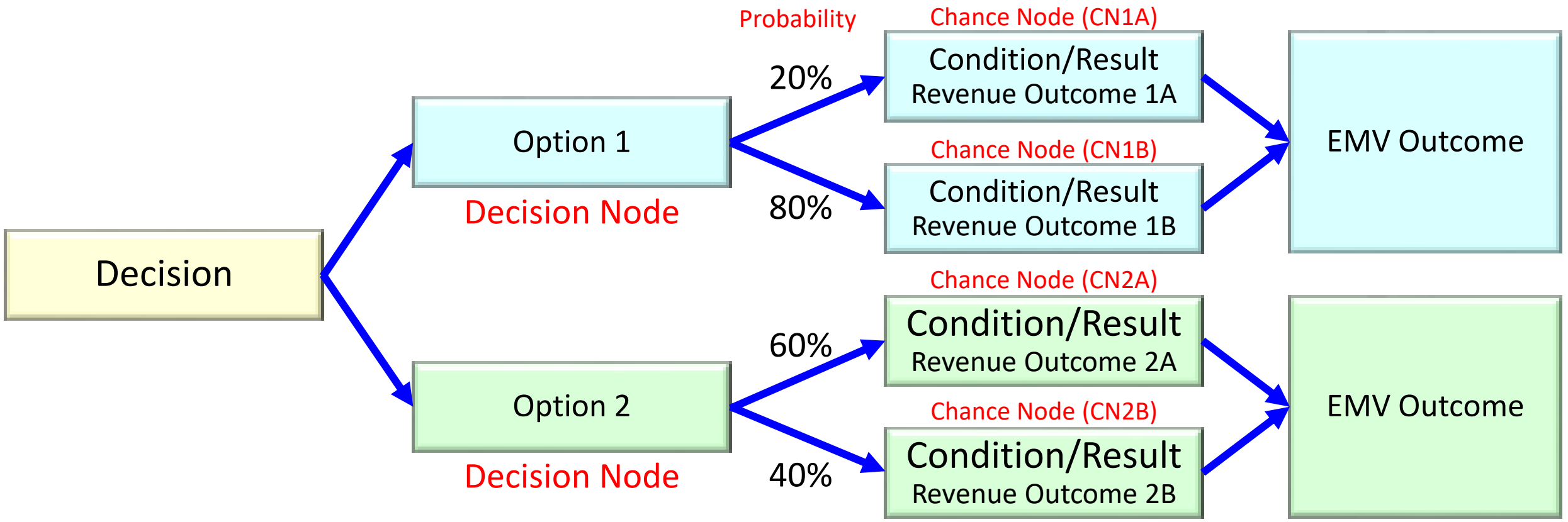
RISK MANAGEMENT



MANAGED THROUGH THESE STEPS

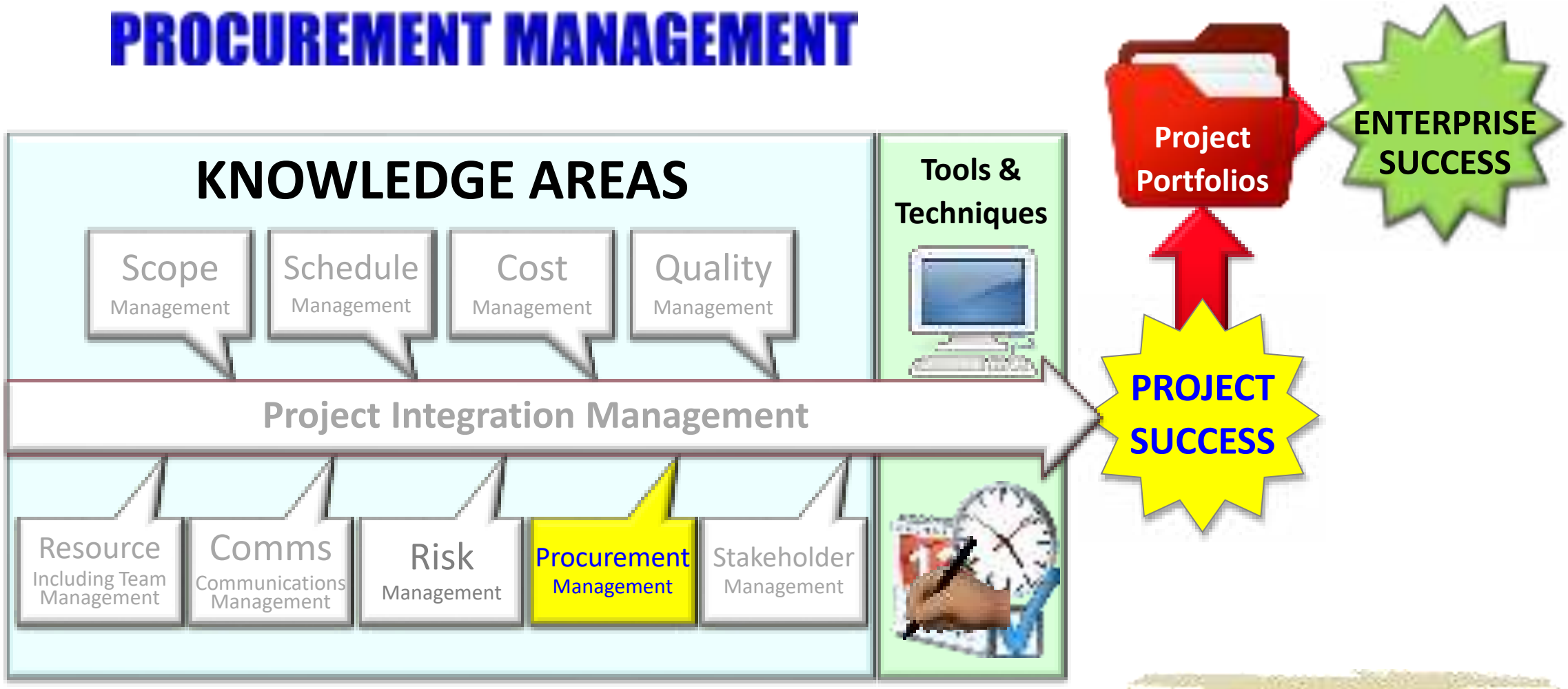


ONE OF THE ANALYSIS PROCESSES WAS EXPECTED MONETARY VALUE



TOPIC 10

PROCUREMENT MANAGEMENT

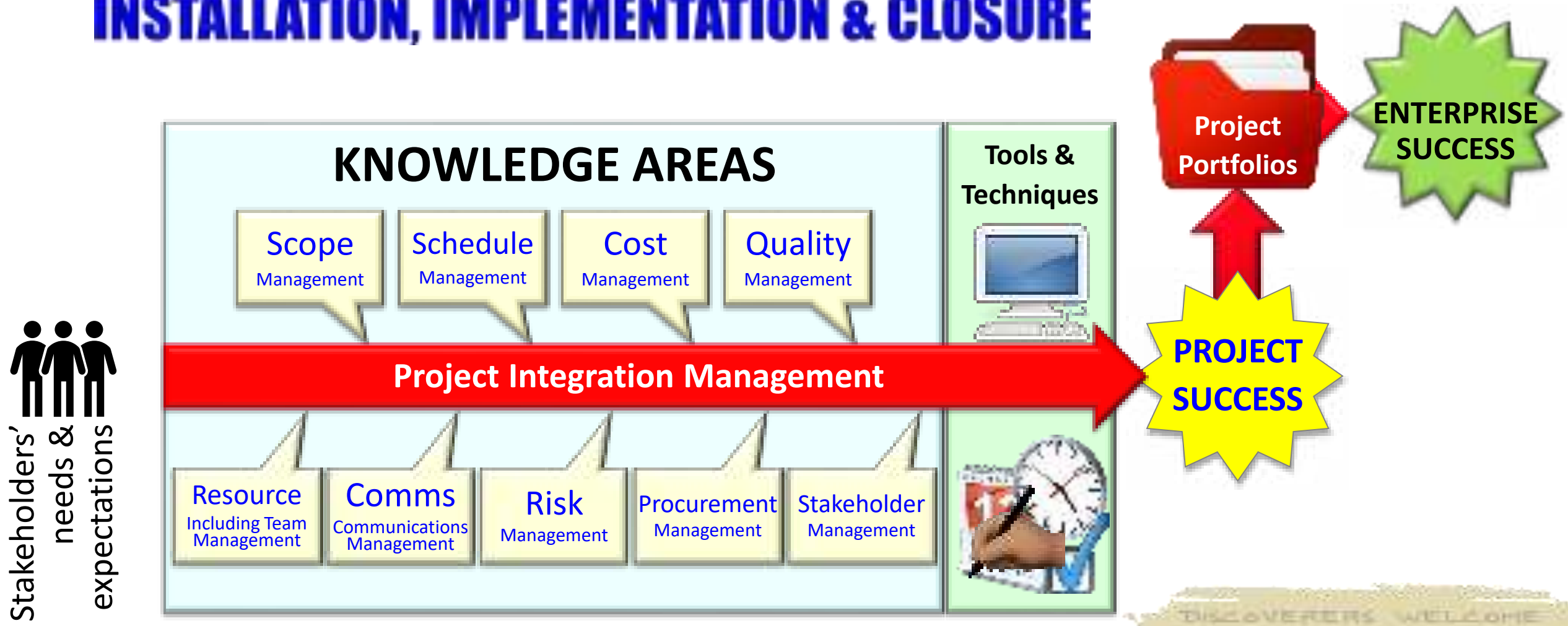


PROCUREMENT MANAGEMENT

- ✓ Project Procurement Management is critical in ensuring that the right systems, support, services and equipment are available – when and where they are needed
- ✓ It is used to:
  - ➢ Assess the right development/procurement strategy **(e.g. make/buy)**
  - ➢ Identify what procurement is required **(the right products/services)**
  - ➢ Choose the right procurement framework **(e.g. contractual, etc.)**
  - ➢ Determine the appropriate engagement **(insource, outsource, etc.)**
  - ➢ Select the suitable payment options **(Buy, Rent, Lease)**

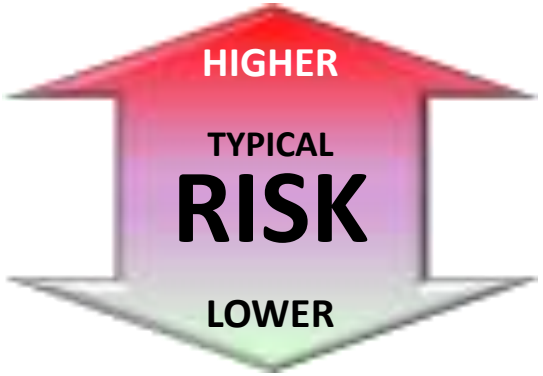
TOPIC 11

INSTALLATION, IMPLEMENTATION & CLOSURE



TOPIC 11 SUMMARY

- ✓ Installation is typically an important part of implementation for projects
- ✓ It can include: software/firmware, data, hardware, systems & facilities **(the scope affects the methods that will be applied)**
- ✓ The devil is often in the detail **(this must be managed carefully)**
- ✓ Installation leads into transition, which can include:
  - ➢ Direct Cutover
  - ➢ Phased Operation
  - ➢ Parallel Operation
  - ➢ Pilot Operation



General profile, but the Risk for each will also be dependent on the type of implementation

CLOSURE INCLUDES

Taking appropriate action to close the project/phase

Which can be defined in terms of:

- ✓ Operational/Technical/Contractual Closing (finalising the actual project processes/issues)
- ✓ Administrative Closing (facilitated through Postmortem review, Lessons Learnt, Audit, updating documents & Project Final Report)

These are done in parallel as an integrated approach


ANY
QUESTIONS