ADAPTIVE US INC.

CBAP® V3

Study Guide

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Preparation Effort

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Introduction

As the book title suggests, this book is a guidebook for the aspirants of the CBAP® examination from IIBA®, Canada. We value your time and hence the book is designed to be extremely specific – Help you pass the certification examination with least possible effort.

This book is authored by qualified CBAP® trainers who have helped many other participants clear the CBAP® examination in the very first attempt. They are also regular trainers for CBAP® preparations in both corporate and open-hose workshops and have trained participants across the world – USA, Australia, Middle East, South East Asia, Europe and Africa.

Now CBAP® examination is based on BABoK® v3.0 and so is this book. This book presents BABoK® concepts in a tabular format which is easy to understand. This book is also followed by an audio book and eLearning to further assist participants.

Feedbacks and suggestions on the book

We will be glad and thankful if you can share your feedbacks and suggestions on the book. Please send your feedbacks and suggestions to Info@AdaptiveUS.com.

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About Adaptive US Inc.

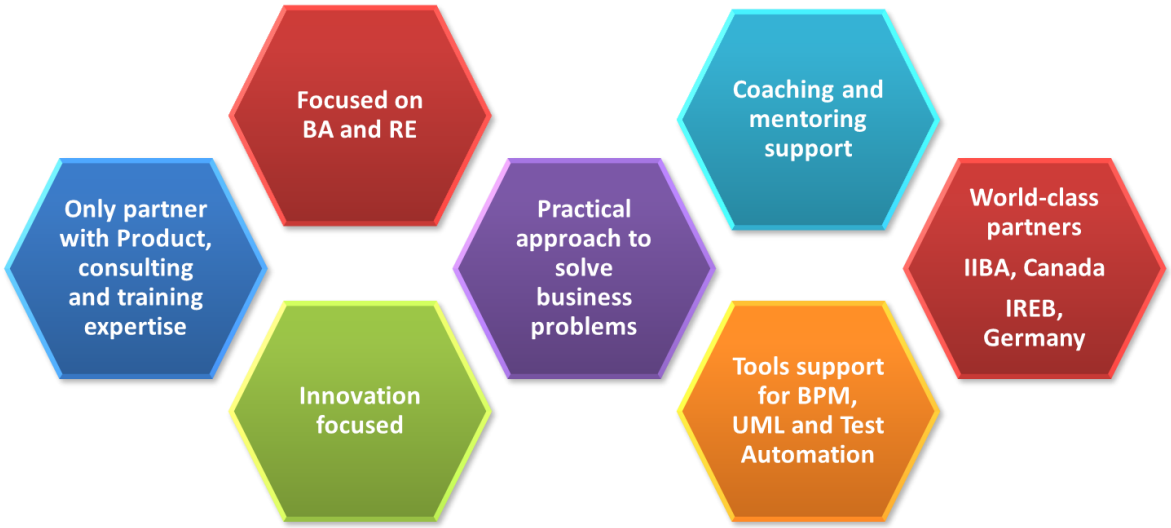
Adaptive US Inc. provides CBAP®, CCBA®, ECBA™ online trainings, question banks, study guides, simulators, flash cards, audio books, digital learning packs across the globe.

Adaptive US Inc. is the only training organization to offer success guarantee and all-inclusive plans for its workshops.

Key facts

- ✓ World's #1 IIBA® training organization
- ✓ World's largest BA publisher and assessments provider
- ✓ Premiere Partner to IIBA®, Canada and IREB, Germany
- ✓ 300+ certified BA professionals
- ✓ 300+ BA workshops – 5000+ BAs trained
- ✓ Our trainers are part of BABoK® V3 team

Unique benefits of working with us



Our key clients

Adaptive workshops catalogue

Category	Course Name
Business analysis	Certified Business analyst Professional (CBAP®) (Endorsed by IIBA®, Canada)
Business analysis	Certification of Capability in BA (CCBA®) (Endorsed by IIBA®, Canada)
Business analysis	Entry level certificate in Business Analysis (ECBA™) (Endorsed by IIBA®, Canada)
Business analysis	Certified Professional in Requirements Engineering (CPRE-FL®)(Endorsed by IREB, Germany)

For the latest information, always refer to our web-site, www.AdaptiveUS.com.

1.Preface and Introduction

1.1 What is business analysis?

BABoK®V3 definition:

Business analysis is the practice of *enabling change* in an enterprise by *defining needs* and *recommending solutions* that deliver value to stakeholders.

Business analyst enables an enterprise to articulate its needs, rationale for change and to design and describe solutions that can deliver value.

Business analysis can be performed within a project or across the enterprise. It can be used to understand the current state, Define future state and determine activities required for transition. Business analysis can be performed from various perspectives like agile, business intelligence, information technology, business architecture, business process management etc.

Who is a Business analyst?

A person who performs BA tasks mentioned in BABoK® is considered a Business analyst irrespective of his job title or organization role.

Business analysts elicit actual needs of stakeholders, not simply capture expressed desires. They are also responsible for discovering and analysing information from various sources.

Common job titles for BAs are business architect, system analyst, requirements engineer, process analyst, management consultant, product manager etc.

Business analysts help organizations define the optimal solutions for their needs, given the set of constraints (including time, budget, regulations and others).

Key activities BAs perform are:

1.2 What is IIBA®?

International Institute of BA (IIBA®) was founded in Toronto, Canada in October of 2003 to support the BA community by:

- Creating and developing awareness and recognition of the value and contribution of the business analyst.
- Defining the BA body of knowledge (BABoK®).
- Providing a forum for knowledge sharing and contribution to the BA profession.
- Publicly recognizing and certifying qualified practitioners through an internationally acknowledged certification program.

What is BABoK®?

BABoK® contains a description of generally accepted practices in the field of business analysis. It gives a guidance on the skills and knowledge that a business analyst must

possess. Contents of BABoK® have been verified thoroughly by practitioners.
BABoK® does not mandate that practices described should be followed under all circumstances. Any set of practices MUST be tailored to the specific BA conditions.

1.3 What and Why of CBAP®

CBAP® stands for Certified BA Professional, 3rd level certification provided by International Institute of BA (IIBA®), Canada (www.IIBA.org).
Following are some of the benefits of becoming a CBAP® :

- Be recognized for your competency in business analysis.
- BA is the fastest growing career opportunity for IT professionals.
- People with domain experience can move into IT sector by becoming a business analyst.
- Better job prospects.
- Better salary.

Target Audience for CBAP®

CBAP® examination targets the following audience:

- Seasoned BAs
- BA Consultants
- Trainers

Eligibility for CBAP®

- Minimum 7500 hours of Business analysis-related work in the last 10 years. Minimum 900 hours in each of 4 of the 6 BABoK® Guide Version 3 knowledge areas.
- Professional development: 35 hours of verifiable BABoK® coursework in the last 4 years. Adaptive US Inc. is an authorized EEP of IIBA®, its trainings provide desired PDUs for the CBAP® certification examination.
- References: Two references from a career manager, client (internal or external) or CBAP®. One must be current.
- Signed code of conduct is required.

Adaptive US provides a CBAP® Application Simulator.

CBAP® Question pattern

- Case study and scenario-based examination.
- Longer cases (1-1.5 pages) of information having 3 to 5 questions each (About 40%)
- Multiple choice answers
- 120 questions
- 3.5 hours

Examination weightage – KA wise

Domain	% Distribution
BA planning and monitoring	14%
Elicitation and collaboration	12%
Requirements life cycle management	15%
Strategy analysis	15%
Requirements analysis and design definition	30%
Solution evaluation	14%

Additional Information

- Application expires within 1 year from approval
- 3 exams can be taken within a year without any waiting time in between

Certification process

- Become an IIBA® member at www.iiba.org.
- Benefits include free, unlimited access to the BABoK® and 500+ online books, local, national and international networking opportunities and ability to influence the growth and direction of the BA profession.
- Take required training from an IIBA® EEP, such as Adaptive US Inc. (www.AdaptiveUS.com).
- Download BABoK® and start reading.
- Join a study group, or start one.
- Begin preparing for the application.

Preparing the application

- Begin the application at least 2 weeks before you plan to apply.
- It can take anywhere from 6-10 hours to complete.
- Download and use Adaptive BA experience calculator.

- Apply within 6 months of when you plan to write.
- Visit IIBA® web-site for more info.

Tips for the certification examination

(i)Understand BABoK® Themes

- Understand what BABoK® believes to be the right thing for BA
- Read Adaptive CBAP® V3 Study Guide 3 to 4 times and BABOK® once
- Understanding the role of a BA from BABOK® perspective

(ii)Review the knowledge areas

- Review understanding of each KA, its importance / Tasks (Purpose / Description/Elements)
- Validate your understanding of KA/processes through Adaptive practice questions and questionbank

(iii) Be happy – No memory based questions

- No need to memorize inputs/guidelines &tools /outputs for tasks.
- There are no memory based direct questions or match the following kind ofquestions.

(iv) Exam and Question Pattern

- Single correct optionquestions.
- Roughly 40%case basedquestions
- Some cases can be 2 pages and some runinto smallparagraphs.
- Case based questions require time to go throughthem

(iv) Understand BA techniques

- Plenty of scenario based questions on BA techniques like what technique is suitableunder a givensituation

  For example, if question is talking about life cycle of an object, it's sequence diagram.

(v) Know UML

- Understand Data flow diagram, Use case diagram andUML
- Know terms like Extend, Include, Generalization, Inheritance

(vi) Choose right action

- Situations are provided to BA and they are asked whether (s)he will go for corrective measure or preventivemeasure
- Adaptivedrill and simulations contain large number of suchquestions

(vii) Understand requirements characteristics

- Learn to identify the missing characteristic in a given requirement
- For example, "No users can update other user's password" – Missing noun qualifier

(viii) Exam and Question Pattern

- Simple numerical questions using data presented in a tabularformat
- Percentage calculation, per day calculation or revenue/ cost calculations, ROIcalculations
- No NPV calculation

(ix) Manage time

- Time management is the keyhere
- Although not complex, case based questions require significanttime.
- Focus on thelast 2 paragraph of the case.
- Take 2 to 3 minute breaks after 45 mins torejuvenate

(x) Ask for a Calculator

- Ask for a calculator at PrometricCentre
- It's very useful for calculation basedquestions

(xi) Attempt all questions

- Questions are from all parts of BABOK® except perspectives.
- Attempt all questions as there is no negativemarking
- You don't lose anything by attempting the question which you don't knowalso

(xii)Use elimination technique

- Scenario based questions are hard where two of the options are most likely theanswers.
- Use elimination technique to focus on 2 most likelyanswers

(xiii) Be cautious ofdistractors

- Question will be framed in sucha way that most of the times it will point outthesimilarities between the two but one or two words will make the difference and you should be able to catch that.

(xiv) Identify easy pickings

- By taking a close look into the table and data provided in questions with basic maths percentage calculation, day calculation etc. one should be able to crack it.
- No KA knowledge or formula is required.

(xv)Do not ponder over questions

- Mark questions forreview.
- Some questions are trickyand it's better to mark them for review and come backlater.

(xvi) Your understanding is vital

- Since it is a competency-based examination, focus more on understandingthe scenarios/cases.

Knowledge areas

Knowledge areas represent areas of specific BA expertise.

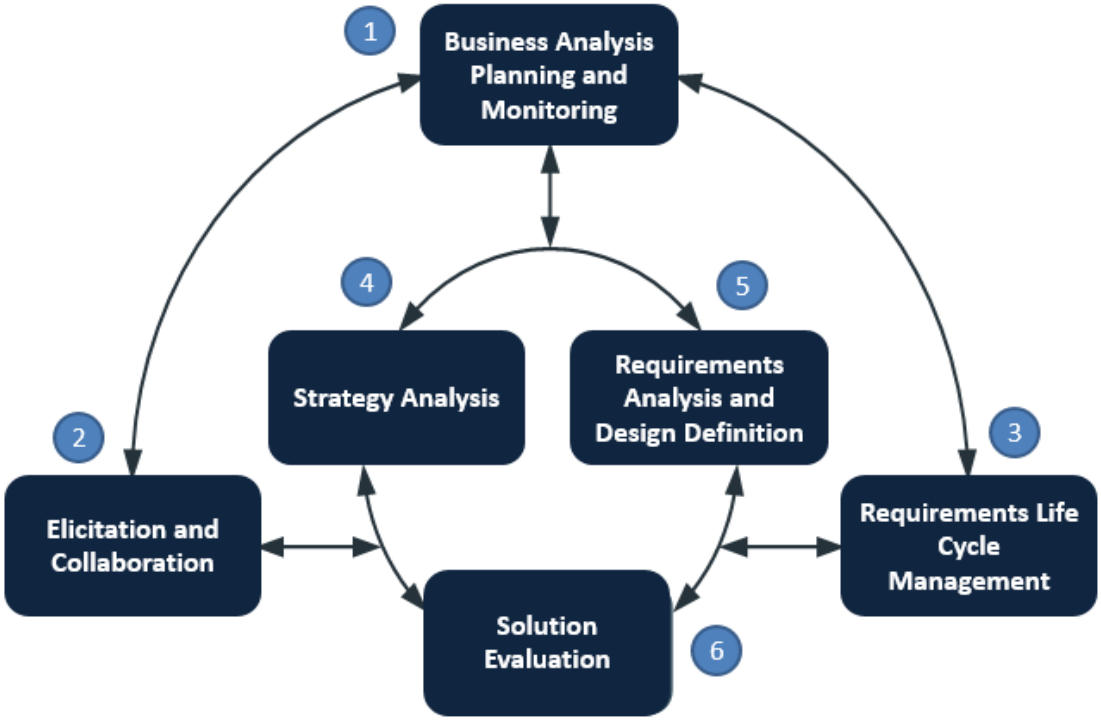
There are 6 knowledge area in BABoK®:

1. BA planning and monitoring
2. Elicitation and collaboration
3. Requirements life cycle management
4. Strategy analysis
5. Requirements analysis and design definition
6. Solution evaluation

Knowledge Areas	Description
BA planning and monitoring	Tasks BAs perform to organize and coordinate efforts of BAs and stakeholders
Elicitation and collaboration	Tasks BAs carry out to Prepare for elicitation, Conduct elicitation activities, confirm results, communicate and collaborate with stakeholders

Requirements life cycle management	Tasks BAs perform to manage and maintain requirements and design information from start till end
Strategy analysis	Tasks BAs perform to identify a need of strategic or tactical importance, how to collaborate and enable stakeholders to address that need etc.
Requirements analysis and design definition	Tasks BAs carry out to organize elicited requirements, model them, validate and verify them and identify and estimate Potential value of solution options
Solution evaluation	Tasks BAs perform to assess the performance and value delivered by a solution

Diagram below depicts the relationships between different knowledge areas:



Tasks

A task is an essential piece of work to be performed as part of business analysis. There is no upper limit to the number of times any task may be performed. Tasks may be performed at any scale – from few minutes to few months.

In this book, tasks are structured in the following manner:

<table>
<tr><td colspan="3">Purpose: Short description as to why a BA performs a task and the value derived from it</td></tr>
<tr><th>Inputs</th><th>Stakeholders</th><th>Outputs</th></tr>
<tr><td>This section lists the inputs for a task which will lead to outputs</td><td>This section lists stakeholders who are likely to participate in a task</td><td>This section lists the results produced by performing a task</td></tr>
<tr><td colspan="3">Guidelines and Tools: This section lists resources which are required to transform input into output.</td></tr>
<tr><td colspan="3">Techniques: This section lists the techniques that can be used to perform the BA task</td></tr>
</table>

1.4 Underlying competencies

Underlying competencies are skills, knowledge and personal characteristics that support effective performance of business analysis.

2.Business Analysis Key Concepts

2.1 Key Terms

Business analysis information	Broad and diverse set of information at any level of detail which are analyzed, transformed and reported during business analysis. e.g.: elicitation results, requirements, solution options etc.
Design	A usable representation of a solution.
Enterprise	A system of one or more organizations and the solutions they use to pursue a shared set of common goals.
Organization	An autonomous group of people which work towards achieving common goals and objectives.
Plan	Proposal for doing or achieving something.
Requirement	Usable representation of a need.
Risk	Effect of uncertainty on the value of a change, solution or enterprise.

2.2 Requirements Classifications

Business requirements	Goals, objectives and outcomes which indicate the reason for initiating a change
Stakeholder requirements	Stakeholder needs which must be met to achieve business requirements
Solution requirements	Capabilities and qualities of a solution that meets stakeholder and business requirements. Broadly classified into: • Functional requirements • Non-functional requirements or quality of service requirements
Transition requirements	Capabilities that the solution must possess in order to facilitate transition from current state to future state

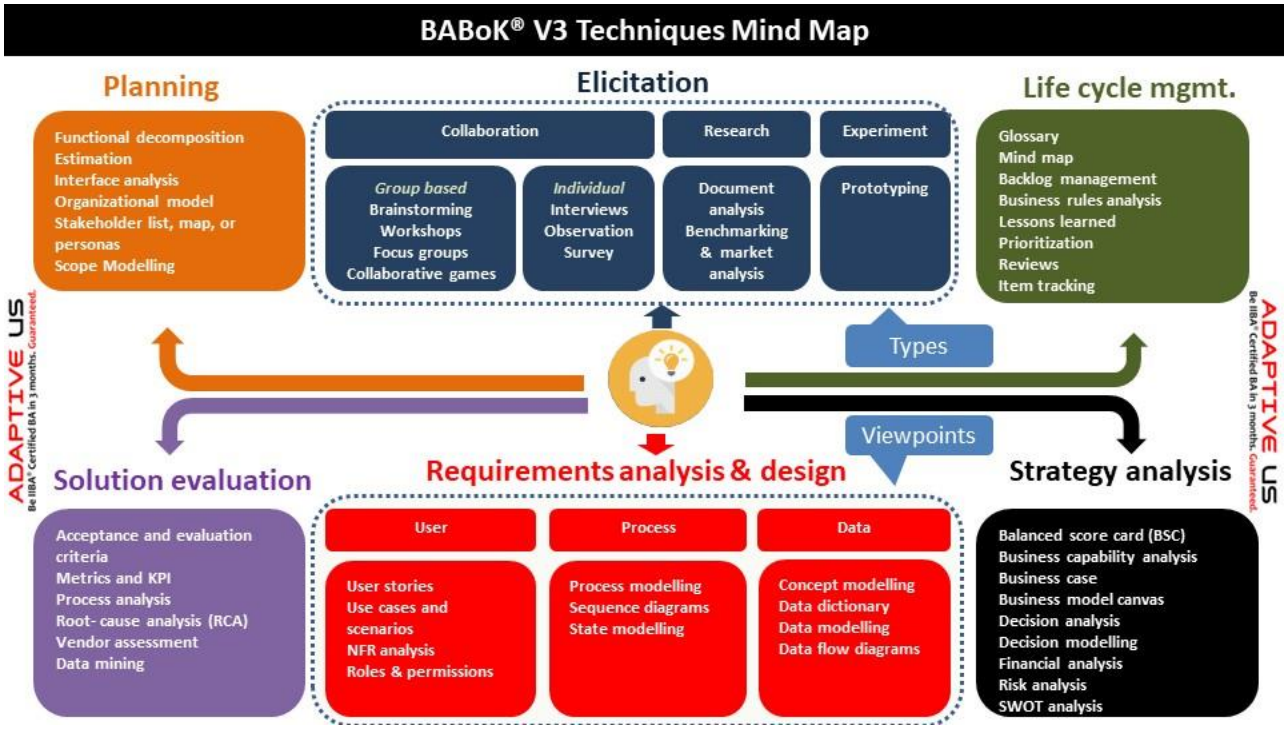
2.3 Stakeholders

Individuals or groups with whom business analysts interact directly or indirectly. They are major sources of requirements, assumptions or constraints.

Stakeholder	Role
Business analyst	Default stakeholder in all business analysis activities.
Customer	Has a contractual right. May use products or services produced by enterprise.
Domain Subject Matter Expert (SME)	People with in-depth knowledge of a topic relevant to business need or solution scope. Examples: Managers, Process owners, Consultants etc.
End user	Those who directly use the product or solution.
Implementation SME	Has specialized knowledge pertaining to implementation of solution components. Examples: Change manager, Solution architect, Information architect etc.
Operational support	Responsible for managing and maintaining systems.
Project manager	Ensures project objectives are met considering several project factors. Manages work required to deliver a project.
Regulator	Define and enforce standards.
Sponsor	Authorizes work to be done, controls the budget and scope of the initiative.
Supplier	Provides products or services to the organization.
Tester	Determines whether the solution meets requirements and quality standards.

3. BABoK® V3 Techniques

BABoK® V3 Techniques Mind Map



Summary of BABoK® V3 Techniques

Techniques	Purpose of the technique	Strengths	Limitations	Key elements
Functional decomposition	Functional decomposition breaks down a large aspect (processes, functional areas, deliverables, scope, or problems) into smaller aspects, as independent as possible, so that work can be assigned to different groups. This reduces complexity of analysis.	Helps to manage complex problems by breaking them into parts. Provides shared understanding of complex matters. Helps in estimation.	No way to be certain that all components have been captured. Missing or incorrect elements can lead to re-work. Not understanding of relationships between pieces can create an inappropriate structure. Need deep subject knowledge and collaboration with stakeholders.	Aspects those can be decomposed are: Business outcomes, Work to be done Business processes, Functions, Business units Solution components, Activities, Products and services, Decisions
Estimation	Estimation techniques are used for better understanding of possible range of costs and efforts associated with any change.	Better decisions based on an improved understanding costs and time. Teams provide a better estimate than a single individual.	Stakeholders treat estimates as commitments. Using a single estimation method can set undue expectations. Accuracy depends on knowledge level about elements. Often altered to match desires of influential stakeholders.	Types of estimation: • Top-down • Bottom-up • Parametric • Rough order of magnitude (RoM) / Ball park • Rolling wave • Delphi • PERT (Program Evaluation Review Technique)

Techniques	Purpose of the technique	Strengths	Limitations	Key elements
Interface analysis	An interface is a connection between 2 components or solutions. Identify interfaces and interactions between solutions and/or solution components	Helps in identifying stakeholders for elicitation. Early identification leads to increased functional coverage. Interfaces specifications provide a structured means of allocating requirements, business rules and constraints to the solution. Avoids over analysis of fine details owing to its broad application.	Does not provide insight into internal components / other aspects of solution.	Types of interface: 1. User interfaces - Users interacting with system plus reports. 2. Data interfaces between systems. 3. Application programming interfaces (APIs). 4. Hardware devices. 5. Business processes. 6. External partners.
Organizational modelling	Org. modelling describes roles, responsibilities, and reporting structures that exist within an organization, and aligns those structures with organization's goals. Visual representations of organizational units.	Common in most organizations. Enables future projects to know participants involved and their roles. Helps to identify influencers in organization.	Out of date at times. Does not tell about real influencers in the organization.	

Techniques	Purpose of the technique	Strengths	Limitations	Key elements
Stakeholder list, map, or personas	Identify stakeholders affected by a proposed initiative or share a common business need, level of decision making authority, authority within domain and organization, attitude/ interest towards change, and business analysis work.	Identifies stakeholders for requirements elicitation. Helps to engage all stakeholder groups. Useful to understand changes in impacted groups over time Assist in analyzing stakeholders and their characteristics Helps to identify all possible sources of requirements	Those who continuously work with same stakeholders may not use stakeholder analysis technique as they don't feel much change will happen in their respective team. Assessing influence and interest of specific stakeholders can be complicated and risky.	RACI Matrix: Responsible Accountable Consulted Informed
Scope modelling	Describe scope of analysis or scope of a solution. They serve as a basis for defining and limiting scope of business analysis and project work	Help in defining contractual obligations. Helps in project effort estimation. Provide justification of In scope/Out of scope decisions. Help in assessing completeness and impact of solutions.	At a high-level. Scope change can be difficult due to political and contractual obligations. Wrong assumptions, changing needs, technological advancements can change scope.	Scope model can include: 1. Business processes, functions, capabilities to be defined or modified. Use cases to be supported. 2.Technologies to be changed. 3.Organizational roles and units impacted. 4.Events to be responded to and impacted. 5.Systems, tools, assets required for change or impacted by change

Techniques	Purpose of the technique	Strengths	Limitations	Key elements
Brainstorming	One or group of stakeholders deliberate on an idea to produce numerous new ideas in a non-judgmental environment, and to derive themes for further analysis.	Excellent way to foster creative thinking as ideas are not judged. Fun, engaging, and productive. Generate many ideas in a short time. Useful to reduce tension between participants.	Depends on participants' creativity and willingness to participate. Participants must agree to avoid debating / criticizing ideas during brainstorming.	Steps for brainstorming: Prepare Conduct session Wrap-up
Workshops	Requirements workshop, also known as JAD (Joint application design) session, is a highly productive focused event attended by carefully selected key stakeholders, and SMEs for a short, intensive period (typically 1 or a few days).	Get detailed requirements in a short time. Means for stakeholders to collaborate Costs are lower than cost of performing multiple interviews Immediately validate facilitator's interpretation.	Highly dependent on expertise of facilitator, and knowledge of participants. Too many participants can slow down workshop process. Not collecting inputs from all participants can lead to overlooking of important requirements.	Roles during the workshop: Sponsor Facilitator Scribe Time keeper Participants
Focus groups	Elicit ideas, impressions, preferences, and needs and attitudes from *pre-qualified individuals* about a specific product, service or opportunity in an interactive group environment. Guided by a moderator. Typically *1 to 2* hours with *6-12* attendees.	Learning people's attitudes, experiences and desires. Encourages active participation and discussion. Online focus groups works best when participants are distributed geographically.	Unwillingness to discuss sensitive or personal topics. What people say is inconsistent with how they actually behave. Homogeneous groups do not represent complete set of requirements. Skilled moderator needed. Can't read body language in online focus groups.	Can be carried out for products under development, to be launched, in production

Techniques	Purpose of the technique	Strengths	Limitations	Key elements
Collaborative games	Uses game playing techniques to collaborate in developing common understanding of a problem or a solution. Involves strong visual or tactile (activities) elements such as moving sticky notes, writing on whiteboards, or drawing pictures. A neutral facilitator guides the game flow.	Identifies hidden assumptions or differences of opinions. Encourages creative thinking. Participants play a more active role. Exposes needs that aren't being met.	Can be perceived as silly and unproductive. Uncomfortable for reserved participants.	Example collaborative games: Product box Affinity map Fishbowl
Interviews	Most common form of elicitation technique where interviewers ask questions to stakeholders. Effective interviewers control discussions, understand needs from *ALL* stakeholders, probe deeper when needed and ensure completeness of answers.	Encourages participation. Builds rapport Simple and direct. Allows discussions and explanations and non-verbal behavior. Allows follow-up and probing questions to confirm understanding. Allows interviewees to express opinions in private.	Needs significant time. Needs commitment and involvement of participants. Needs trained facilitator. Subject to interviewer's interpretation. Unintentionally leading the interviewee.	Interview success depends on: 1. Interviewer skills a. Domain understanding b. Documentation skills c. Experience and willingness 2. Interviewee a. Readiness to provide relevant information b. Clarity about interview goal 3. Rapport between interviewer and interviewee

Techniques	Purpose of the technique	Strengths	Limitations	Key elements
Observation	Elicit information by observing activities and their contexts.	Documenting details about current processes. When stakeholders are unable to express requirements well. Provides realistic and practical insight into business processes. Identify non-documented informal tasks or work-arounds. Recommendations for improvement are based on evidence.	Possible for existing processes only. Time-consuming and can be disruptive. Participants may alter work practices when observed. Can't evaluate knowledge based activities.	Observation types: Active/Noticeable – Ask questions during process. Interrupts work flow but helps in gaining a quick understanding. Passive/Unnoticeable - Ask questions at end. Do not interrupt work.
Survey or questionnaire	Administers a set of written questions to stakeholders and SMEs. Survey can elicit information from many people, sometimes anonymously, in a relatively short period of time. Can collect information about customers, products, work practices and attitudes. Alternatively, respondents are provided with a series of statements and asked for their level of agreement.	Quick and inexpensive to collect information from a large audiences. Does not require significant time from stakeholders. Effective and efficient when stakeholders are not located in one location. Closed-ended surveys are effective in statistical analysis. Open-ended surveys can provide insights and opinions.	Open-ended surveys require more analysis. Specialized skills in statistical sampling methods required. Questions left unanswered or answered incorrectly due to their ambiguity. Follow up questions or more survey iterations may be required. Response rates can be too low for statistical significance.	Survey questions can be Open ended or close ended.
Document analysis	Elicit BA information, by examining materials describing business environment or	Analysis without creating new content. Useful when SMEs are not	Limited to "AS-IS" perspective. May not be up-to-date or valid. Authors may not be available for	Steps for document analysis: 1.Prepare

Techniques	Purpose of the technique	Strengths	Limitations	Key elements
	organizational assets. Document analysis helps in understanding context of a business need or understanding how existing solutions are implemented. Based on BA information being explored, purpose, scope and topics to be researched are determined.	available. Determine what is current and what has changed. Results can be to validate against results of other elicitation techniques. Findings can be presented in easy to understand formats.	clarification. Time-consuming.	2.Perform document review and analysis 3.Record findings
Benchmarking and market analysis	Benchmarking compares org. practices against best-in-class practices from competitors, government, industry associations or standards. Market analysis understands customers' needs, factors influencing purchase decisions, and studies competitors.	Provides information about new methods, ideas, and tools to improve. Target specific groups and products to answer specific needs. Determine when to enter or exit a market. Expose weaknesses within a certain company or industry. Identify differences in product offerings and services available from competitors.	Time-consuming and expensive. Need expertise to conduct analyze gathered information. Benchmarking can't produce innovative solutions. Needs proper market segmentation.	Key principle: No criticism.

Techniques	Purpose of the technique	Strengths	Limitations	Key elements
Prototyping	Provides an early model of final result, widely used for product design. Details UI requirements and integrates them with other requirements such as use cases, scenarios, data, and business rules. Stakeholders often find prototyping to be a concrete means of identifying, describing and validating their interface needs. Prototypes can discover desired process flow and business rules.	Supports users who are more comfortable and effective at articulating their needs by using pictures. Early user interaction and feedback. Throw-away prototypes are inexpensive to quickly uncover and confirm a variety of requirements. Proof of concepts demonstrate technical feasibility.	Can take considerable time if process gets bogged down by "how's" rather than "what's". Assumptions about underlying technology needs to be made for functional prototype. Users may develop unrealistic expectations Users may focus on design specifications than requirements.	Throw-away prototype Evolutionary or Functional prototype
Glossary	Comprises of key terms relevant to a business domain to provide a common understanding of terms. Contains definitions and synonyms. Needs to be organized and be accessible to all stakeholders.	Promotes communication and common understanding of business domain. Encourages consistency as single reference source for business terms. Simplifies writing and maintenance of BA information.	Requires dedicated persons to maintain. Challenging to get stakeholder agreement on a single definition for a term.	What glossary should contain: 1. Unique to a domain. 2. Multiple definitions. 3. Commonly used meaning is different from that which is used within domain. 4. Chance for misunderstanding.

Techniques	Purpose of the technique	Strengths	Limitations	Key elements
Mind Map	Articulates and captures ideas in a non-linear (tree) structure. Ideas are grouped as topics, sub-topics, further sub-sub-topics. Mind maps use words, images, color, and connections to structure thoughts, ideas, and information.	Collaboration and communication tool. Structures complex thoughts, ideas, and information. Facilitate understanding and decision making. Enable creative problem solving.	Can be misused as a brainstorming tool. Can become complex with details.	
Backlog management	Backlogs record, track and prioritize remaining work items. Backlog management is a planned approach to manage remaining work for project. In managed backlogs, items at top have highest business value and priority. Backlog items can be user stories, use cases, defects, CRs, risks etc.	Prioritization for changing needs. Elaborate and estimate in detail ONLY priority items. Tells what items need to be worked on and what items can wait.	Large backlogs can be difficult to manage. Needs experience to break down items for accurate estimate. Lack of details can result in lost information over time.	
Business rules analysis	Business policies dictate actions of an enterprise and people in it by broadly controlling, influencing, or regulating them. Business rules serves as a criterion for guiding behavior and making decisions in a specific, testable manner.	An enterprise-wide rules engine can assist in quick implementation of rules changes. Centralized rules repository enables reuse. Allows organizations to make changes to policies without changing processes.	When combined, rules can be lengthy, inconsistent or produce unanticipated results. Poorly defined vocabulary can result in inaccurate or contradictory business rules.	1.Use business terminology for validation. 2.Document independently from enforcement. 3.Stated in declarative format at atomic level. 4.Maintained in a manner enabling monitoring and

Techniques	Purpose of the technique	Strengths	Limitations	Key elements
				adaption as they change.
Lessons learned	Discusses and documents successes, failures and improvement recommendations for future phases or projects. Can include any format or venue that is acceptable to key stakeholders. Can be formal facilitated meetings or informal.	Identifies areas of improvement. Assists in building team morale. Reinforces positive experiences. Reduces risks for future projects. Recognizes strengths or shortcomings.	Can become blame game. Lack of willingness to discuss and document problems. Facilitation required to ensure discussions remain focused on solutions and improvement opportunities.	Discuss BA activities & deliverables, Final solution, service, or product, Automation introduced or eliminated, Impact to organizational processes, Performance expectations and results, Root causes impacting performance results
Prioritization	Provides a framework for stakeholder decisions to understand relative importance of requirements. Importance may be based on value, risk, difficulty of implementation etc.	Helps in consensus building and trade-offs. Ensures maximum solution value. Assists in meeting initiative timelines.	Stakeholders often avoid difficult choices and do not make trade-offs. Solution team may try to influence prioritization by over estimating complexity of certain requirements. Lack of defined metrics may make it subjective.	Techniques for prioritization: Grouping Ranking Time boxing/ Budgeting Negotiation

Techniques	Purpose of the technique	Strengths	Limitations	Key elements
Reviews	Communicate, verify and validate content of work products, formally or informally. Communicate review objectives in advance to participants.	Promotes stakeholder discussions and involvement for quality output. Identifies defects early. Desk checks and pass around reviews are convenient.	Rigorous team reviews can be time consuming. Informal reviews are more practical but may not ensure removal of significant defects. Difficult to validate whether prior independent review in desk check and pass around reviews. Can lead to repeated revisions if changes are not carefully managed. Sharing and discussing review comments over e-mail can elongate approval process.	Purpose of review: Remove defects Check conformity to specifications or standards Check completeness Quality measurement Reach consensus on approach or solution Issue resolution Alternative exploration Education of reviewers
Item tracking	Captures and assigns responsibility for issues and stakeholder concerns. Items can refer to actions, assumptions, constraints, dependencies, defects, enhancements and issues.	Stakeholder concerns are tracked and resolved. Allows to rank importance of outstanding items.	Can be expensive to capture and track items. Consumes productive time. Stakeholders could become mired in details and statistics.	• Item identifier: Unique ID • Summary • Category & Type • Date identified • Identified by • Impact • Priority • Status etc.

Techniques	Purpose of the technique	Strengths	Limitations	Key elements
Balanced scorecard	A strategic planning and management tool to measure org. performance beyond traditional financial measures aligned to organization's vision and strategy.	Monitor progress against objectives and adapt strategy as needed. Balanced planning and thinking. Encourages forward thinking and competitiveness.	Lack of clear strategy can make aligning dimensions difficult. Stakeholders may perceive this as the only tool for strategic planning than one tool among many. Misinterpreted as a replacement for strategic planning, execution and measurement.	4 dimensions of balance score card are: Learning and growth dimension Business process dimension Customer dimension Financial dimension
Business capability analysis	Capability maps provide a graphical view of capabilities. Capabilities describes ability of an enterprise to act on or transform something that helps achieve a business goal or objective. Capabilities describe outcome of performance or transformation, not how it is performed.	Create focused and aligned initiatives by providing a shared outcomes, strategy, and performance. Align business initiatives across multiple units of the organization.	Requires a broad, cross–functional collaboration in defining capability model and value framework. No set standards for notation of capabilities maps.	
Business cases	Formally or informally, justify investments based on estimated value compared to cost. Spend time and resources on business case proportional to the size and importance of its potential value. Business cases do not provide intricate details.	Integrated view of facts, issues, and analysis. Financial analysis of costs and benefits. Guides decision making.	Subject to biases of authors. Often not updated after funding. Assumptions wrt costs and benefits may be invalid.	Steps: 1. Define needs. 2. Determine desired outcomes. 3. Assess constraints, assumptions, and risks. 4. Recommend solutions.

Techniques	Purpose of the technique	Strengths	Limitations	Key elements
Business model canvas	Comprises 9 building blocks describing how an organization intends to deliver value. As a diagnostic tool, use elements of the canvas as a lens into current state of business, especially wrt relative amounts of energy, time, and resources currently invested in various areas.	Easy to understand and simple to use. Widely used and effective framework to understand and optimize business models. Maps of programs, projects, and other initiatives to the strategy of the enterprise.	Does not account measures for social and environmental impacts. Does not provide a holistic insight for strategy. Does not include strategic purpose of enterprise.	The 9 building blocks: Key partnerships Key activities Key resources Value proposition Customer relationships Channels Customer segments Cost structure Revenue streams
Decision analysis	Supports decision-making in complex, difficult, or uncertain situations. Examines and models possible consequences of different decisions.	Determines expected value of alternative scenarios. Assesses importance placed on different alternatives. Assesses options based on objective criteria rather than emotions. Constructs suitable metrics to compare financial and non-financial outcomes.	Requires knowledge of probability. Information may not be available on time. Decisions may have to be taken immediately at times. Tendency to treat results of decision analysis as more certain than they actually are.	Values, goals and objectives relevant to decision problem. Nature of decision to be made. Areas of uncertainty that affect decision. Consequences of each possible decision.

Techniques	Purpose of the technique	Strengths	Limitations	Key elements
Decision modeling	Show how repeatable business decisions are made using data and knowledge.	Easy to share and understand. Facilitate shared understanding. Support impact analysis. Multiple perspectives can be shared and combined, especially when a diagram is used. Decision tables help in managing large numbers of parameters. Helps with reuse. Helps in rules-based automation, data mining, predictive analytics and BI projects.	Unnecessary for simple decisions coupled to process. Practices may differ from model. Difficult to obtain agreement on cross-functional rules. Needs clearly defined business terminology to avoid data quality issues for process automation	
Financial analysis	Explore financial aspects (benefits and costs) of an investment.	Objective (quantitative) comparison of investments. Assumptions and estimates are clearly stated. Reduces uncertainty by identifying and analyzing influencing factors.	Costs and benefits are difficult to quantify. Numbers give false sense of security.	Cost of change Total cost of ownership (TCO) Opportunity cost Sunk cost Net benefit Return on investment Payback period Discount rate Free cash flow

Techniques	Purpose of the technique	Strengths	Limitations	Key elements
Risk analysis and management	Identify, analyze and evaluate uncertainties that could negatively affect value, develop and manage way of dealing with risks.	Can be applied at multiple levels - strategic, tactical or operational. Successful risk responses on one initiative can be useful for others. Ongoing risk management helps to re-evaluate risks and suitability of planned responses.	# of possible risks can become unmanageably large. Possible to manage only a subset of potential risks. Often significant risks are not be identified.	Risk management techniques are: Avoid Transfer Mitigate Accept Increase
SWOT analysis	SWOT is an acronym for Strengths, Weaknesses, Opportunities, and Threats. A framework for strategic planning, opportunity analysis, competitive analysis, business, and product development.	Helps quickly analyse various aspects of current state, and environment prior to identifying potential solution options. Focusing on factors which add value to business.	High-level view, needs further analysis. Clear context needed to stay within focus.	Strengths and weaknesses are internal, while Opportunities and Threats are external.
Concept modelling	Organizes business vocabulary, usually starting with glossary.	Makes precise communication. Independent of data design biases. Helps in reducing ambiguity.	Requires abstract thinking skill. Need tool support for strict implementation.	Organizing, managing and communicating core knowledge, Need to capture large numbers of business rules, Stakeholders find it hard to understand data models, Regulatory or compliance challenges.

Techniques	Purpose of the technique	Strengths	Limitations	Key elements
Data dictionary	Standard definitions of primitive data elements, their meanings, allowable values, how those elements combine into composite data elements. Used to manage data within a solution's context, often used along with ER diagrams.	Ensures stakeholders agreement on format and content of relevant information. Ensures consistent usage of data elements.	Can become obsolete unless maintained. Needs maintenance to ensure quick and easy retrieval. Metadata required by multiple scenarios must be taken into account.	Data elements can be primitive or composite
Data modelling	Data model describe entities, classes or data objects relevant to a domain, their attributes and relationships among them.	Helps in consistent vocabulary. Ensures logical design of persistent data correctly represents business needs. Consistent approach to analyze and document data and its relationships. Can be at different levels of detail. Can expose missing requirements.	Requires background in software. Typically beyond knowledge of an individual stakeholder.	

Techniques	Purpose of the technique	Strengths	Limitations	Key elements
Data flow diagrams	Show transformation of data from (data source such as external sources, activities and destination). Data used in DFDs should be described in a data dictionary. Highest level diagram (Level 0) is context diagram represents the entire system.	Depict transaction-based systems and boundaries of a system. To discover processes and data. Verify functional decompositions or data models. Excellent way to define scope and interfaces. Helps in effort estimation. Easy to understand. Helps to identify duplicate or missing data elements.	Can become complex for large-scale systems. Different DFD notations exist. Can't show sequence of activities, logic or stakeholders.	

Techniques	Purpose of the technique	Strengths	Limitations	Key elements
Process modelling	Graphical model to describe sequential flow of activities. A system process model defines sequential flow of control among programs or units within a computer system. A program process flow shows sequential execution of program statements within a software program.	MOST stakeholders understand process models. Can be at multiple levels. Can show large number of scenarios and parallel branches. Identifies overlooked stakeholder groups. Identify potential improvements Documentation for compliance. Used for training and coordination of activities. Used as a baseline for continuous improvement. Provides transparency and clarity to process owners	Formal process models perceived as document-heavy approach. Can become extremely complex and unwieldy. Single individual will not be able to understand and 'sign off' a complex process. Can't show process problems just from model. In a highly dynamic environment, process models can become obsolete quickly. Stakeholders often alter processes to meet their needs without updating the model.	1.Describes context of solution or part of solution, 2.Describes current (as is), or is desired (to be) process, 3.Provides a visual to accompany a text description and 4.Provides a basis for process analysis.
Sequence diagrams	Sequence diagrams (also known as event diagrams) model logic of usage scenarios, by showing information (also known as stimuli, or message) passed between objects during execution of a scenario.	Shows interactions between objects in visual and chronological (time) order. Refines use cases with more details.	Creating sequence diagram for every use case can be a waste of time and effort. Fairly technical.	

Techniques	Purpose of the technique	Strengths	Limitations	Key elements
State modelling	State models (also sometimes called a state transition model) describe and analyze different possible states (formal representation of a status) of an entity within a system, how that entity changes from one state to another and what can happen to entity when it is in each state.	Identifies business rules and information for entity being modelled. Identifies activities that apply to entity at different states.	Consumes time and effort. Obtaining consensus is time-consuming.	1. Set of possible states (Statuses) for an entity, 2. sequence of states that entity can be in, 3. how an entity changes from one state to another, 4. events and conditions that cause entity to change states and 5. Actions that can or must be performed by entity in each state as it moves by its life cycle.
User stories	User stories are a brief textual description, typically 1 or 2 sentences, of functionality that users need from a solution to meet a business objective. User story describes actor (who uses story), goal they are trying to accomplish, and any additional information to be critical to understanding scope of story.	Easily understood. Prioritizing, estimating and planning solutions. Focuses on value to stakeholders. Results in shared understanding of domain by collaboration while developing user stories. Facilitates rapid delivery and feedback by small, implementable, and testable slices of functionalities.	Can prove to be a challenge due to lack of detailed specifications. Requires context and visibility. Should be supplemented with higher level analysis and artifacts. Regulatory restrictions, or when organization mandates documentation.	Parts of user story: Title Statement of value. Conversation Acceptance criteria

Techniques	Purpose of the technique	Strengths	Limitations	Key elements
Use cases and scenarios	Scenarios, and use cases describe how actors (a person or a system) interacts with a solution to accomplish one or more of that person or systems goals.	Good at clarifying scope, and providing a high-level understanding of requirements. Narrative flow of use case description makes it easy to understand. Use case description articulates functional behavior of a system.	Written at higher-level of abstraction (low level of detail). Flexible format of use cases may result in capturing inappropriate or unnecessary details. Additional analysis and design required to identify include use cases.	
Non-functional requirements analysis	Examines requirements for a solution that define how well functional requirements must perform. Also known as quality attributes or quality of service requirements. Expressed in textual formats as declarative statements or in matrices.	Provides measurable expressions of how well functional requirements must perform. States constraints applicable to functional requirements.	Difficult to articulate and define than functional requirements. Usefulness depends on how well stakeholders can express their needs. Getting agreement on NFRs can be difficult. Overly stringent NFRs significantly increase cost and effort for development. Difficult to measure and test.	NFR categories are: Availability, Compatibility Functionality, Maintainability, Performance efficiency, Portability, Reliability, Scalability, Security, Usability, Certification Compliance, Localization, Extensibility
Roles and permissions matrix	Ensures coverage of activities by denoting responsibility, to identified roles, and to discover missing roles.	Provides procedural checks and balances, and data security, by restricting individuals from performing certain or all actions. Promotes improved review of transaction history, in that audit logs can capture details about	Need to recognize required level of detail for a specific initiative or activity. Too much detail can be time consuming, too little detail can exclude necessary roles.	Initiative level roles and responsibilities with RACI matrix IT system roles and responsibilities with CRUD (Create, Read, Update and Delete) matrix.

Techniques	Purpose of the technique	Strengths	Limitations	Key elements
		any assigned authorities at time. Provides documented roles and responsibilities for activities.		
Acceptance and evaluation criteria	Acceptance criteria describe minimal set of requirements to be met for a solution to be worth implementing, also known as Must Have requirements. Typically used when evaluation only one possible solution and is expressed as pass or fail. Must be testable.	Agile methodologies require requirements to be expressed as testable acceptance criteria. Express contractual obligations. Evaluation criteria help in assessing diverse needs and defining priorities.	Difficult to change for legal or political reasons. Achieving consensus is challenging.	
Metrics and key performance indicators (KPIs)	Measure performance of solutions, solution components and other matters of interest to stakeholders. A metric is a quantifiable level of an indicator to measure progress. A target metric is objective to be reached within a specified period.	Allows stakeholders to understand extent to which a solution meets an objective. Facilitates organizational alignment, linking goals to objectives, supporting solutions, underlying tasks and resources.	Can be expensive, bureaucratic, and useless. Can distract from key responsibilities, especially on agile projects. Mostly no feedback is provided to stakeholders collecting metric data as to understand how their actions are affecting quality of project results. Can lead to sub-optimal performance when metrics are used to assess performance.	Properties of indicators: 1. Clear: Precise and unambiguous. 2. Relevant: Appropriate to the concern. 3. Economical: Available at reasonable cost. 4. Adequate: Provides a sufficient basis on which to assess performance. 5. Quantifiable: Can be independently validated. 6. Trustworthy and Credible: Based on evidence and

Techniques	Purpose of the technique	Strengths	Limitations	Key elements
				research.
Process analysis	Analyzes processes for their effectiveness, efficiency, and identifies improvement opportunities.	Ensures solution addresses right issues. Minimizes waste. Flexibilities wrt techniques and methodologies.	Time-consuming. Challenging to decide which approach to use and how rigorously to follow them. Not very effective in knowledge or decision-intensive processes.	

Techniques	Purpose of the technique	Strengths	Limitations	Key elements
Root cause analysis	Identify and evaluate underlying causes of a problem, looking into causes occurring due to people, physical or organizational effects. Reactive analysis: For corrective action. Proactive analysis: For preventive action.	Structured method to identify root causes. Helps to come up with effective solutions.	Need formal training or extensive experience to facilitate a team of experts. Prove to be difficult with complex problems.	Steps for RCA are: 1. Problem Statement Definition 2. Data Collection 3. Cause Identification 4. Action Identification
Vendor assessment	Assess ability of a potential vendor to meet commitments wrt delivery and consistent provision of a product or service.	Ensures vendor is reliable and organization expectations are met. Reduces risk of choosing an unsuitable vendor. Improved long-term satisfaction with decision.	Time-consuming to gather sufficient information on multiple vendors. Risk of failure as partnership evolves cannot be prevented. Subjectivity may bias evaluation outcome.	Aspects to be careful: Choose licensing and pricing models Determine product reputation and market position Determine terms and conditions Determine vendor reputation Determine vendor stability

Techniques	Purpose of the technique	Strengths	Limitations	Key elements
Data mining	Finds useful patterns and insights from large amounts of data, usually resulting in mathematical models. Utilized in either supervised (user poses a question) or unsupervised (pure pattern discovery) investigations.	Reveals hidden patterns and insights. Increased accuracy of data and decision. Reduce human bias.	Requires specialist knowledge. Takes considerable effort. Can result in erroneous correlations. May lead to accidental misuse. Resistance to use of advanced math and lack of transparency.	Steps: Elicit requirements Data preparation: Analytical dataset Analyze data Modelling techniques Deployment

3.1 Business Analysis Planning and Monitoring

Functional Decomposition

Functional decomposition breaks down any large aspect (processes, functional areas, deliverables, scope, or problems) into smaller aspects, as independent as possible, so that work can be assigned to different groups. This reduces complexity of analysis.

Define what to decompose, how to decompose, and how deeply to decompose. Decomposition can be applied to diverse subjects like:

Level of functional decomposition defines where, why and when to stop decomposing. Decomposition can be represented by a combination of plain texts, hierarchical diagram, programming languages (CRUD operations), visual diagrams etc. Work breakdown structure (WBS) decomposes project scope in phases, work packages and deliverables.

Strengths

- ✓ Helps to manage complex problems by breaking them into parts.
- ✓ Provides shared understanding of complex matters.
- ✓ Helps in estimation.

Limitations

- × No way to be certain that all components have been captured.
- × Missing or incorrect elements can lead to re-work.
- × Not understanding relationships between pieces creates inappropriate structure.
- × Need deep subject knowledge and extensive collaboration with stakeholders.

Estimation

Estimation techniques are used to understand possible range of costs and efforts for a change. Estimation helps to get a reasonable assessment of likely efforts and costs. Represent estimation as a range of values, with minimum and maximum.

Top-down estimation

Estimate efforts for components using hierarchical breakdown. Done when the budget is fixed.

Bottom-up estimation

Uses WBS to estimate deliverables, activities, tasks and estimates from stakeholders and rolls them up to get a total. It is easier to estimate smaller items than larger items. Bottom-up estimating produces MOST accurate and defensible estimates.

Parametric estimation

Uses a calibrated parametric model of element attributes. For example, if 1 use case takes 3 days to develop, it will take 60 days to develop 20 use cases. Estimate = Sum (f_i*x_i)

Rough order of magnitude (RoM) / Ball park

A high-level estimate with a very wide confidence interval. Typically based on history or expert judgment with limited information.

Rolling wave

Continual refinement of estimates. Estimate activities in current iteration and extrapolate it for entire scope of work. After each iteration, re-estimate future activities.

Delphi estimation

Uses a combination of expert judgment and history. Include individual estimates, sharing estimates with experts and having several rounds until consensus is reached.

PERT (Program Evaluation Review Technique)

Each component of estimate has 3 values:

(M) Most likely estimate (3 days)

(O) Optimistic or best-case scenario (2 days)

(P) Pessimistic or worst-case scenario (7 days)

Most likely estimate is NOT an average of best and worst case scenarios.

PERT estimate:

(1 * Optimistic + 1 * Pessimistic + 4 * Most likely)/6 = (4*3+2+7)/6 = 3.5

Sources of information

- Analogous (similar) situations - similar project.
- Organization history - Prior experiences with similar work.
- Expert judgment - Relying on expertise of experts.

Strengths

✓ Better decisions based on an improved understanding costs and time.
✓ Teams provide a better estimate than a single individual.

Limitations

× Stakeholders treat estimates as commitments.
× Using a single estimation method can set undue expectations.
× Accuracy of estimates depends on knowledge level about elements.
× Often altered to match desires of influential stakeholders.

Interface Analysis

An interface is a connection between 2 components or solutions. Identify interfaces and interactions between solutions and/or solution components. Interface types are:

1. User interfaces - Users interacting with system plus reports.
2. Data interfaces between systems.
3. Application programming interfaces (APIs).
4. Hardware devices.
5. Business processes.
6. External partners.

Interface analysis defines:

- Why the interface is needed?Who will use interface?
- What information will be exchanged?When information will be exchanged?
- How frequently?Where information exchange will occur?
- How interface should be implemented?

Prepare

Utilize techniques like document analysis, observation, scope modeling (Use case model), interviews etc. to understand which interfaces need to be identified.

Identify interfaces

Identify interfaces which are needed in future for each stakeholder or system that interacts with the system. Describe function of interface, assess usage, evaluate suitable type and elicit details about interface.

Define interfaces

Include name, exchange method between entities, message format, exchange frequency etc.

Strengths

- ✓ Helps in identifying stakeholders for elicitation.
- ✓ Early identification leads to increased functional coverage.
- ✓ Interfaces specifications provide a structured means of allocating requirements, business rules and constraints to the solution.
- ✓ Avoids over analysis of fine details owing to its broad application.

Limitations

- × Does not provide insight into internal components / other aspects of solution.

Organizational Model

Org. model describes roles, responsibilities, and reporting structures in an organization. It is a visual representation of organizational units defining:

- Members in group,
- Who reports to whom,
- Functional role for each person, and
- Interfaces between unit and other units or stakeholders.

3 types of Org. models are:

Functions: Groups staff together based on shared skills or areas of expertise. Helps in standardization of work or processes.

Markets: To serve particular customer segments, geographical areas, projects or processes rather than group employees based on common skills or expertise. Enables organization to be better oriented with needs of its customers, but may develop inconsistencies in work performance, and duplicate work in multiple divisions

Matrix: Separate managers for each functional area, and for each product, service, or customer. Staff report to:

- A line manager, who is responsible for performance of a type of work, and for identifying opportunities for efficiency in work, and
- A market (product/service/project/etc.) Manager, who is responsible for managing product, service, etc. Across multiple functional areas.

Org. unit comprises of a number of defined roles and has interfaces with other org. units. Org. chart is main diagram for org. modeling.

Strengths

- ✓ Common in most organizations.
- ✓ Enables future projects to know participants involved and their roles.
- ✓ Helps to identify influencers in organization.

Limitations

- × Can be out of date.
- × Does not tell about real influencers in organization.

Stakeholder List, Map, or Personas

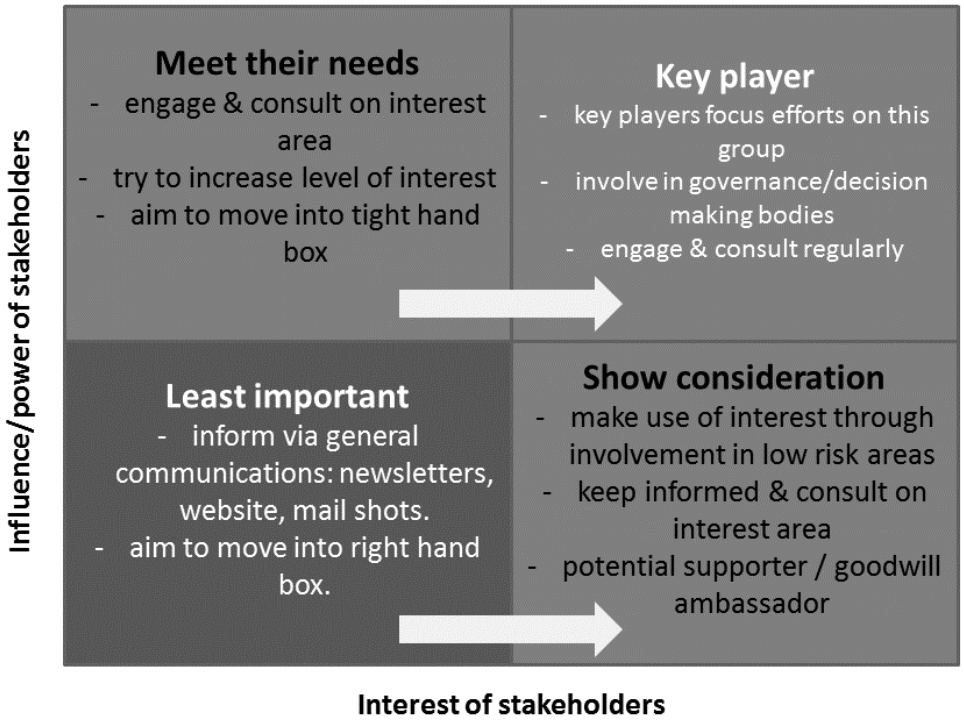
Identify and analyze stakeholders affected by a proposed initiative or share a common business need, level of decision making authority, authority within domain and organization, attitude/ interest towards change, and business analysis work.

Stakeholder lists

Brainstorm and interview to generate a stakeholder list. An exhaustive stakeholder list ensures that important stakeholders and groups have not been overlooked. Minimizes risks of missing out requirements.

Stakeholder maps: Represent relationships of stakeholders to solution and to one another.

Stakeholder matrix: Maps level of stakeholder influence against level of stakeholder interest/impact. 4 quadrants are:



Onion diagram: Levels of stakeholder involvement with solution / project / process.

Responsibility (RACI) matrix

Responsible	One who performs the task.
Accountable	Decision maker and held accountable.
Consulted	Stakeholder or stakeholder group asked for opinions, typically SMEs.
Informed	Stakeholder or stakeholder group who are informed of tasks.

Personas

Persona is a fictional character that depicts way a typical user interacts with a product.

Strengths

- ✓ Identifies stakeholders for elicitation.
- ✓ Helps to engage all stakeholder groups.
- ✓ Assist in analyzing stakeholders and their characteristics.

Limitations

- × Influence and interest assessment can be complex and risky.
- × Some may not feel the need for it in ongoing projects.

Scope models

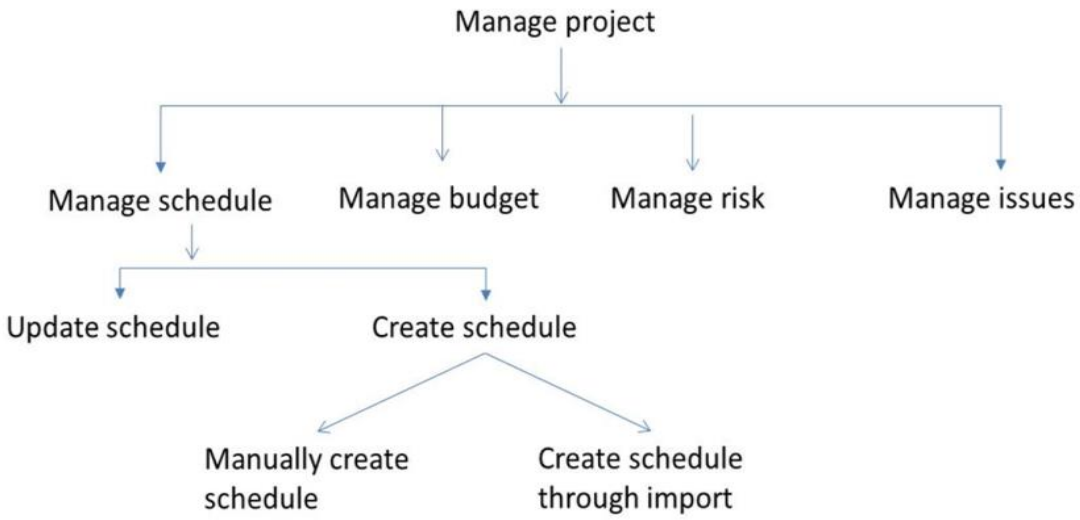
Describe scope of analysis or scope of a solution. They serve as a basis for defining and limiting scope of business analysis and project work. Scope models show:
In-scope: Elements contained by boundary (as seen from inside). E.g.: Functional decomposition.
Out-of-scope: Elements not contained within boundary (as seen from outside). E.g.: Context diagram.
Both: Elements on both sides of boundary (as seen from both sides).

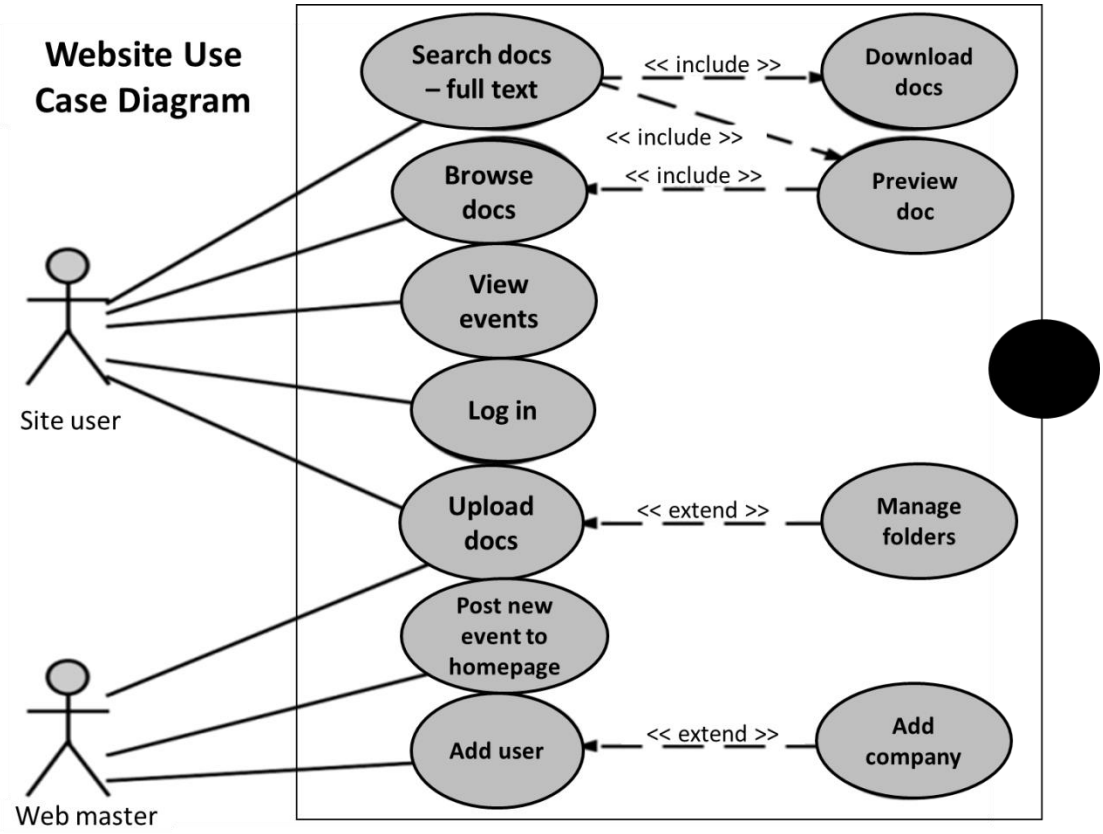
While considering scope of change and context, determine:

- ✓ Business processes, functions, capabilities to be defined or modified.
- ✓ Use cases to be supported.
- ✓ Technologies to be changed.
- ✓ Organizational roles and units impacted.
- ✓ Events to be responded to and impacted.
- ✓ Systems, tools, assets required for change or impacted by change.

In order to ensure completeness and integrity of scope models, identify relationships between potential scope elements.

Diagramming techniques:
Parent-Child/Composition-Subset: Hierarchical decomposition.





Function-Responsibility: Relates a function with agent that is responsible for its execution. Example Use case diagram.
Supplier-Consumer: Relates how information or materials is transmitted between them.
Cause-Effect: Logical relations identifying aspects that are involved or impacted by change.
Emergent: Complex systems have several elements which interact to produce results that cannot be predicted.

Scope models should explicitly state critical assumptions and their implications.

Strengths

- ✓ Help in defining contractual obligations.
- ✓ Help is project effort estimation.
- ✓ Provide justification of In scope/Out of scope decisions.
- ✓ Help in assessing completeness and impact of solutions.

Limitations

- At a high-level.
- Scope change can be difficult due to political and contractual obligations.
- Wrong assumptions, changing needs, technological advancements can change scope.
- Common complex boundaries such as a horizon (a boundary that is completely dependent on position of stakeholder) cannot be addressed by traditional scope models.

3.2 Elicitation and Collaboration

Brainstorming

One or group of stakeholders deliberates on an idea to produce numerous new ideas in a non-judgmental environment, and to derive themes for further analysis.

Steps for brainstorming

Prepare

- Define area to brainstorm.
- Set time limit. Allocate more time for larger groups.
- Identify facilitator and participants.
- Aim for 6 to 8 participants representing range of backgrounds and experiences.
- Set expectations with participants, and get their buy in into the process. Fundamental principle is No criticism of any idea.
- Establish criteria for evaluating and rating ideas.

Conduct session

- Share new ideas without discussion, criticism or evaluation.
- Visibly record all ideas.
- Encourage participants to be creative, share exaggerated ideas, and build on others' ideas.
- Don't limit number of ideas.

Wrap-up

- Combine ideas and eliminate duplicates.
- Evaluate ideas using defined evaluation criteria.
- Create and distribute condensed list of ideas.

Strengths

- ✓ Excellent way to foster creative thinking.
- ✓ Fun, engaging, and productive.
- ✓ Generate many ideas in a short time.
- ✓ Useful to reduce tension between participants.

Limitations

- × Depends on participants' creativity and willingness to participate.
- × Politics may limit participation.
- × Participants must agree to avoid debating / criticizing ideas during brainstorming.

Workshops

Requirements workshop, also known as JAD (Joint application design) session, is a highly productive focused event attended by carefully selected key stakeholders, and SMEs for a short, intensive period (typically 1 to a few days). Workshops may be used to generate new ideas for features or products, reach an agreement on a topic or review requirements.

An experienced, neutral facilitator must facilitate requirements workshop. A scribe documents requirements, and outstanding issues. Business analyst may act as facilitator or scribe and can also be a participant in case she is an SME on topic. However, she MUST approach participant role with caution, as she may unduly influence requirements towards her own viewpoints, and priorities.

Prepare for requirements workshop

- Clarify stakeholders' needs, and purpose of workshop.
- Identify critical stakeholders for workshop.
- Identify facilitator and scribe.
- Define workshop's agenda.
- Determine how to document outputs of workshop.
- Schedule sessions and send invitations.
- Arrange logistics.
- Send materials in advance to so that attendees come prepared.
- Conduct pre-workshop interviews with (key) attendees to ensure purpose of requirements workshop is understood, and aligned with needs of (key) attendees.

Workshop roles

Sponsor	Has ultimate accountability for outcome of workshop. Not a frequent participant.
Facilitator	Introduces goals, agenda, and rules, facilitates decision making and conflict resolution, gives participants a chance and ensures they don't deviate from topic.
Scribe	Documents decisions in a pre-determined format. Keeps track of items deferred during session.
Time keeper	Keeps track of time spent on each item in agenda.

Participants	Key stakeholders and SMEs.

Conduct requirements workshop

- State purpose of workshop and desired outcomes.
- Establish agreed upon ground rules.
- Maintain focus by frequently validating workshops activities with stated objectives.

Post requirements workshop wrap-up

- Follow up on any open action items.
- Complete and distribute documentation.

Strengths

- ✓ Get detailed requirements in a short time.
- ✓ Means for stakeholders to collaborate, to reach consensus, make decisions, and gain mutual understanding of requirements.
- ✓ Costs lower than cost of performing multiple interviews as interviews may yield conflicting requirements, and resolving same can be very costly.
- ✓ Stakeholders can immediately validate facilitator's interpretation of requirements, as feedback is immediate.

Limitations

- ✓ Difficult to schedule.
- ✓ Highly dependent on expertise of facilitator, and knowledge of participants.
- ✓ Too many participants can slow down workshop.
- ✓ Not collecting inputs from all participants can lead to overlooking of important requirements.

Focus Groups

Elicit ideas, impressions, preferences, and needs and attitudes from pre-qualified individuals about a specific product, service or opportunity in an interactive group environment. Guided by a moderator. Typically 1 to 2 hours with 6-12 attendees.

Product life cycle stage	Utility of focus group
Under development	Ideas are analyzed in relationship to stated requirements. This may result in updating existing requirements or uncovering new requirements.
To be launched	How to position product in market.
In production	Revisions to next release of requirements. Assess customer satisfaction with a product or service.

Observers may record or monitor focus group but should not participate. Analyze and report themes from focus group discussions. Can be in one location or through online sessions.

Focus groups are similar to brainstorming sessions. Differences are:

- Focus groups are typically more structured, and mandate a moderator.
- Brainstorming session's goal is to actively seek broad, creative, even exaggerated ideas.

Steps for focus group

Plan

1. Have clear and specific objectives.
2. Define plan – Time, location, logistics, participants, budget, outcomes etc.
3. Recruit participants based on focus group objectives.
4. Invite additional individuals to allow for non-attendance.
5. Create discussion guide - Provide a prepared script for moderator with specific questions and topics to be discussed. Include reminders to welcome participants, explain goals/objectives of session, how to conduct session and how to use feedback.

Assign moderator, and recorder. BA can fill role of either moderator or recorder.

Conduct

Follow a pre-planned script of specific issues, and ensure focus group objectives are met. Discussion should appear free-flowing and relatively unstructured to participants.

Close

Analyze participants' agreements, and disagreements, looks for trends and produces a summary report.

Strengths

- ✓ Saves time, and cost compared to conducting multiple individual interviews.
- ✓ Learning people's attitudes, experiences and desires.
- ✓ Encourages active participation and discussion.
- ✓ Online method works for stakeholders in multiple locations.

Limitations

- × Unwillingness to discuss sensitive or personal topics.
- × What people say is inconsistent with how they actually behave.
- × Homogeneous groups do not represent complete set of requirements.
- × Need skilled moderator.
- × Difficult to schedule.
- × Can't read body language in online focus groups.

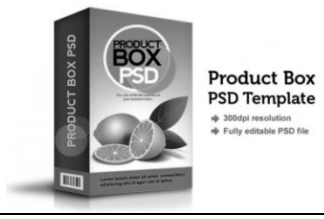
Collaborative Games

Uses game playing techniques to collaborate in developing common understanding of a problem or a solution. Involves strong visual or tactile (activities) elements such as moving sticky notes, writing on whiteboards, or drawing pictures. A neutral facilitator guides the game flow.

Steps are:

1. Define game purpose.
2. Play game.
    a. Opening step - Rules of the game and start generating ideas.
    b. Exploration step - Participants engage with one another and look for connections between their ideas, test those ideas and experiment with new ideas.
    c. Closing step – Assess ideas which are likely to be MOST productive.

Examples:

Game	Description	Objective
Product box	Construct a product box to be sold in a retail store. 	Identify features those drive interest in market place.
Affinity map	Write features on sticky notes, put them on a wall. Move noted to other features that are similar.	Identify related or similar features or themes.
Fishbowl	Divide participants in 2 groups. One group speaks about a topic. Other group listens intently and documents its observations.	Identify hidden assumptions or perspectives.

Strengths

- ✓ Identifies hidden assumptions or differences of opinions.
- ✓ Encourages creative thinking.
- ✓ Participants play a more active role.
- ✓ Exposes needs that aren't being met.

Limitations

- × Can be perceived as silly and unproductive.
- × Uncomfortable for reserved participants.
- × Time-consuming.
- × Can lead to a false confidence in conclusions reached.

Interviews

Most common form of elicitation technique where interviewers ask questions to stakeholders. Effective interviewers control discussions, understand needs from ALL stakeholders, probe deeper when needed and ensure completeness of answers. Interview success depends on:

Interviewer skills

- Domain understanding,
- Documentation skills,
- Experience and willingness.

Interviewee

- Readiness to provide relevant information,
- Clarity about interview goal,
- Rapport between interviewer and interviewee.

Define interview goal:

Consider business need and goals for each interview.

Identify potential interviewees: Along with PM, sponsors and other stakeholders, based on interview goal. Communicate interview goals clearly to interviewees.

Design interview questions: Based on interview goals, such as, data collections, research stakeholder's views of change, or proposed solution, develops a proposed solution, or build rapport with interviewees.

Use open-ended questions to encourage description which encourages thinking. Use closed questions to elicit a single response such as yes, no, or a specific number. Closed questions clarify or confirm a previous answer.

Organize interview questions based on priority and significance. Order questions in a flow such as general to specific, start to finish, and summary to detailed, interviewee's level of knowledge and subject of interview.

Organize logistics:

Decide location and mode of communication (in-person, phone, or online conferencing), recording needs etc. Send questions in advance ONLY when interviewee needs to collect information to prepare for interview.

Interview flow

Opening:

- Describe purpose,
- Confirm interviewees' roles,
- Address any initial concerns raised by interviewees,
- Explain how information from interview will be recorded, and shared with various stakeholders.

During interview

- Maintain focus on interview goals and predefined questions,
- Adapt based on information provided and non-verbal clues,
- Provide required information,
- Manage concerns raised by addressing them during interview or documenting them for follow-up,
- Practice active listening,
- Record discussions.

Closing interview includes:

- Ensure no areas are overlooked.
- Provide contact information to follow up with additional information.
- Summarize session.
- Considers multiple sessions if needed.
- Thank interviewees for their time.

Interview follow-up

Organize interview information and confirm results quickly.

Strengths

- ✓ Encourages participation.
- ✓ Builds rapport with stakeholders.
- ✓ Simple and direct technique.
- ✓ Allows observations of non-verbal behavior.
- ✓ Allows follow-up and probing questions.
- ✓ Interviewees express opinions which they may not do in public.

Limitations

- Needs significant time.
- Needs commitment and involvement of participants.
- Needs trained facilitator.
- Subject to interviewer's interpretation.
- Unintentionally leading the interviewee.

Observations

Elicit information by observing activities and their contexts.

Active/Noticeable observation– Ask questions during process. Interrupts work flow but helps in gaining a quick understanding.

Passive/Unnoticeable observation - Ask questions at end. Do not interrupt work.

Possible variations of observations are:

- Ask actor to perform specific task.
- Do actual work to get a hands-on feel - Limit this to activities appropriate for a non-expert to perform and whose results would not negatively impact business.
- Becoming temporary apprentice.
- Recording video and viewing it with observed person to get further details.

Steps for observation

- Have a clear and specific objective.

Prepare for observation

- Determine activities to observe.
- Identify sample users (e.g. Experts and novices or just experts) to observe.
- Prepare observation questions.

Conduct observation session

- Explain reason for observation. Assure participants that the sole purpose is to gather requirements and only to study the processes.
- Inform users to stop observation process if it interferes with their work.
- Attentively watch activity.
- Record what you see, time taken, quality of work, process anomalies etc.
- Ask questions while work is being performed or after observation session.

Confirm observation results

- Review notes and recorded data.
- Follow up to obtain further clarification.
- Share notes and data with participants to ease any concerns that they may have.
- Validated notes and data are collated with other related observations.
- Findings are summarized, analyzed and opportunities for improvement are communicated with stakeholders.

Strengths

- ✓ Documenting details about current processes.
- ✓ When project's objective is to enhance or change a current process.
- ✓ When stakeholders are unable to express requirements well.
- ✓ Provides realistic and practical insight into business processes.
- ✓ Productivity can be directly viewed and compared with standards or performance metrics.
- ✓ Identify non-documented informal tasks or work-around.
- ✓ Recommendations for improvement are based on evidence.

Limitations

- × Possible for existing processes only.
- × Time-consuming and can be disruptive.
- ✘ Participants may alter work practices when observed.
- ✘ Can't evaluate knowledge based activities.

Surveys and Questionnaire

Administers a set of written questions to stakeholders and SMEs. Can elicit information from many people, sometimes anonymously, in a relatively short period of time.

Steps for survey

- Define purpose and objective of survey.
- Identify target groups.
- Minimize respondent's time, max 10 minutes.
- Select sample group. Be aware of group's characteristics.
- Use information about background of target group to develop questions.
- Divide significantly diverse groups into smaller and homogeneous groups.
- Identify distribution and collection methods.
- Define target level and timeline for responses.
- Determine whether survey should be followed up with individual interviews.
- Write survey questions.
- Perform usability test on survey.
- All questions must be directed towards stated objectives.
- Arrange questions in an order which tells a story.
- Ensure questions are clear and concise, use familiar terminologies.

Avoid following:

- Double questions in a single question.
- Negative phrasing.
- Complex branching structures.
- Uncomfortable questions.
- Information restricted by regulations.

Distribute survey or questionnaire

- Communicate survey objectives, use of results and arrangements for confidentiality or anonymity.
- Select distribution means according to organizational policies, urgency of obtaining results, Level of security required and Geographic distribution of respondents.

Document survey results

- Collate responses.
- Analyze and summarize results.
- Report findings to sponsor.

Strengths

- ✓ Quick and relatively inexpensive.
- ✓ Does not require significant time from stakeholders.
- ✓ Works when stakeholders are not located in one location.
- ✓ Closed-ended surveys can be used in statistical analysis.
- ✓ Open-ended surveys can provide insights and opinions.

Limitations

- × Open-ended surveys require more analysis.
- × To achieve unbiased results, specialized skills in statistical sampling methods are required.
- × Questions may be left unanswered or answered incorrectly due to their ambiguity.
- × Follow up survey iterations may be required.
- × Response rates can be too low for statistical significance.

Document Analysis

Elicit business analysis information, by examining materials describing business environment or organizational assets. Document analysis helps in understanding context of a business need, or understanding how existing solutions are implemented based on business analysis information being explored, purpose, scope and topics to be researched are determined.

Data mining analyzes data to group it into categories, determine patterns and opportunities for change.

Background research comprises of reviewing materials like marketing studies, industry standards, guidelines etc. Document analysis about an existing solution may comprise of reviewing business rules, technical documentation, previous requirements, problem reports etc. to determine how existing solution works and reason for implementing it way it is.

Steps for conducting document analysis

1. Prepare

Consider content relevance, credibility, and ease with which content can be conveyed and understood.

2. Perform document review and analysis

- Conduct detailed review of each document's content and record relevant notes.
- Identify conflicting or duplicate notes.
- Note gaps in knowledge.

3. Record findings

- Check whether content and level of detail is appropriate.
- Create visual aids to improve understanding.

Strengths

- ✓ Analysis without creating new content.
- ✓ Useful when SMEs are not available.
- ✓ Determine what is current and what has changed.
- ✓ Results can be validated against results of other elicitation techniques. (A common theme)
- ✓ Findings can be presented in visual formats.

Limitations

- Limited to "AS-IS" perspective.
- May not be up-to-date or valid.
- Authors may not be available for clarification.
- Time-consuming.

Benchmarking and Market Analysis

Benchmarking compares org. Practices against best-in-class practices from competitors, government, industry associations or standards. Market analysis understands customers' needs, factors influencing purchase decisions, and studies competitors.

Benchmarking steps

- Identify areas to study.
- Identify benchmarking sources.
- Conduct survey / visit enterprises.
- Determine gaps between best and current practices.
- Develop proposals to implement gaps.

Market analysis

- Identify (target) customers and understand their preferences.
- Identify opportunities to increase stakeholder value.
- Identify competitors and investigate their operations.
- Look for trends in market, anticipate growth rate, and estimate potential profit.
- Gather market data and use existing resources such as company records, research studies, books to answer questions at hand.
- Determine trends and draw conclusions.
- Define appropriate business strategies.

Strengths

- ✓ Provides information about new methods, ideas, and tools to improve.
- ✓ Market analysis.
- ✓ Target specific groups and products to answer specific needs.
- ✓ Determine when to enter or exit a market.
- ✓ Expose weaknesses within a certain company or industry.
- ✓ Identify differences in product offerings and services available from competitors.

Limitations

- × Time-consuming and expensive.
- × Need expertise to conduct analyze gathered information.
- × Benchmarking can't produce innovative solutions.
- × Needs proper market segmentation.

Prototyping

Provides an early model of final result, widely used for product design. Details UI requirements and integrates them with other requirements such as use cases, scenarios, data, and business rules. Stakeholders often find prototyping to be a concrete means of identifying, describing and validating their interface needs. Prototypes can discover desired process flow and business rules.

2 common approaches to prototyping are:

Throw-away prototype	Seeks to quickly uncover and clarify interface requirements using simple tools, sometimes just paper and pencil. Focus on functionalities which are not easily elicited by other techniques, have conflicting viewpoints, or difficult to understand.
Evolutionary or Functional prototype	Extends initial interface requirements into a fully functioning system. Requires specialized prototyping tool or language and produces a working application.

Prototyping examples

Proof of principle / Concept	Check technical feasibility.
Form study prototype	Focuses on basic size, look and feel of product and not on functionality. (A phone – Screen size is between 4 inch to 6 inch, Tablets are between 7 inch to 10 inch)
Usability prototype	How users interact with system.
Visual prototype	Model to test visual aspects of solution (Look and feel-Mockup).
Functional Prototype / Working model	To test software functionality, qualities of system, workflow.

Prototyping methods

Story boarding	Visually and textually details sequence of activities.
Paper prototyping	Drafted using paper and pencil.
Workflow modeling	Sequence of operations performed.
Simulation	To demonstrate solutions or solution components.

Strengths

- ✓ Supports users who are more comfortable and effective at articulating their needs by using pictures.
- ✓ Early user interaction and feedback.
- ✓ Throw-away prototypes are inexpensive to quickly uncover and confirm a variety of requirements.
- ✓ Proof of concept (PoC) prototypes demonstrate technical feasibility.

Limitations

- × Assumptions about underlying technology need to be made for functional prototype.
- × Users may develop unrealistic expectations wrt delivered system's performance, completion date and usability.
- × Users may focus on design specifications than requirements. This can constrain solution design.
- × Developers try to provide a UI that precisely matches prototype, even if superior technology exists.

3.3 Requirements Life Cycle Management

Glossary

Comprises of key terms relevant to a domain. Contains definitions and synonyms. Needs to be organized and be accessible to all stakeholders. Include terms when:

1. Unique to a domain or has multiple definitions.
2. Commonly used meaning is different from those which is used within domain or have chance for misunderstanding.

Define glossaries in early stages of project to enhance understanding and transfer knowledge. Identify person responsible for maintaining the glossary. Limit glossary editing to specific stakeholders ONLY.

Strengths

- ✓ Promotes communication and common understanding of business domain.
- ✓ Encourages consistency as single reference source for business terms.
- ✓ Simplifies writing and maintenance of business analysis information.

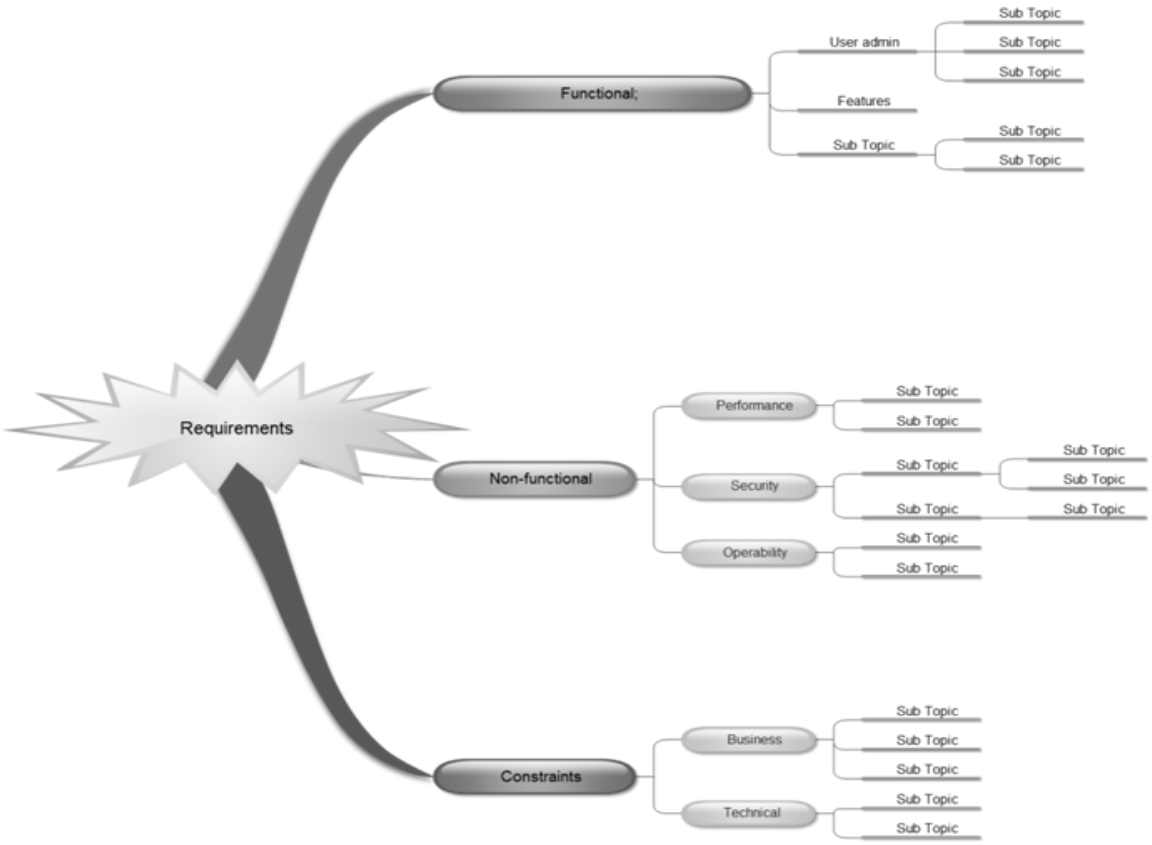
Limitations

- × Requires dedicated persons to maintain.
- × Challenging to get stakeholder agreement on a single definition for a term.

Mind Map

Articulates and captures ideas in a non-linear (tree) structure. Ideas are grouped as topics, sub-topics, further sub-sub-topics.

Mind maps use words, images, color, and connections to structure thoughts, ideas, and information.



Strengths

- ✓ Collaboration and communication tool.
- ✓ Structures complex thoughts, ideas, and information.
- ✓ Facilitate understanding and decision making.
- ✓ Enable creative problem solving.

Limitations

- × Can be misused as a brainstorming tool.
- × Can become complex with details.

Backlog Management

Backlogs record, track and prioritize remaining work items. Backlog management is a planned approach to manage remaining work for project. In managed backlogs, items at top have highest business value and priority. Backlog items can be user stories, use cases, defects, CRs, risks etc. Use multi-phased prioritization approach to prioritize backlog items (Initially prioritize epics, then stories).

Describe high priority backlog items in detail with an accurate estimate of size and complexity. Do minimal amount of work on low priority items; just enough to be able to understand the work involved to complete it.

Managing changes to backlog

- Add and re-order backlog for new or changed items.
- Remove completed items or decided to be removed.
- Removed items can be re-added to backlog.

Strengths

✓ Prioritization for changing needs.
✓ Elaborate and estimate in detail ONLY priority items.
✓ Tells what items need to be worked on and what items can wait.

Limitations

✗ Large backlogs can be difficult to manage.
✘ Needs experience to break down items for accurate estimate.
✘ Lack of details can result in lost information over time.

Business Rules Analysis

Business policies dictate actions of an enterprise and people in it by broadly controlling, influencing, or regulating them. Business rules serves as a criterion for guiding behavior and making decisions in a specific, testable manner.

Business rules analysis identifies, expresses, validates, refines, and organizes business rules. Rules may be explicit or tacit (implicit). Requires a defined glossary. Usually expressed as decision tables or decision trees (flow chart).

Business rules should be:

- Use business terminology for validation.
- Documented independently from enforcement.
- Stated in declarative format at atomic level.
- Maintained in a manner enabling monitoring and adaption as they change.

Definitional rules

Represent operational knowledge of organization. Prescribe how information may be derived, inferred or calculated. For example, Gross margin = Revenue - Variable cost of production. These rules can be misapplied but cannot be violated.

Behavioral rules

Behavioral rules guide actions of stakeholders which may be violated. Take precautions in the solutions to prevent violations. Example, "No customer should be provided a credit period more than 30 days."

Strengths

- ✓ An enterprise-wide rules engine can assist in quick implementation of rules changes.
- ✓ Centralized rules repository enables reuse.
- ✓ Allows organizations to make changes to policies without changing processes.

Limitations

- × When combined, rules can be lengthy, inconsistent or produce unanticipated results.
- × Poorly defined vocabulary can result in inaccurate or contradictory business rules.

Lessons Learned (Retrospective)

Discusses and documents successes, failures and improvement recommendations for future phases or projects. Can include any format or venue that is acceptable to key stakeholders. Can be formal facilitated meetings or informal.

Review the following:

- Business analysis activities or deliverables,
- Final solution, service, or product,
- Automation introduced or eliminated,
- Impact to organizational processes,
- Performance expectations and results,
- Root causes impacting performance results.

Strengths

- ✓ Identifies areas of improvement.
- ✓ Assists in building team morale.
- ✓ Reinforces positive experiences.
- ✓ Reduces risks for future projects.
- ✓ Recognizes strengths or shortcomings.

Limitations

- × Can become blame game.
- × Lack of willingness to discuss and document problems.
- × Facilitation required to ensure discussions remain focused on solutions and improvement opportunities.

Prioritization

Provides a framework for stakeholder decisions to understand relative importance of requirements. Importance may be based on value, risk, difficulty of implementation etc.

Grouping	Classify into high, medium, or low priority.
Ranking	Rank orders from most to least important. Rank is unique.
Time boxing/ Budgeting	Based on fixed resources, time (duration) or budget (a fixed amount of money). Used when solution approach has been determined.
Negotiation	Establishing a consensus among stakeholders wrt requirements' priority.

Strengths

- ✓ Helps in consensus building and trade-offs.
- ✓ Ensures maximum solution value.
- ✓ Assists in meeting initiative timelines.

Limitations

- × Stakeholders often avoid difficult choices and do not make trade-offs.
- × Solution team may try to influence prioritization by over estimating complexity of certain requirements.
- × Lack of defined metrics may make it subjective.

Reviews

Communicate, verify and validate work products, formally or informally.
Communicate review objectives in advance to participants.

Typical objectives can be:

- Remove defects
- Check conformity to specifications or standards
- Check completeness
- Quality measurement
- Reach consensus on approach or solution
- Issue resolution
- Alternative exploration
- Education of reviewers

Formal techniques

Inspection (Most stringent process)	Remove defects and create a high-quality product. Mandates prior self-review and distinct roles.
Formal walkthrough / Team review	Uses individual reviews and team consolidation.
Single issue / Technical review	Focuses on either one issue or a standard.

Informal techniques

Informal walkthrough	Getting feedback on draft work product.
Desk check	Independent reviewers provide feedback at their desks.
Pass around	Multiple reviewers provide feedback.
Ad hoc	Informal review or assistance from a peer.