

Certified Business Analyst Handbook – Foundation Level Exam Preparation



Version 1.0

Copyright Notice

This document may be copied in its entirety, or extracts made, if the source is acknowledged.

Copyright Notice © International Qualifications Board for Business Analysis (hereinafter called IQBBA®)

IQBBA is a registered trademark of GASQ Service GmbH.

The authors for version 2.0, released in October 2017 hereby provide their copyright rights to IQBBA for this 2019 version

All rights reserved.

Table of Contents

1. Fundamentals of Business Analysis.....	8
1.1 Terms and Definitions.....	8
1.2 Role of the Business Analyst.....	12
1.3 Overview on the Business Analysis Activities	14
1.4 Competencies.....	16
1.5 Sample Exam Questions	20
1.5.1 Question 1.1	20
1.5.2 Question 1.2	20
1.5.3 Question 1.3	20
1.6 Answers and Justifications	20
2. Strategy Definition	22
2.1 Introduction.....	22
2.2 Internal Analysis	22
2.2.1 Vision, Mission and Business Goals	22
2.2.2 Business Process Analysis.....	24
2.2.3 The Concept of Business Needs	27
2.2.4 Gap Analysis.....	28
2.3 External Analysis	29
2.3.1 Market Research and Analysis.....	29
2.3.2 User Needs Identification	31
2.4 Stakeholder Identification	32
2.5 Solution Proposal and Analysis.....	35
2.6 Project Initiation	40
2.7 Sample Exam Questions	41
2.7.1 Question 2.1	41
2.7.2 Question 2.2	41
2.7.3 Question 2.3	41
2.7.4 Question 2.4	42
2.8 Answers and Justifications	43
3. Management of Business Analysis Process	44
3.1 Introduction.....	44
3.2 Approaches to Business Analysis	44
3.2.1 Traditional vs. Agile Environments	45
3.2.2 Interdisciplinary Approach	50
3.3 Communication.....	53
3.4 Products.....	57

3.5 Tools and Techniques	60
3.5.1 Tools and Techniques	60
3.5.2 Notations.....	62
3.6 Sample Exam Questions	63
3.6.1 Question 3.1	63
3.6.2 Question 3.2	63
3.6.3 Question 3.3	63
3.6.4 Question 3.4	64
3.6.5 Question 3.5	64
3.6.6 Question 3.6	64
3.6.7 Question 3.7	65
3.6.8 Question 3.8	65
3.6.9 Question 3.9	65
3.6.10 Question 3.10	65
3.6.11 Question 3.11	66
3.6.12 Question 3.12	66
3.7 Answers and Justifications	66
4. Requirements Engineering in Business Analysis	70
4.1 Requirements Development.....	70
4.1.1 Introduction	70
4.1.2 Elicitation	71
Questionnaire	72
Interview	73
Persona and user story	73
Use case.....	74
User scenario	74
Self-recording	75
Consultancy	75
Analysis of existing business documents	75
Brainstorming	76
Field observation	78
Apprenticing.....	79
Workshops with stakeholders.....	79
4.1.3 Analysis and Modeling.....	80
Requirements analysis	80
Constraints and assumptions	83
Conflict management.....	83

Modeling	85
4.1.4 Specification	90
4.1.5 Verification and Validation	98
4.2 Requirements Management	101
4.2.1 Introduction	101
4.2.2 Information Architecture	101
4.2.3 Requirements Communication	104
4.2.4 Traceability	106
4.2.5 Configuration Management	110
Configuration Management	110
Change Management	112
4.2.6 Solution Scope Management	114
4.2.7 Quality Assurance	115
4.3 Tools and Techniques	116
4.3.1 Tools and Techniques	116
Brainstorming, Persona, User story, Use case, User scenario, Survey (questionnaire), Workshop	116
Prototyping, Decomposition, Story mapping	116
5 Whys	116
4.3.2 Notations	116
4.4 Sample Exam Questions	120
4.4.1 Question 4.1	120
4.4.2 Question 4.2	120
4.4.3 Question 4.3	120
4.4.4 Question 4.4	121
4.4.5 Question 4.5	121
4.4.6 Question 4.6	121
4.4.7 Question 4.7	121
4.4.8 Question 4.8	122
4.4.9 Question 4.9	122
4.4.10 Question 4.10	123
4.4.11 Question 4.11	123
4.4.12 Question 4.12	123
4.4.13 Question 4.13	124
4.4.14 Question 4.14	124
4.4.15 Question 4.15	124
4.4.16 Question 4.16	125
4.4.17 Question 4.17	125

4.4.18 Question 4.18	125
4.5 Answers and Justifications	126
5. Solution Evaluation and Optimization.....	130
5.1 Evaluation.....	130
5.2 Optimization.....	133
5.3 Sample Exam Questions	139
5.3.1 Question 5.1	139
5.3.2 Question 5.2	139
5.3.3 Question 5.3	140
5.4 Answers and Justifications	140
6. References	141
5.5 Books and Other Publications	141
5.6 Standards	143
7. Figures.....	144
8. Tables.....	148

Introduction to this Handbook

Purpose and scope

This handbook serves as a guideline for preparing for IQBBA certification.

The document reuses the IQBBA Foundation Level Syllabus version 2019 and extends its content with examples and sample exam questions (IQBBA FL Sample Exam Set Version 1.0, 15 November 2018).

Sample exam questions

Exam questions presented in this document were never a part of the real examination. They were created for educational purposes and should be considered as a help in exam preparation. The questions are documented in the official IQBBA document: IQBBA FL Sample Exam Set Version 1.0, 15 November 2018

Examination

The examination to become a Certified Business Analyst is based on the IQBBA Foundation Level syllabus. All sections of the syllabus are subject to examination. The examination questions are not necessarily confined to an individual section. A single question may refer to information in several sections.

The full examination areas are defined in the Learning Objectives of the syllabus. Consequently, the Learning Objectives provide the framework for the exams.

The format of the examination is Multiple Choice with a single correct option (one correct answer out of four options).

The exam set contains 40 questions.

Examinations can be taken after having attended accredited courses, or in an open examination without a previous course. You will find detailed information regarding examination times on the GASQ website (www.gasq.org) and on the IQBBA website (www.IQBBA.org).

1. Fundamentals of Business Analysis

1.1 Terms and Definitions

The BABOK Guide 2.0 defined Business Analysis as the set of tasks, knowledge, tools and techniques required to identify business needs and determine solutions to business problems [BABOK]. The latest version of BABOK Guide, 3.0, updates the definition to highlight the aspect of value.

Business Analysis – the practice of enabling change in an enterprise by defining needs and recommending solutions that deliver value to stakeholders. Business Analysis enables an enterprise to articulate needs and the rationale for change, and to design and describe solutions that can deliver value [BABOK].

Specific activities of Business Analysis are collected within knowledge areas (KA). IQBBA proposes the following KAs:

- Strategy definition
- Management of Business Analysis process
- Requirements Engineering in Business Analysis
- Solution evaluation and optimization

These KAs are supported by specific methods, tools, and techniques, and require specific skills and competencies.

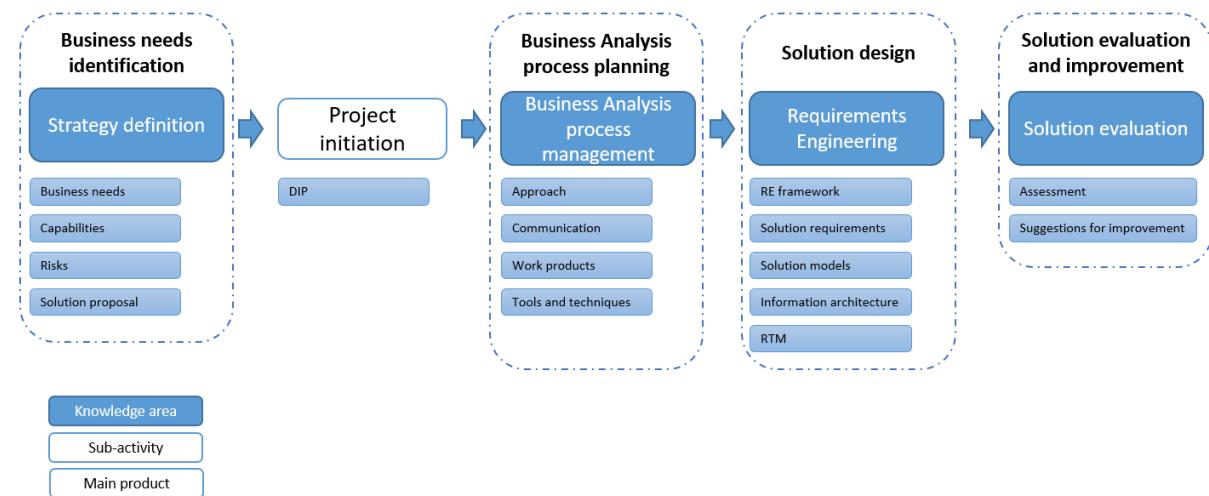


Figure 1 Overview of Business Analysis areas

The activities of the Business Analyst may vary depending on his role and scope of responsibility. A Business Analyst working at the organization level is typically responsible for collecting insights and business needs and/or opportunities from the business environment (customers, competitors, organization's assets) and proposing new, often innovative, business solutions. A Business Analyst working at the program/project level will instead be in charge of delivering the agreed business solution – in this context the role can be compared to the Product Owner in Agile.

Business Analysis tasks may differ depending on the product life cycle. During initial phases of a product life cycle, a Business Analyst is typically responsible for establishing business needs and proposing a solution, later – during solution development – a BA's activities are concerned with helping the team to build the right solution. When the product is released and working in production, typical BA tasks include monitoring and improving its efficiency, and introducing changes where necessary.

Solution – the implementation of the requirement or a design idea which, if implemented, is expected to lead to the partial or full satisfaction of a set of attribute requirements; to solve a (defined) problem [Tgilb].

Sample solutions for delivering value may include:

- Changes to the organization culture or structure
- Improvements to the business process
- Development of business products or services
- Development of solutions (also software) supporting business activities

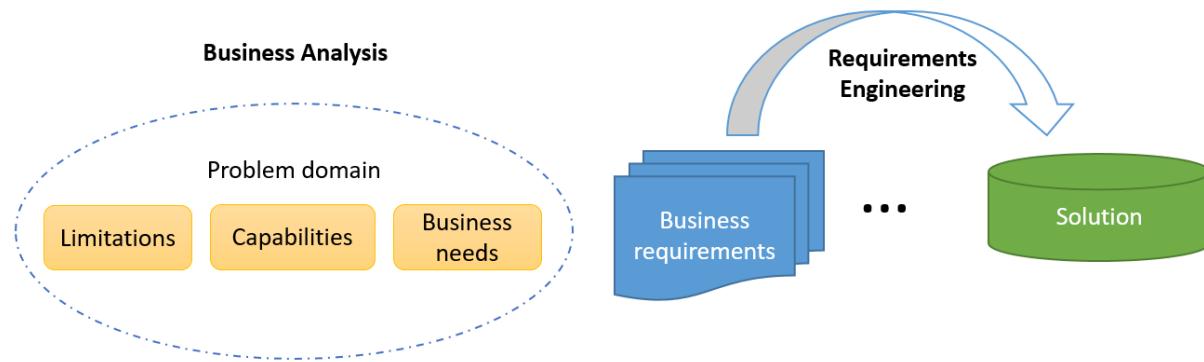


Figure 2 Business Analysis and Requirements Engineering

Solutions are built based on requirements. A requirement can be defined as the documented representation of a need of specific stakeholders or organization, bringing a value to the business [BABOK][IEEE 610].

Requirement:

- (1) A condition or capability needed by a user to solve a problem or achieve an objective.
- (2) A condition or capability that must be met or possessed by a system or system component to satisfy a contract, standard, specification, or other formally imposed documents.
- (3) A documented representation of a condition or capability as in (1) or (2) [IEEE 610].

Requirements are the foundation of solution scope and design. Requirements are typically classified into categories to allow better management. BABOK Guide proposes the following classification, representing the abstraction levels for requirements:

- Business requirements
- Stakeholder's requirements
- Transition requirements
- Solution requirements
 - Functional requirements
 - Non-functional requirements

Business requirement – a high level type of requirement expressing needs of the business.

Functional requirement – a requirement that specifies a function that a component or system must perform [IEEE 610].

Non-functional requirement – a requirement that does not relate to functionality, but to attributes such as reliability, efficiency, usability, maintainability and portability.

Meaning of different types of requirements

Business requirements – the highest level of requirements, developed during Strategy Definition activities. Business requirements define the high-level goals, objectives and needs of the organization.

Stakeholder requirements – elaboration of business requirements, defining the needs of stakeholders and how they will interact with a solution.

Solution requirements – the most detailed type of requirements describing the solution characteristics that will be needed to meet the higher-level business and stakeholder requirements.

Functional requirements – the capabilities that a product must provide to its users

Non-functional requirements – quality attributes, design and implementation constraints and external interfaces that must be possessed by the product

Transition requirements – the solution capabilities required to transition from the current to the future state and are no longer needed once the transition is complete

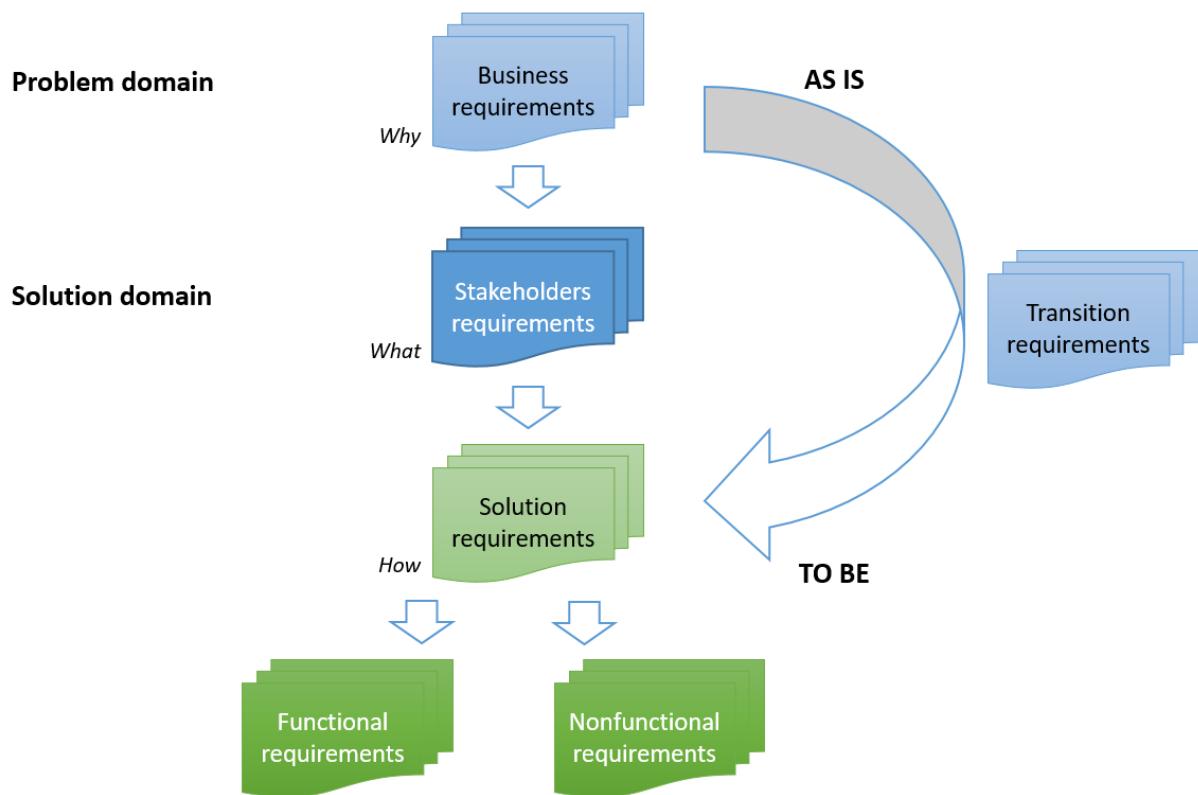


Figure 3 Levels of requirements

Business Requirements

WHAT the business is trying to achieve

WHY a project should be undertaken or a solution implemented

Metrics that will be used to measure success

Stakeholder Requirements

WHAT each specific stakeholder/group needs from a solution

Use cases of a solution

Bridge between business requirements and solution requirements

Solution Requirements

WHAT characteristics the solution will support

HOW are the stakeholders' needs are satisfied

Examples

Business requirement	Reduce errors in processing customer orders by 30% by the end of the next year
Stakeholder requirements	Create new order View order history Check order status
Solution requirements	
Functional requirements	The system should display customer order history The system should allow the customer to create new order
Nonfunctional requirements	The system should support up to 300 concurrent users The system should be operating on Chrome xx
Transition requirements	Historical orders should be transferred to the new system

Table 1 Examples of requirements

IQBBA extends the above classification to add information supporting solution design and requirements management:

- Business constraints
- Solution constraints
- Business assumptions
- Technical assumptions

Constraint – a statement of restriction that modifies a requirement or set of requirements by limiting the range of acceptable solutions.

Business constraint – the limitations on the project's flexibility to implement the requested solution [BABOK].

Solution constraint – any restrictions that are related to the design and architecture of the solution such as hardware and software platforms, programming language or technology, and software that must be used [BABOK].

Assumption – an influencing factor or condition that is believed to be true at given moment but has not been confirmed to be accurate.

Business assumption – an assumption related to the business domain or development/maintenance conditions.

Technical assumption – an assumption related to technical aspects of the planned solution.

When working with different levels of abstraction of requirements, it is important to maintain traceability (see: 4.2.4 Traceability) supporting scope management, coverage analysis and change impact analysis.

Questions

Recall the definition of a requirement, Business Analysis, and solution

Explain how requirements can be classified

Explain the role of Business Analysis in an organization, program and project

Provide examples of objectives of Business Analysis in the different phases of a product life cycle

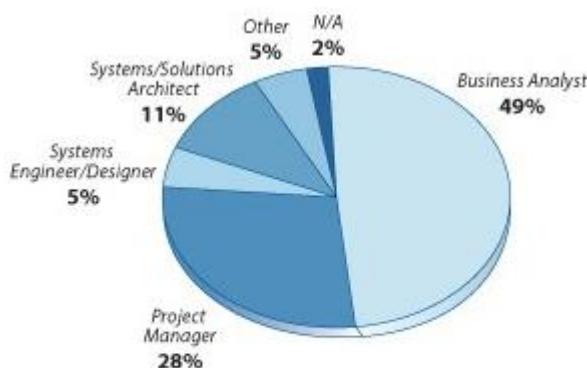
Recall main knowledge areas in Business Analysis

1.2 Role of the Business Analyst

The Business Analyst (BA) is a person responsible for identifying business needs of stakeholders and for determining solutions to business problems with the aim of introducing change which adds value to the business. As mentioned in BABOK Guide, the Business Analyst is someone who “helps organization change”.

Business Analyst – a person responsible for identifying the business needs of their clients and stakeholders, to determine solutions to business problems [BABOK].

The Business Analyst often acts as a bridge between business stakeholders and the solution delivery team, identifying, negotiating, and achieving a consensus between the needs of the various representative individuals and groups.



Source: ESI International survey of 2,000 business professionals, 2005.

Figure 4 Alternative roles for a Business Analyst

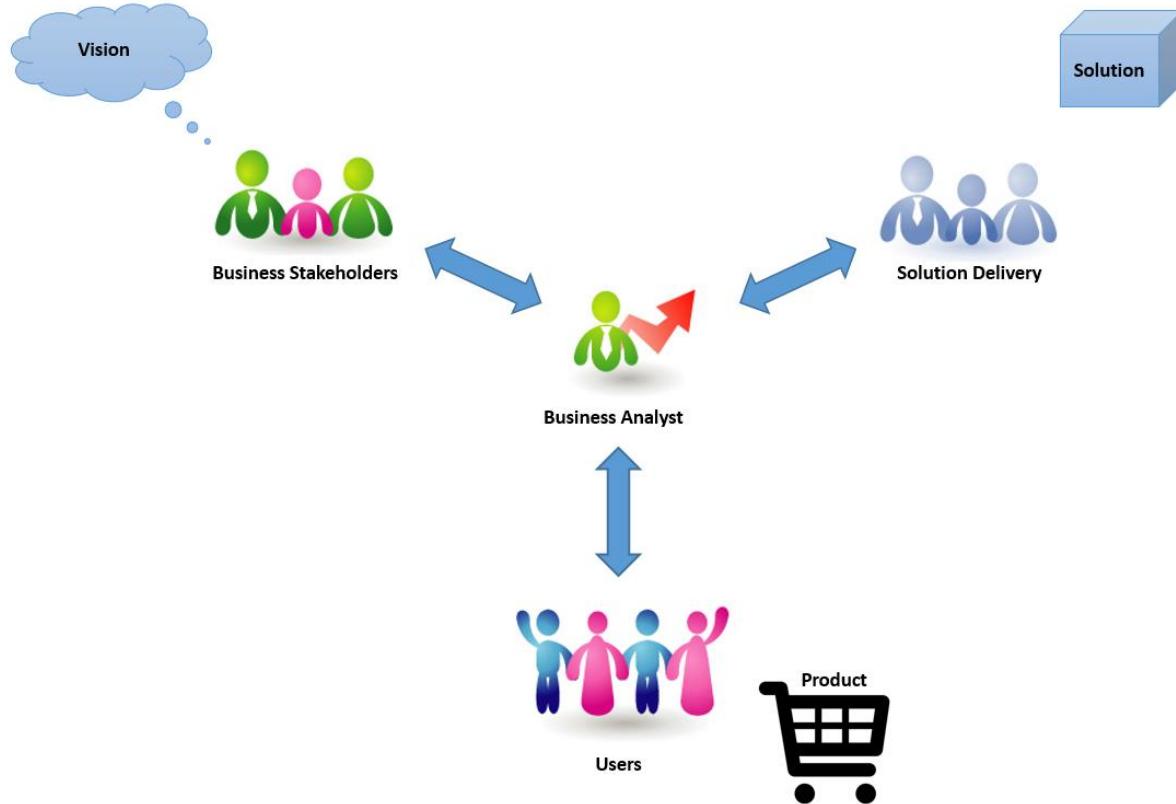


Figure 5 The role of a Business Analyst

As one of the main work products of Business Analysis are business needs and business requirements, BAs play an important role in the success of both organization-level programs and in specific change or development work.

Problems with requirements can cause change or development work to fail. In most cases these problems are caused by poor or incorrectly conducted Business Analysis (especially Requirements Engineering, a part of the Business Analysis knowledge area).

Common pitfalls in Business Analysis include but are not restricted to:

- Unclear business objectives of the initiative
- Missing business requirements, often the result of lack of analysis of the stakeholders
- Instability of the requirements (frequent and uncontrolled changes in requirements)
- Poor translation of the business needs to requirements (incomplete, inconsistent, or not measurable requirements)
- Communication problems and knowledge barriers

The above issues may result in problems later, such as during solution proposal scope definition, solution realization planning, implementation or testing. Unclear business requirements, or a low quality business design of the solution, can lead to confusion and to questions regarding the intended business solution. If no actions are taken to correct this state, the risk of the failure increases.

The impact of improper Business Analysis on change or development work is already known, but still very often neglected.

The major reasons for neglecting Business Analysis are time pressure, focus on fast results without proper analysis of the needs, opportunities, and risk, and characterizing Business Analysis processes as a cost, not an added value.

Possible consequences of neglecting Business Analysis

Some business processes within an organization are not known or understood, which may lead to problems with defining the right business problems and thereby the business requirements

Business processes and artifacts are not covered by requirements or are described incompletely

All key stakeholders are not identified

Business goals or needs are not identified causing the designed solution to fail to meet the organization's needs and not achieve the business goals

Table 2 Consequences of neglecting Business Analysis

Mature organizations normally have defined a generic approach to Business Analysis. This approach covers definition of activities together with their goals, the tools and techniques supporting specific tasks, and the roles and responsibilities of people involved in the BA's work and products. It is important to remember that different environments and approaches to management or solution development and/or maintenance may require specific approaches to Business Analysis. Therefore the BA must work together with stakeholders to determine which tasks and techniques defined in the general Business Analysis process are appropriate for the specific situation.

Questions

Explain the role and responsibilities of a Business Analyst in terms of an organization and a project

Provide examples of common pitfalls in Business Analysis

Provide examples of cooperation between a Business Analyst and other roles within an organization and the program/project's stakeholders

Provide examples of the consequences of neglecting Business Analysis

1.3 Overview on the Business Analysis Activities

Business Analysis covers the following major activities:

- Strategy definition
 - Internal analysis
 - External analysis
 - Business need definition
 - Gap analysis
 - Solution proposal (including feasibility analysis)
 - Solution delivery or maintenance program/project initiation
- Management of Business Analysis processes
 - Business Analysis process definition (for organization, program, project or other form of change development or implementation works, etc.)
 - Communication planning
 - Work products management
 - Tools and techniques selection
- Requirements Engineering in Business Analysis
 - Requirement Management
 - Requirements communication
 - Requirements tracing
 - Requirements configuration and change management
 - Requirements quality assurance
 - Requirements Development
 - Requirements elicitation including stakeholders and/or product requirements development

- Requirements analysis and specification
- Solution modeling
- Requirements validation and verification
- Solution evaluation and optimization
 - Assessing the solution options (proposals)
 - Evaluating performance of the solution
 - Solution/business process optimization

These activities produce different work products (artifacts). Some of them, such as use cases, requirements and design documents, describe the function, logic, or design of solution, while others are concerned with the delivery process itself, such as, business cases, plans and risk assessments. It is necessary to ensure that all key artifacts are under version control and correctly traced to their origin.

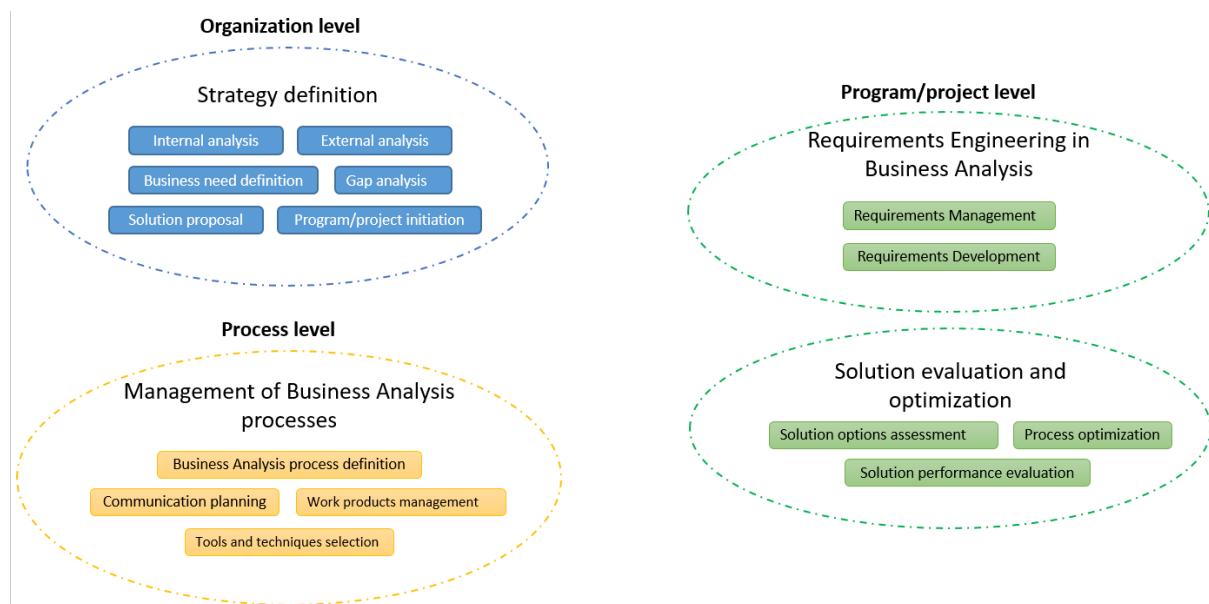


Figure 6 Business Analysis areas

Some of Business Analysis work products include:

- Business goals
- Business needs
- Business requirements
- List of risks
- List of stakeholders
- Limitations (constraints) and assumptions
- Business process definition

Product	Example
Business goals	Generate 25% of annual revenues from new products Reduce inventory cost by 5% by the end of 2020
Business needs	Need more new products Need increased product portfolio visibility Need information about current inventory costs
Limitations	New process must be introduced before end of 2020

Assumptions

New process will not require any special user training

Table 3 Sample Business Analysis products

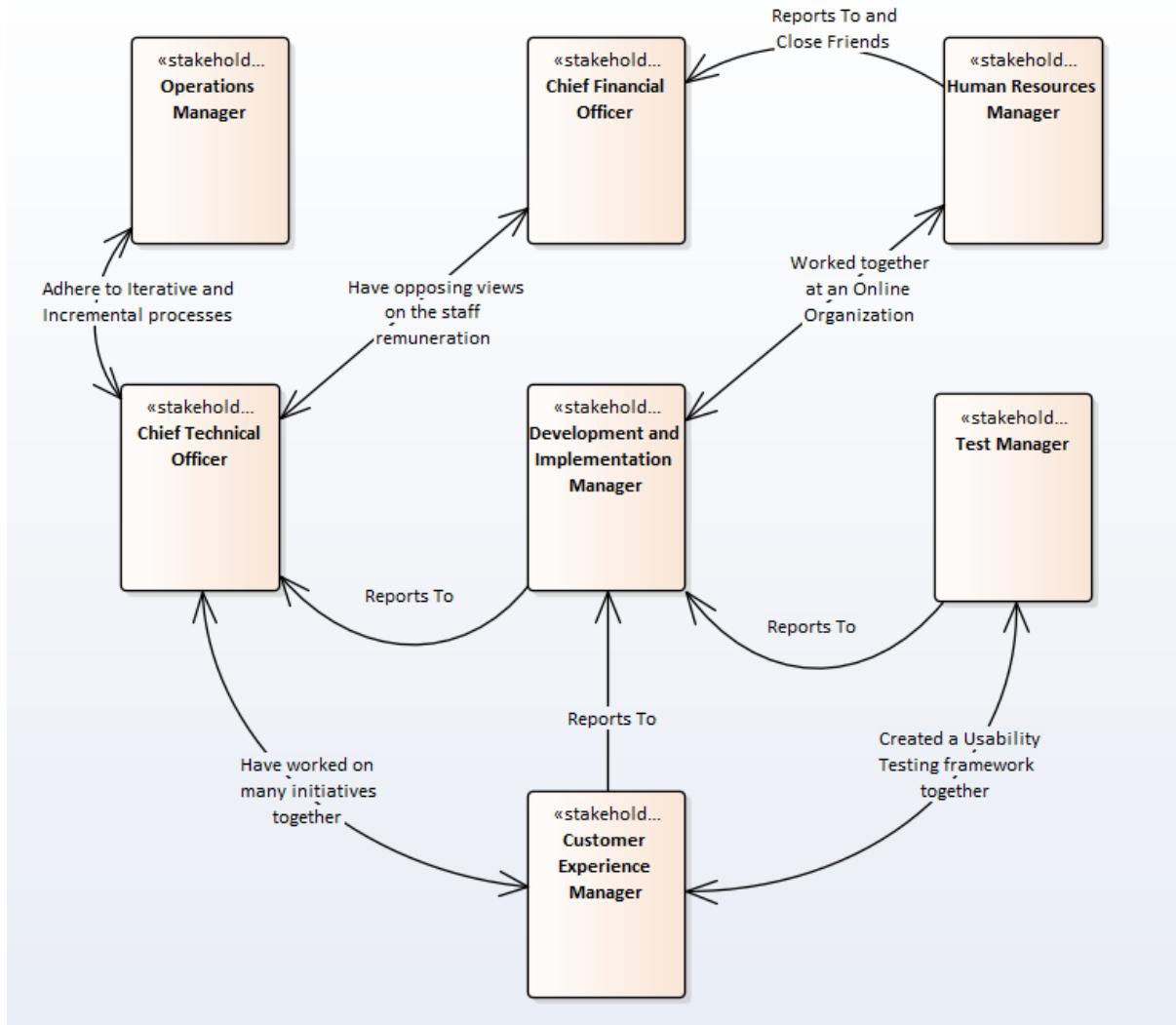


Figure 7 Sample stakeholders map with communication direction [SparksEA]

A more complete list of work products can be found in 3.4 Products.

Questions

Recall the main activities of Business Analysis

Provide examples of Business Analysis work products

1.4 Competencies

The main goal of a BA is to provide business solutions which add value to the business. To be able to provide a business solution that provides a measurable benefit to the organization, the Business

Analyst must have knowledge of the business domain. Understanding the business, its rules, processes, risks and context are necessary conditions for effective and valuable Business Analysis.

Domain knowledge is not a replacement for Business Analysis methods. Both domain knowledge and methods knowledge are needed to be a good Business Analyst. Related to domain knowledge, the Business Analyst must also understand the domain environment.

The Business Analyst needs the following competencies to effectively understand and work within the defined environment:

- Analytical thinking and problem-solving skills
- Behavioral characteristics
- Business knowledge
- Basic technical knowledge
- Interaction skills
- Communication skills
- Negotiation skills and diplomacy
- Some level of managerial skills
- Creativity

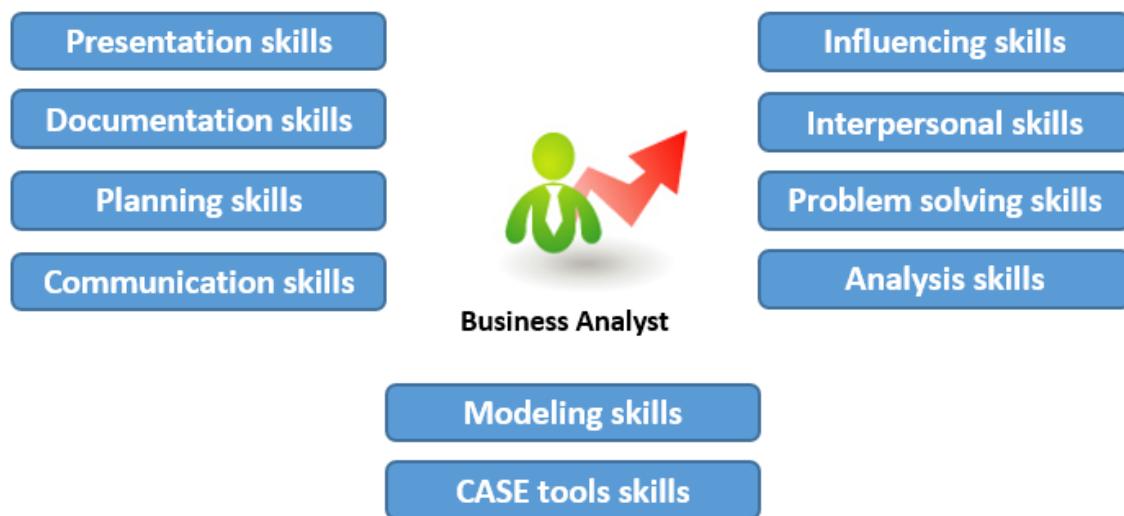


Figure 8 Sample Business Analysis skills

Communication skills are particularly important for the success of Business Analyst. Typically they include:

- Ability to communicate with all levels of management
- Ability to communicate with stakeholders of various knowledge levels
- Precision in articulating ideas and thoughts
- Ability to relate with line workers
- Good technical writing skills
- Strong communication skills in all forms (verbal, non-verbal, written)

In addition, the Business Analyst should be an effective facilitator to enable groups to work cooperatively and effectively [Bens].

Facilitator – a person or group who assists others in carrying out a work process, such as quality control or setting objectives; by virtue of their being especially trained, qualified, and knowledgeable in that process [TGilb].

In the context of Business Analysis, facilitation requires the following skills:

- Leading
- Solving issues
- Building team and community
- Empowering people
- Resolving conflicts
- Transforming (introducing change)
- Evoking wise-democracy
- Building personal effectiveness

Effective Business Analysts use facilitation to support working with a group of stakeholders to elicit, document, analyze, verify and achieve consensus on requirements.

A good facilitator demonstrates the following competencies:

- Connects with the group quickly
- Communicates and listens well
- Processes ideas from people
- Shows a natural interest
- Negotiates between parties
- Understands group dynamics and empowers the group
- Focuses on the business not on personal solutions
- Helps the group to listen and draw logical conclusions

Some of the tools used in facilitation include:

- Gap analysis
- Flipcharts
- Checklists
- Multi-voting
- Root cause analysis
- Brainstorming
- Focus group framework

Many Business Analysts lack formal training and experience as facilitators, and sometimes have difficulty running a facilitation session. For Business Analysis, facilitation techniques focus on the skills necessary to elicit and analyze business needs, requirements, and stakeholders' expectations. Knowing what to ask, how to ask, and how to help the stakeholders discover their requirements, are all critical skills for the Business Analyst role.

Within the Business Analyst role, there can be a defined career path that reflects the progress of developing skills and competencies. Some sample classifications include:

Based on the specialization profile:

- Generalist practitioner
- Specialist practitioner [IIBA Competency].

Focus Context Within the Organization			
	Project/Process/Service Continuous Improvement	Department/Business Function Transition	Enterprise
Role Category			
Generalist	Business Analyst Management Consultant BA Project Lead	Business Consultant Business Relationship Manager Management Consultant Portfolio Manager BA Program Lead	Business Architect Business Relationship Manager Strategic Business Analyst Management Consultant Strategic Planner BA Practice Leader
Specialist	Agile Business Analyst Application Domain Expert (SME) Business Intelligence Analyst Business Rules Analyst Business Systems Analyst Business Process Analyst Data Analyst Product Owner Requirements Engineer/Manager Service Request Analyst Systems Analyst	Business Intelligence Analyst Business Domain Expert (SME) Functional Business Analyst Process Owner/Steward Product Manager (Marketing) Service Owner Systems/Solution Architect Functional Business Analyst	Industry Domain Expert (SME) IT Strategist Process Architect
Hybrid	BA/PM BA/Tester BA/Developer BA/User Experience Database Analyst Information Architect Product Manager (Marketing) Programmer/Analyst Project Manager QA Analyst Usability/UXP	Middle-to-Senior Management Product Manager (Marketing) Solutions Architect Systems Design Analyst	CXO Enterprise Architect

Figure 9 Business Analysis roles (IIBA Competency Model V3)

Based on the level of proficiency:

- Junior BA
- Intermediate BA
- Senior BA

Based on the scope of responsibilities:

- Enterprise BA
- Program BA
- Project BA

Questions

Recall the main competencies of a Business Analyst

Explain why communication skills are important in the profession of Business Analyst

Recall main competencies of a good facilitator

Explain how facilitation can help in Business Analysis

1.5 Sample Exam Questions

1.5.1 Question 1.1

LO-1.1.1 Know the key concepts of Business Analysis (K1)

Question

Which of the following types of requirements would be the most appropriate to express a need of a user representative regarding usability of the planned solution?

Answer set

- [A] Business requirements
- [B] Stakeholder's requirements
- [C] Transition requirements
- [D] Solution requirements

1.5.2 Question 1.2

LO-1.2.1 Explain the role and responsibilities of a Business Analyst in terms of an organization and a project (K2)

Question

Which of the following statements most likely is true?

Answer set

- [A] The Business Analyst is one of the key stakeholders in an organization or a project as he/she defines the business needs and goals to be satisfied by a solution.
- [B] The main responsibilities of a Business Analyst include detailing business needs into solution/system requirements.
- [C] One of main objectives of a Business Analyst is defining and introducing change which adds value to the business.
- [D] The Business Analyst acts as a single point of contact between business stakeholders and the solution delivery team communicating business requirements to the team and representing the team back to the stakeholders.

1.5.3 Question 1.3

LO-1.2.2 Understand how the Business Analyst interfaces with other roles within an organization and program/project's stakeholders (K2)

Question

Which of the following statements is certainly true?

Answer set

- [A] One of main tasks of a Business Analyst is using the business requirements to define the project plan, including schedule and budget.
- [B] Business Analysis activities include connecting stakeholders to help them to define needs and requirements related to planned systems.
- [C] One of the main activities of a Business Analyst is to understand the AS-IS state of the organization with the aim of changing it to constantly rework the process.
- [D] The Business Analyst acts as a bridge between different stakeholders in helping to establish business needs and propose solutions adding value to the business.

1.6 Answers and Justifications

Question 1.1 – answer B

Justification

B – Correct. This refers to the need perceived by a specific stakeholder (user representative)

A – Incorrect. Business requirements express needs of a business, not a specific stakeholder.

C and D – Incorrect. These refer to the solution itself.

Question 1.2 – answer C

Justification

C – Correct. This is the main task of BA, as explained in the IQBBA syllabus, section 1.2.

A – Incorrect. The term “stakeholder” refers to a project/initiative, therefore using it in the context of an organization is not correct.

B – Incorrect. The main task of a BA is “identifying the business needs of their clients and stakeholders, to determine solutions to business problems” detailing business requirements into solution requirements is not considered as a key activity.

C – Incorrect. This statement would be true only in some cases (like Agile methods), as it refers to the role of Product Owner.

Question 1.3 – answer D

Justification

D – Correct – as explained in the IQBBA syllabus, section 1.2.

A – Incorrect. It is more about project manager’s responsibilities.

B – Incorrect. As stated in the IQBBA syllabus, section 1.2., the BA “is a person responsible for identifying business needs of stakeholders and for determining solutions to business problems with the aim of introducing change which adds value to the business.” BA should therefore help to define/express needs related to business problems, not specific systems.

C – Incorrect. Understanding of AS-IS should not aim to change the current state just for the sake of changing it. Every change should add some value and should be driven by a specific goal.

2. Strategy Definition

Terms

Business Case, Business Goal, Business Need, Business Process, Cost-Benefit Analysis, Feasibility Study, Gap Analysis, Innovation, Market Research, Mission, Process Owner, SMART, Solution Approach, Solution Proposal, Solution Scope, Stakeholder, SWOT, Vision

2.1 Introduction

Strategy definition is a set of activities and tasks aimed at establishing a way to reach a specific future state of an organization. Specific activities of strategy analysis include, but are not limited to:

- Analysis of the current situation of the organization
- Establishing business needs on the basis of external and internal influences, including stakeholders expectations and demands
- Analysis of the vision, mission and goals and establishing means to attain the stated objectives
- Defining the strategy for change

2.2 Internal Analysis

2.2.1 Vision, Mission and Business Goals

Vision – an overall image of what the organization wants to be or become in the long-term. It defines the future state of an organization [BMM].

Mission – a definition of ongoing operational activities of the organization.

Business Goal – short- or long-term objective of an organization.

The Mission defines the ongoing operational activities of the organization which will allow the Vision to become a reality.

The Mission is planned and realized by a strategy, which can be understood as the approach to achieve Business Goals considering the given environment and business context.

Name	Example
Vision	Be a professional, trusted provider of goods and services
Mission	Provide products and services across Europe and North America for both business and personal customers
Business Goal	By January 1, 2020, 95% on-time order delivery Within six months, 10% increase in product sales

Table 4 Examples of Vision, Mission and Goals

Business Goals amplify the Vision – they define what must be satisfied to attain the Vision.

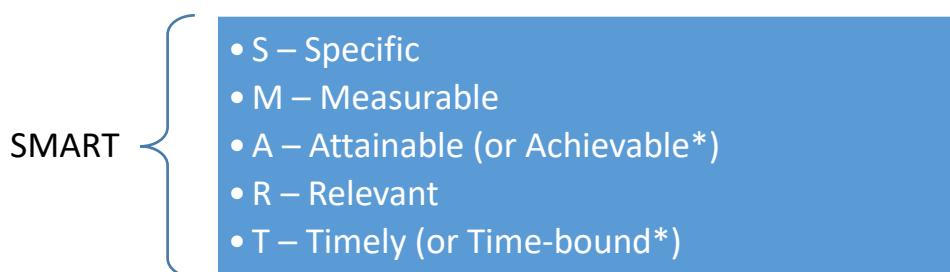


Figure 10 Vision, Mission and Business Goal

Setting Business Goals is important for the following four reasons:

- The organization needs to have a vision of what it wants to accomplish. This is facilitated by having clearly stated goals, along with establishing time periods in which they need to be achieved.
- It keeps a clear picture of what the organization is trying to do with the business, and helps focus motivation.
- It allows the organization to understand and maintain a commitment to the business' main objectives.
- It provides a metric against which to measure the organization's progress.

SMART is a system and a tool that is used to establish goals and define their quality objectives. In order for a goal to be a SMART goal, it must have specific characteristics.



* BABOK Guide

Example of a SMART Goal

Grow market share by 20%, in the area of XYZ, for product line ABC by the end of this fiscal year

It is important to note that the ability of achieving Business Goals may be influenced by risks and limitations. Therefore establishing goals and objectives also typically includes risk management activities [ISO 31000].

All the mentioned elements influence Business Analysis activities as they define future state and high level direction for the organization.

Questions

Recall the definition of a Vision, Mission and Business Goal

Explain relationships between Vision, Mission and Business Goals

Explain how Vision, Mission and Business Goals can influence Business Analysis activities

Explain the basic principles of building proper Business Goals

2.2.2 Business Process Analysis

A business process is a set of activities aimed at producing a specific output for a particular customer or market. A business process focuses on how the work is done within an organization, the way of organizing work, activities, relationships, and the dependencies between them. A process can be considered as the ordering of work activities across time and place, with a beginning, an end, and clearly defined inputs and outputs [Sparx].

Business Process – a collection of activities designed to produce a specific output for a particular customer or market.

A business process must have the following characteristics [Sparx]:

- Has a goal
- Has specific inputs
- Has specific outputs
- Uses resources
- Has a number of activities that are performed in some order
- Affects at least one organizational unit
- Creates value for the customer (both internal and external)

The following diagrams show various methods for identifying and documenting business processes.

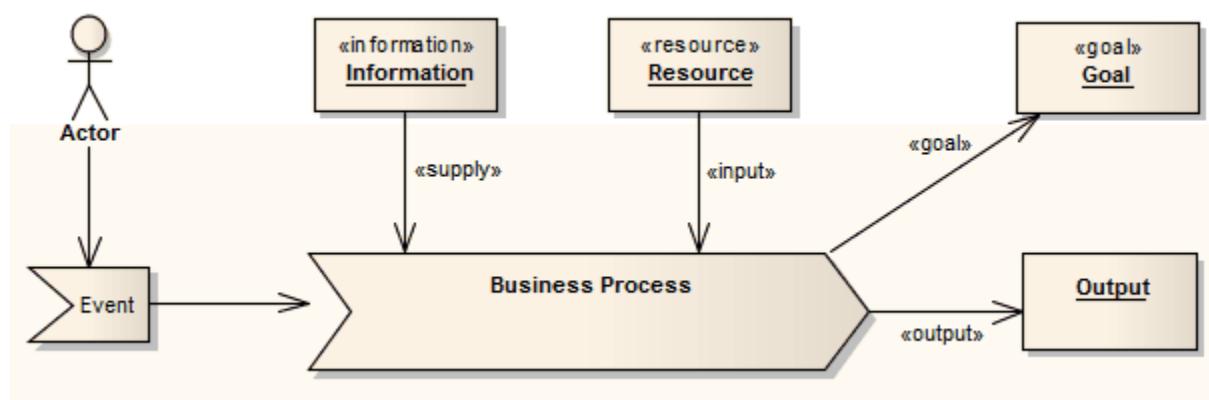


Figure 11 Eriksson-Penker notation [Sparx]

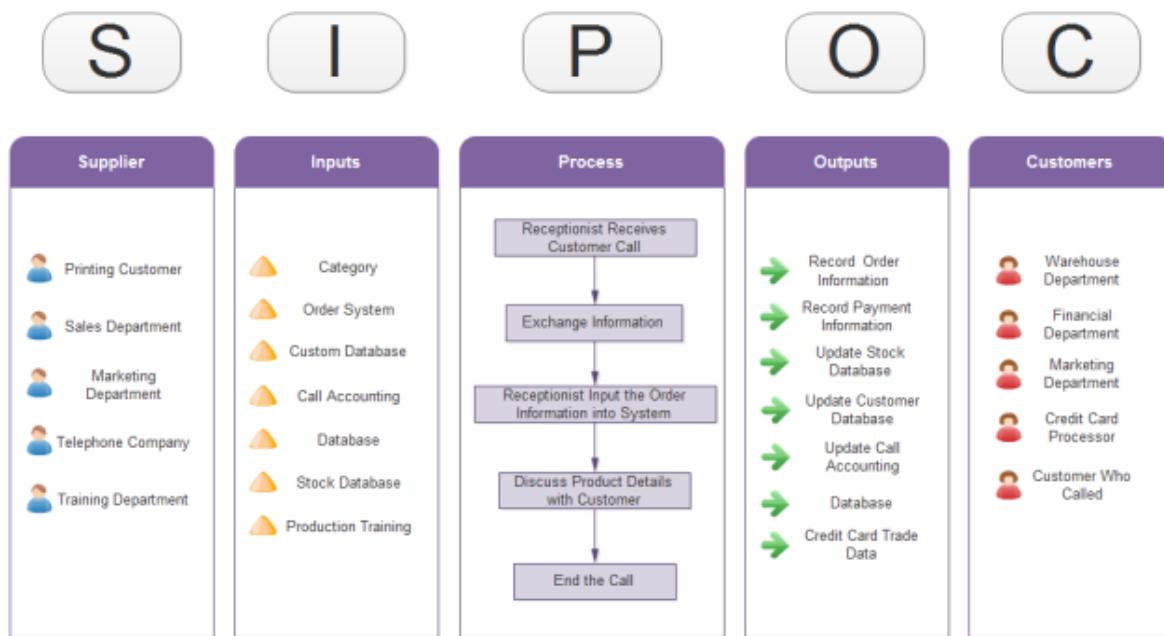


Figure 12 SIPOC method for business process description (<http://www.aleanjourney.com/2017/02/use-sipoc-to-scope-your-improvement.html>)

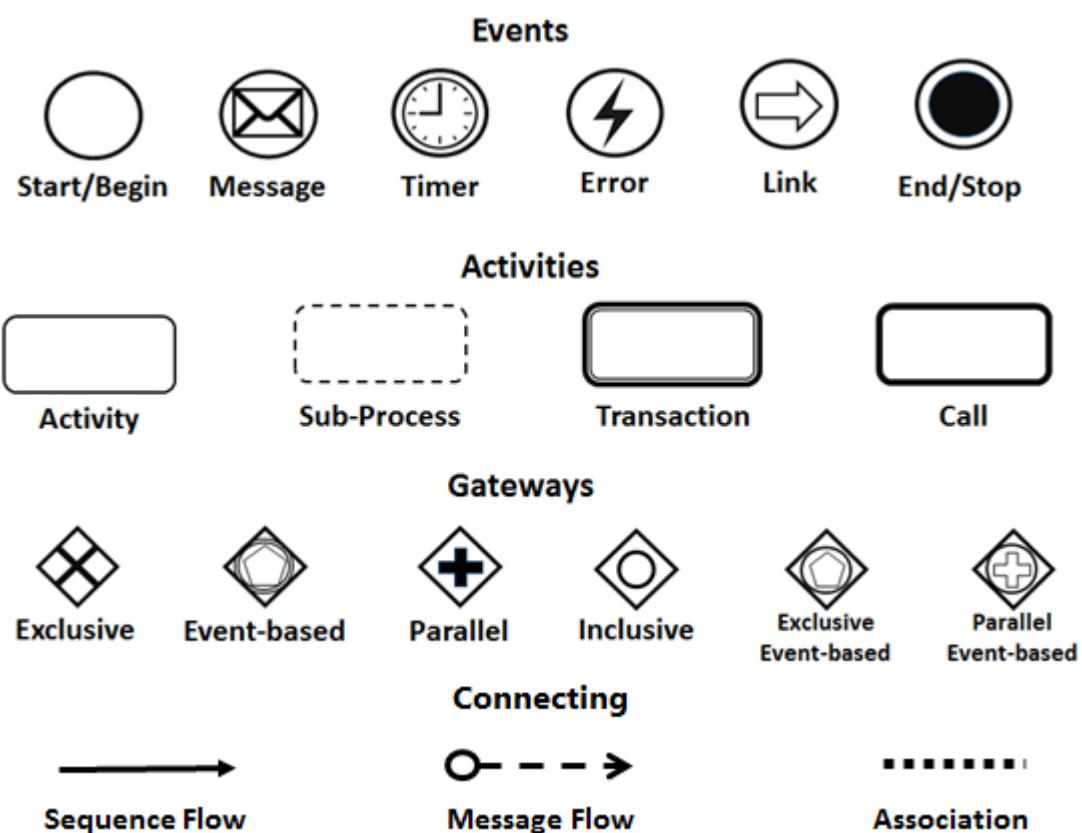


Figure 13 Basic elements of BPMN notation

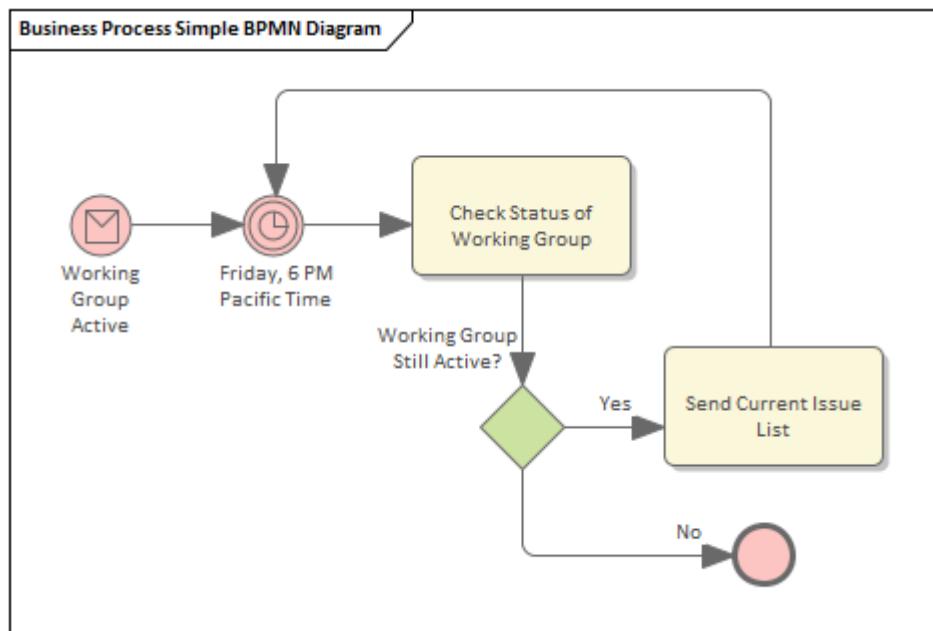


Figure 14 Sample BPMN model [Sparx]

Each process should have a Process Owner defined. According to ITIL, the Process Owner is the person responsible for ensuring that a process is fit for purpose. The Process Owner's responsibilities include sponsorship, design, and continual improvement of the process and its metrics.

Process Owner – a role responsible for overseeing that a process realizes its measurable objectives.

Identification of current business processes performed within the organization allows the Business Analyst to understand the organization's goals and to determine the activities and the flow required to achieve future planned business and strategic goals. This identification helps establish all the activities and roles that are necessary for the execution of the activities that produce the desired results. Identification of business processes helps uncover gaps and ineffective parts of the process, which may then be improved via process optimization. If business processes are not established and understood, then measuring and controlling them may be very difficult due to the organization's level of maturity. In addition, there are likely to be significant problems with the definition of the business goals and needs.

Business processes may be modeled using a technique such as BPMN (Business Process Modeling Notation). This technique provides a view into the various processes performed within an organization. It helps the reader to understand the organization's processes and supports effective requirements analysis and modeling to ensure the proposed solution meets the needs of the current business processes.

Business Process Modeling Notation (BPMN) – a graphical notation that depicts the steps in a business process. BPMN depicts the end to end flow of a business process. The notation has been specifically designed to coordinate the sequence of processes and the messages that flow between different process participants in a related set of activities [BPMN].

Questions

Recall the definition of Business Process and Process Owner

Provide examples of benefits and the application of identification of Business Processes

Explain basic elements of BPMN notation

2.2.3 The Concept of Business Needs

Business Needs describe the business problem or opportunity which the Business Analyst must understand and analyze in order to recommend solutions that meet specific business goals and expectations of key stakeholders.

Business Need – definition of the business problem or opportunity, which BAs have to understand in order to recommend appropriate solutions.

Typically, Business Needs address new market or technical opportunities, collected feedback from users/customers, including complaints, or business stakeholders' insights.

Approaches to establish Business Needs include the following [BABOK]:

- Top down analysis of the Business Goals leading to identification of the Business Needs required to achieve a goal
- Bottom up analysis of the current (“AS-IS”) state of the organization, department, business process or business function, or already deployed solution (e.g., software supporting operations) leading to the identification of the Business Needs required to create value



Figure 15 Top down analysis of a Business Goal



Figure 16 Bottom up analysis of the current (“AS-IS”) state

Business Needs may also result from expectations, wishes or requirements of stakeholders (e.g., a need for providing information allowing management to make smart decisions) and/or from external sources such as market demand or competition.

Questions

Recall the definition of a Business Need

Explain how Business Needs can be identified

2.2.4 Gap Analysis

Gap Analysis aims to understand the difference between the current state of an organization and the desired state. Therefore it facilitates the introduction of change – the results of Gap Analysis provide an understanding of the work to be done in order to bring the organization to the desired state that is defined by mission and goals.

Gap Analysis – a process of comparing the current state (AS-IS) and desired future state (TO-BE) of organization, process etc. in order to identify gaps to be addressed [BABOK].

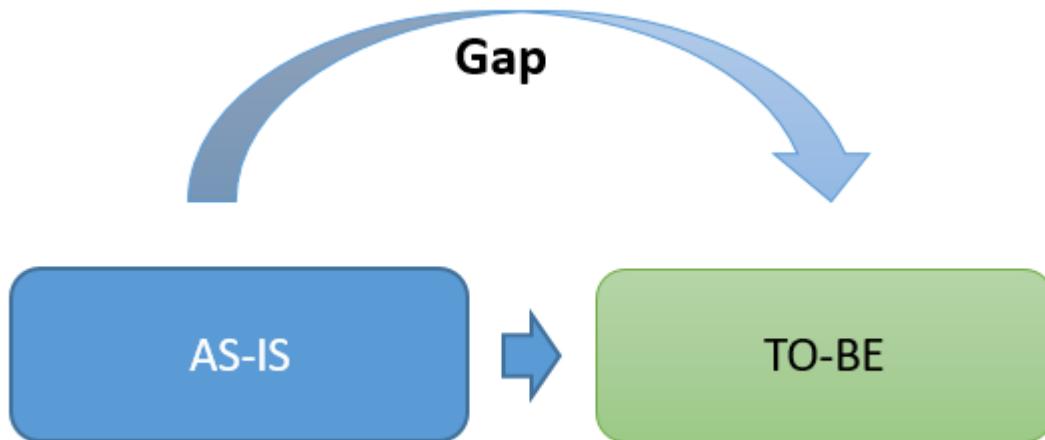


Figure 17 The concept of a capability gap

The starting point for Gap Analysis is establishing the current state of the organization (AS-IS), including understanding the business, vision, mission and goals, business processes, business, technology and cultural conditions that determine and shape the operations of the organization.

The next step is establishing desired future state (TO-BE) of the organization. Current capabilities of the organization must be then evaluated against the desired Business Goals and Needs. The result of evaluation will determine if the organization currently has the capability to satisfy the defined Business Needs. If the current capabilities do not meet the stated goals, changes must be identified and introduced to the organization (business, technology, people etc.) to move it to the future state.

Example of Gap Analysis

Investigating the customer satisfaction of customers who return faulty equipment to a company within warranty for repair.

Gap Analysis		
Area under consideration:	We are investigating the customer satisfaction when returning faulty goods within warranty. We are not considering customer satisfaction outside of warranty, nor the satisfaction of customers at the point of sale.	
Desired state	Current state	Action steps
<ul style="list-style-type: none"> 1. Customer satisfaction rate = 99% 2. Repair time = 12 days 	<ul style="list-style-type: none"> 1. Customer satisfaction rate = unknown 2. Repair time = 26 days 	<ul style="list-style-type: none"> 1.1 Benchmark current customer satisfaction 1.2 Review findings 2.1 Implement new repair system 2.2 Train staff to use new system

Figure 18 Sample Gap Analysis [EPM]

All the assumptions done during the Gap Analysis should be properly documented as they may impact the solution approach or delivery scope.

An important element of Gap Analysis is the identification of risks related to the proposed change. A Risk Management process is necessary to ensure all important risks, especially business risks, are considered when planning the desired future state of the organization.

Questions

Recall the definition of a Gap Analysis

Explain how Gap Analysis impacts Business Analysis works

2.3 External Analysis

2.3.1 Market Research and Analysis

Today it is more and more difficult for an organization to achieve a competitive advantage over its competitors. Traditional products and services do not ensure that an organization will achieve success in the market. Often, more is needed to convince customers that the products or services delivered by a given organization are better than others.

Innovation is one of the tools that helps the organization achieve a competitive advantage.

Innovation – the process turning an idea into value for the customer and resulting in sustainable profit for the enterprise [Carlson, Wilmot].

Innovation is the process of looking at something in a different way, or coming up with a different or novel approach to solving an existing or perceived problem. This process requires people to change the way they make decisions; to do things differently and make choices outside of their norm.

The Business Analyst, the person familiar with all the business processes within the organization and who knows the best of all outcomes and products of the processes, can be the right person to introduce innovation. Based on feedback from customers, market research, analysis of competitors and personal observations, the Business Analyst, together with the support of other teams, is able to identify the following items:

- Areas that require enhancements
- Potential new products that can be delivered by the existing processes
- Changes that will increase customer satisfaction and potential profits

The following diagram shows a sample innovation process.

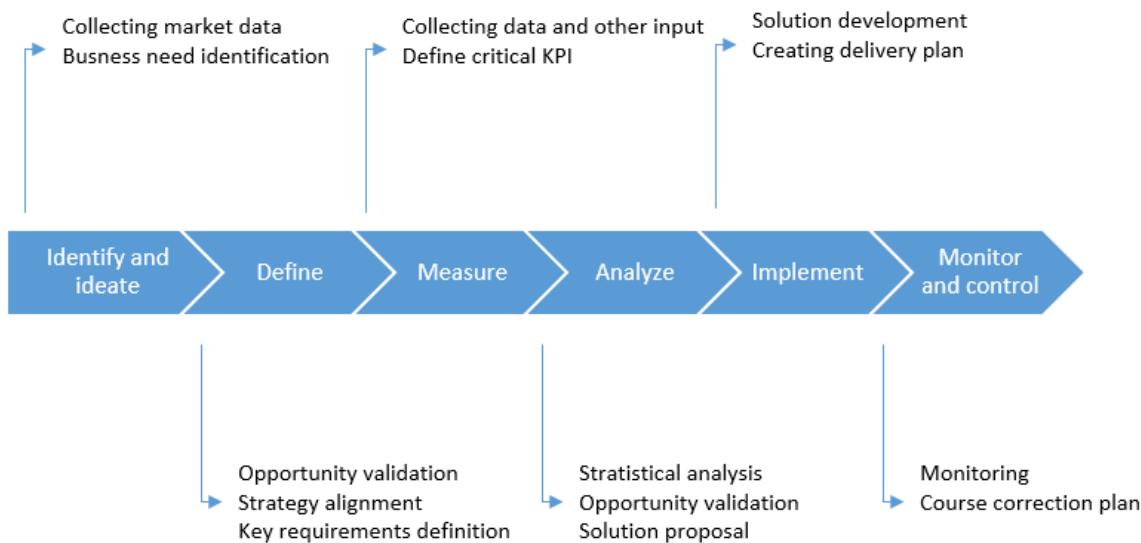


Figure 19 Sample innovation process

One of most effective means for achieving competitive advantage is market analysis and research. Business Analysts should be familiar with these and should be able to use them in planning new products or improvements in organization process or production.

Market Research – an organized effort to gather information about target markets or customers.

Market Research is a structured activity with the purpose of gathering information about markets or customers. Market Research is a very important component of a business strategy (being a part of a Business Analyst's areas of interest). According to ICC/ESOMAR International Code on Market and Social Research, Market Research provides a systematic way to gather and interpret information about individuals or organizations, using statistical analytical methods and techniques. This information supports making decisions about the future course of the organization [ICC/ESOMAR].

Market Research is considered to be a key factor in gaining advantage over competitors. It provides important information to identify and analyze the market's needs, the market size and the competition. Market Research clarifies what people (not only the customers of a given organization) need and how they act. Some of the instruments for Market Research are questionnaires and focus group discussion surveys. Once that research is completed, the results, such as discovered trends, may be used to determine the future course of the Business Strategy.

Common techniques for Market Research include:

- Qualitative and quantitative research
- Mail questionnaires
- Telephone or personal interview surveys
- Observation
- Using technical solutions for collecting data (e.g., Google Analytics)

Market Analysis is a structured and documented investigation of a market helping to determine if there is a need or audience for a product or service. It is a great help when new products or an expansion of the business is planned.

Qualitative and quantitative research
Mail questionnaires
Telephone or personal interviews
Observation



Figure 20 Market Research and Analysis

The goal of a Market Analysis is to determine the attractiveness of a market, both now and in the future. In this way the organization may discover and understand evolving opportunities and trends, and match them with the organization's strengths and weaknesses.

Market Analysis can be used to:

- Prepare to enter a new market (expansion)
- Determine if there is a market for new products or services, and evaluate the chance for the success of introducing a new product or service, or introducing changes (innovations) into existing ones
- Plan to start a new business
- Obtain market information that will assist in the sale of the product or service

There are several dimensions of a Market Analysis; each may be used for different purposes (e.g., evaluating market profitability or determining market trends).

Questions

Recall the definition of innovation, market research and analysis

Explain the role of innovation as a tool for achieving competitive advantage

Explain the role of a Business Analyst in innovation efforts

Explain the role of market research and analysis in Business Analysis

Provide examples of market research and analysis methods and techniques

2.3.2 User Needs Identification

One of the main tasks of a Business Analyst is to provide a business design of a solution that will satisfy the customer's needs and expectations. To be able to do so, the Business Analyst must know these needs. This includes not only those articulated directly, but also the hidden expectations of which the customer may not be aware. The role of a Business Analyst is to work with the end users to identify and explore their requirements and provide support for formulating their various needs. For example, working with the end users may help to identify usability requirements that were not determined in the initial requirements collecting phase.

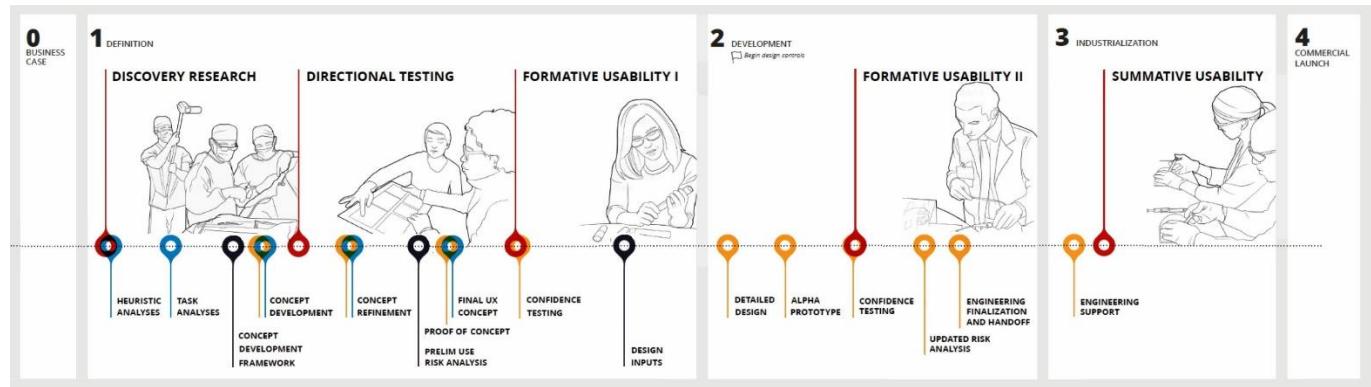


Figure 21 User Needs Identification (source: https://insightpd.com/condensed_poster-2/)

Common techniques for user research are:

- Collecting user/customer feedback
- Qualitative and/or quantitative research
- Personas – targeting users
- Interviews
- Observation of user behavior, including User Journey
- Surveys
- Other techniques used for Market Research

Questions

Explain the role of a Business Analyst in user needs identification

Provide examples of techniques for user research

2.4 Stakeholder Identification

A stakeholder is any person or organization actively involved in the change or development work, or those whose interests may be affected as a result of the execution or completion of the work. Stakeholders may also influence the initiative's objectives and outcomes. Stakeholders come from the business organization, solution delivery organization/team and from external parties (e.g., business context).

Stakeholder – any person who has an interest in an IT project. Project stakeholders are individuals and organizations that are actively involved in the project, or whose interests may be affected as a result of project execution or project completion.

Generic Stakeholder	Examples and Alternate Roles
Business Analyst	Business Systems Analyst, Systems Analyst, Process Analyst, Consultant, Product Owner, etc.
Customer	Segmented by market, geography, industry, etc.
Domain SME	Broken out by organizational unit, job role, etc.
End User	Broken out by organizational unit, job role, etc.
Implementation SME	Project Librarian, Change Manager, Configuration Manager, Solution Architect, Developer, DBA, Information Architect, Usability Analyst, Trainer, Organizational Change Consultant, etc.
Operational Support	Help Desk, Network Technicians, Release Manager
Project Manager	Scrum Master, Team Leader
Supplier	Providers, Consultants, etc.
Tester	Quality Assurance Analyst
Regulator	Government, Regulatory Bodies, Auditors
Sponsor	Managers, Executives, Product Managers, Process Owners

Figure 22 Examples of Generic Stakeholders [BABOK]

Stakeholders can be identified using the following techniques:

- Investigating the business domain
- Identifying owners of the business processes
- Analyzing the structure of the customer's organization
- Exploring the target market of the customer's organization
- Analyzing relationships with external organizations (suppliers, etc.)

Different stakeholders may have different needs and expectations regarding the planned solution. It is very important to identify all key stakeholders and their needs, and to find a common understanding of the purpose of a solution in order to avoid the situation where the final product may meet the requirements of only a selected group of stakeholders. It is also important to ensure that the features to be implemented will not conflict with requirements of other stakeholders. For example, a product designed only for a knowledgeable customer base may not be satisfactory for all end users since end users may have different needs, such as an intuitive user interface, an extended help system or special accessibility needs.

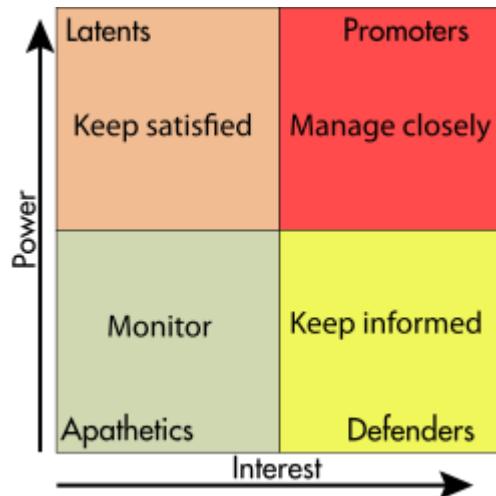


Figure 23 Stakeholders Power-Interest Matrix

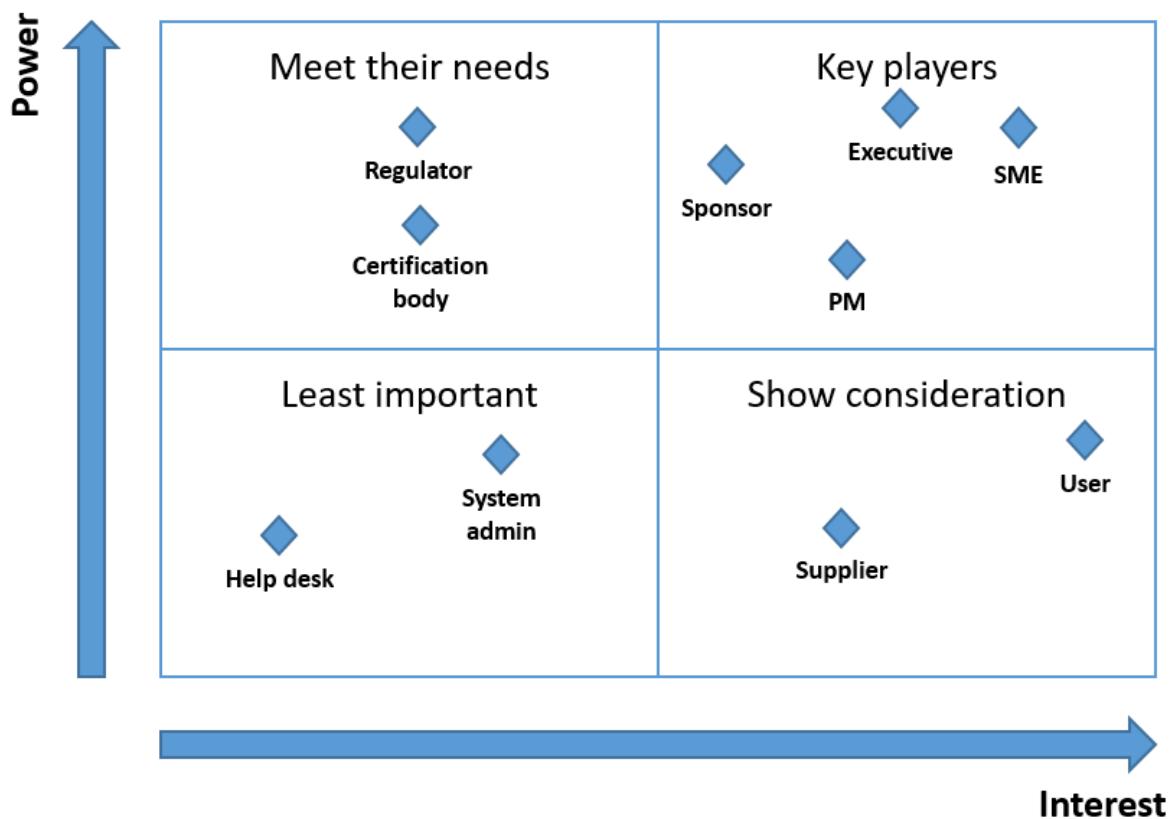


Figure 24 Sample Power-Interest Matrix

The process of identifying key stakeholders and collecting their requirements and expectations is one of the key activities in the Strategy Definition, as it determines the initial scope and requirements for the solution. However, this activity is often skipped or performed only partially, usually leading to problems as the solution delivery work progresses.

Sample questions for stakeholders identification

- Who instigated or requested the project/initiative?
- Who is supplying funding for the project/initiative?
- Who will lose money or other resources if the project/initiative is not completed on time – or at all?
- Who will profit in the marketplace from successful project/initiative completion?
- Who will be responsible for ensuring quality in the project/initiative?
- Who will be responsible for ensuring compliance and risk management in the project/initiative?
- Which organizations or entities are providing software/hardware resources for the project/initiative?
- Who will be held responsible if the project/initiative objectives are not met?
- Who has the practical ability to stop the project/initiative through action or inaction?

The main problems with identifying stakeholders include:

- A lack of understanding of the real operators of the business processes in the organization
- Unclear definition of responsibilities within the customer's organization
- Excluding stakeholders who are not clearly and directly related to the process (e.g., the end users)
- Incomplete analysis resulting in missing processes and activities, as well as misidentification or omission of important stakeholders

Questions

Recall the definition of a stakeholder

Provide examples of stakeholders' types

Explain how stakeholders can impact Business Analysis activities and work products

Provide examples of methods for stakeholder identification

2.5 Solution Proposal and Analysis

There are many ways of delivering value and introducing change to meet specific Business Needs. The approach to be taken to deliver/implement the capabilities required to move the organization to the desired future state is called the Solution Approach.

Solution Approach – alternatives that solve the business problem by using specific solution options.

Sample Solution Approaches include the following:

- Change of business processes (process improvement effort)
- Change of resource allocation/usage
- Introduction of organizational changes
- Purchase of a commercially available solution from a supplier
- Developing a custom solution
- Using the current solutions available within the organization
- Outsourcing (of business functions, etc.)

The Solution Proposal can be defined as an idea or concept which meets specific Business Need(s). Usually there is more than one Solution Proposal (option) addressing the same Business Need – therefore the options need to be evaluated before making the final decision about solution realization.

Solution Proposal – a design option which meets the stated business requirements and business need under given conditions.

Solution Proposal can be documented in the form of Product Vision.

 Vision	Statement or slogan that captures the product's purpose.		
 Target Group The people who should benefit from the product; the product's users and customers	 Needs The main problem the product should solve or the primary benefit it should provide	 Product The product's three to five features that help it stand out	 Business Goals The desired business benefits; they should be prioritised and quantified

Figure 25 Product Vision [Pichler]

 Vision	Help organisations create UX-rich products		
 Target Group Product managers and product owners; entrepreneurs	 Needs Be able to work with one shared canvas	 Product Web or tablet app; data is held in a central repository Easy to integrate UX artefacts Provides guidance and templates	 Business Goals Open up a new revenue stream Develop our main brand

Figure 26 Sample Product Vision [Pichler]

A Feasibility Study allows different solution alternatives to be analyzed and compared to understand how each option addresses the Business Need as well as how the business value will be delivered.

Feasibility Study – analysis and evaluation of a proposed project to determine if it (1) is technically feasible, (2) is feasible within the estimated cost, and (3) will be profitable. Feasibility studies are almost always conducted where large sums of money are at stake. Also called Feasibility Analysis.

In some cases, it is necessary to evaluate the benefits, costs and risks related with a specific solution delivery initiative before the initiative starts.

Business Case – a document that captures the reasoning for initiating a project or task. It describes a justification for the project in terms of the value added to the business as a result of the project outcomes in comparison to the cost of developing the new solution.

A Business Case provides the reasoning and justification for the initiative in terms of the value added to the business as a result of the initiative outcomes, in comparison to the cost of implementing the proposed solution. A part of a Business Case is cost-benefit analysis explaining the value of the solution proposal with respect to the cost of solution delivery and maintenance.

A properly built Business Case allows the organization to achieve the following:

- Understand and apply a way of thinking that allows decision makers to analyze the value, risk and priority of an initiative proposal
- Justify the value of the proposals to the organization and to reject any proposals that do not have proven and measurable value
- Decide if the initiative proposal is of value to the business and is achievable in comparison to alternative proposals
- Track and measure the progress of the solution's development
- Ensure that initiatives with inter-dependencies are undertaken in the proper order

Usually, a Business Case is presented in the form of a structured document but it may be expressed as a short argument or presentation. For example, consider the case in which a software upgrade might improve system usability; the Business Case here is that better usability would improve customer satisfaction, require less task processing time, or reduce training costs.

A Business Case may cover the following topics:

- Information about the opportunity (market trends, competitors)
- Qualitative and quantitative benefits
- Estimates of cost
- Profit expectations
- Follow-on opportunities
- Cash flow consequences of the action, over time, and the methods used for quantifying benefits and costs
- The impact of the proposed initiative on the business operations or business process
- The impact of the proposed initiative on the technology infrastructure
- Constraints associated with the proposed change or development work
- Risks related with the proposed change or development work
- Alignment with priorities established by the business

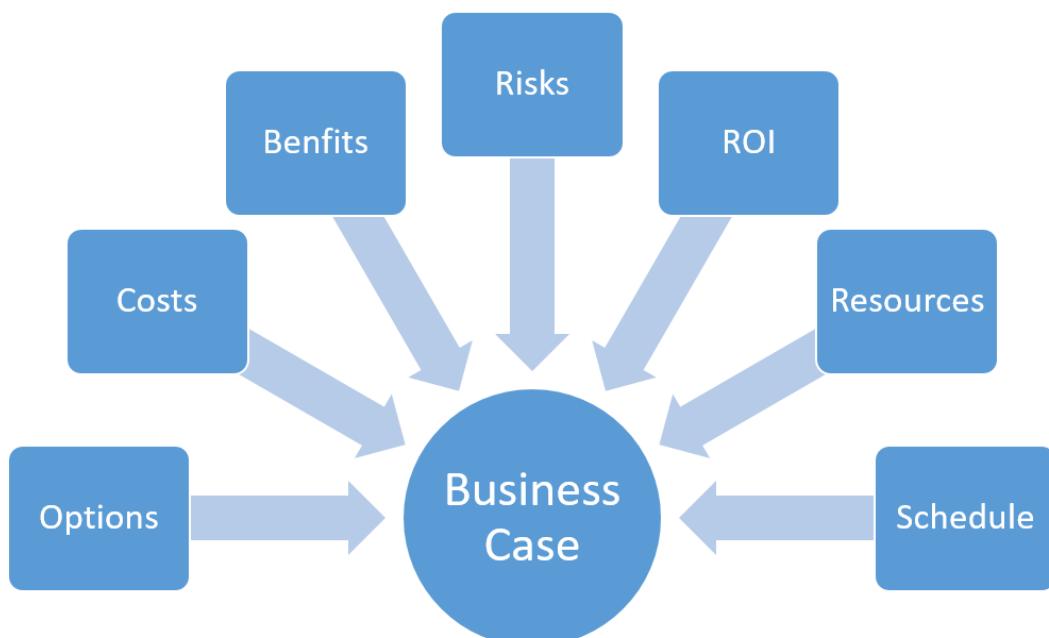


Figure 27 Elements of a Business Case

Business Case Canvas				
Problem	Solution	Benefits	Scope	Stakeholders
	Resources		Risks	
Cost structure		Metrics		

Figure 28 Sample structure of a Business Case

Project business case example			
Project name	Sales Team IVR Telephone system		
Project sponsor	Head of Sales	Project manager	<name>
Date of project approval	3 rd March	Last revision date	3 rd March
Contribution to business strategy	Our strategy is to project best in industry customer service, and the current situation does not reflect this. The new IVR system will ensure all calls are answered in a timely manner. It will also ensure that calls are dealt with efficiency. These two factors align this project to the company strategy.		
Options considered	Options considered included: <ol style="list-style-type: none"> 1. Adding additional staff to sales team 2. Having a dedicated team for our best customers 3. An IVR system (selected) 		
Benefits	1. Increased sales – currently estimated we lose 4% of all sales calls due to current issues 2. Happier customers - we estimate new customer satisfaction will increase by 10% 3. Improved LTV - lifetime value of customers will increase by 5% due to the two points above		
Timescales	Initial analysis shows that the system will take approximately 3-4 months to implement.		
Costs	IVR software = \$35,000 Project management = \$30,000 Software team of 3 for 3 months - \$90,000 Total estimated cost = \$155,000		
Expected return on investment	Year 1 = \$0 Year 2 = \$120,000 Year 3 = \$180,000 as LTV begins to be felt		
Risks	Right now the project looks pretty straightforward but there are still some unknowns surrounding implementation. There is also the risk that the project doesn't meet the sales team's or customers' needs. For this reason it is recommended to involve the sales team closely.		

Figure 29 Sample Business Case (<https://expertprogrammanagement.com/2017/06/project-business-case/>)

Questions

Recall the definition of a solution proposal, feasibility study, Business Case and solution approach

Provide examples of different solution approaches

Explain benefits and meaning of a Business Case

Recall the content of a typical Business case

2.6 Project Initiation

Project initiation activities cover all tasks required to start up a development or maintenance initiative. These tasks typically include:

- Defining delivery/service scope
- Establishing solution delivery and management team
- Selecting or establishing approach to conduct and control change or development activities
- Defining strategies and procedures for risk, configuration, quality and communication management

Initiation activities are often documented in a form of Project Initiation Documentation (PID) which represent the plan of approach in project management [PRINCE2]. PID typically consists of a set of other documents.

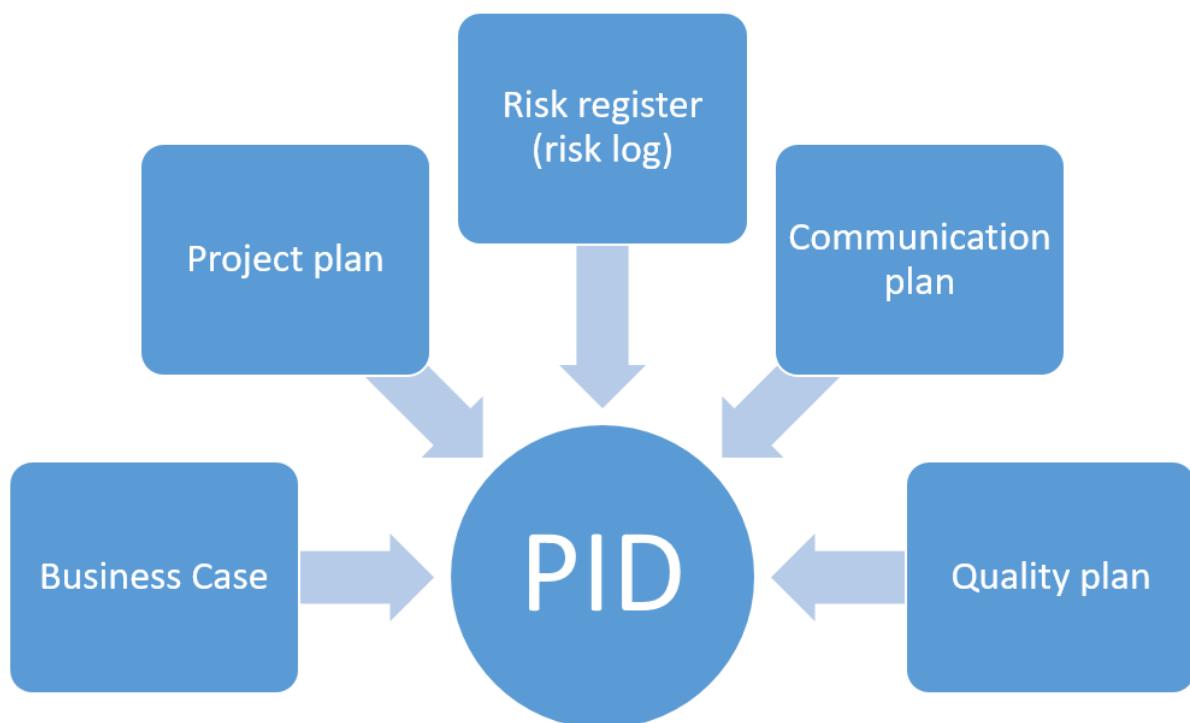


Figure 30 Elements of PID

Business documentation, provided as output from Strategy Analysis activities, serves as important input to the development of the PID and summarizes the delivery scope and key business expectations and conditions. This creates a basis for establishing project scope. An important element of change or development project initiation is the identification of risks and preparing a mitigation plan [ISO 31000].

Questions

Recall the definition of project initiation and project scope

Provide examples of different project initiation activities

Explain the concept and content of PID

2.7 Sample Exam Questions

2.7.1 Question 2.1

LO-2.1.1 Understand how Vision, Mission and Business Goals are connected and influence Business Analysis activities (K2)

Question

You are working on establishing business goals for an organization. Which of the following statements is **not** true?

Answer set

- [A] Setting business goals provides a metric against which to measure the organization's progress.
- [B] Business goals should express a vision of what an organization wants to accomplish.
- [C] Business goals should define the future state of an organization by providing an overall image of what the organization wants to be.
- [D] Business goals should be compliant with the mission of an organization.

2.7.2 Question 2.2

LO-2.1.2 Know the basic principles of building proper Business Goals (K1)

Question

Consider the following statement describing a business goal:

“Increase the customer satisfaction”

What information necessary to ensure the quality of the business goal is clearly missing?

Answer set

- [A] Business context allowing to identify project stakeholders
- [B] Measure and timeframe allowing to verify the goal
- [C] Evaluation of feasibility of the goal
- [D] Business actors involved in achieving of the goal

2.7.3 Question 2.3

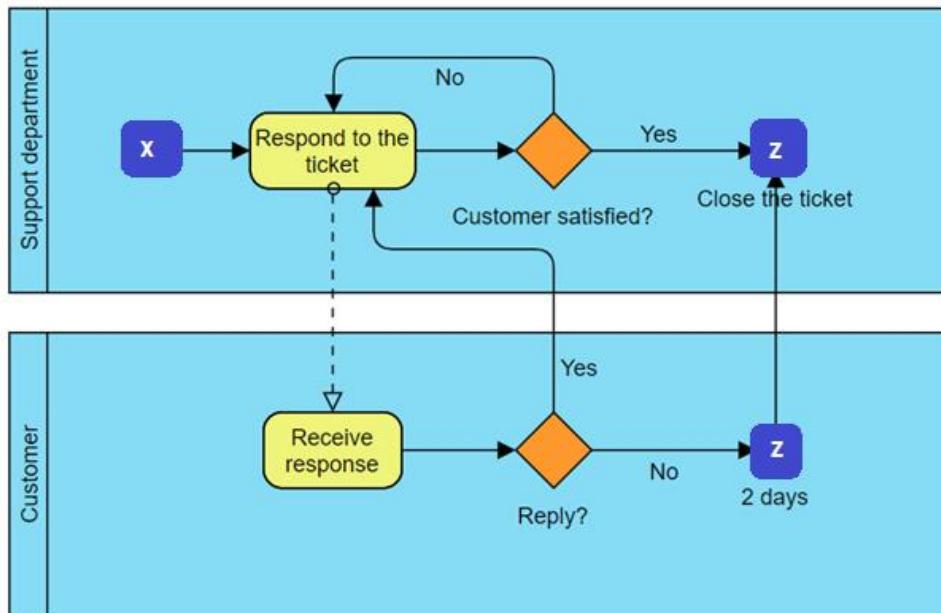
LO-2.1.5 Model a simple Business Process using basic elements of BPMN notation (K3)

Question

Consider the following scenario.

A support department receives a ticket. After the response is sent to the customer, the customer has two days to reply. If she/he does not reply, the ticket is closed. If she/he replies and is satisfied with the response received, the ticket is also closed. However, if the customer is not satisfied, the support department must process the ticket again.

This process is modeled in BPMN. Which elements (from P, Q, R, S, T) should be placed instead of X, Y, Z so that the process is correctly modeled?



P



Q



R



S



T



U

Answer set

- [A] X – P; Y – Q; Z – R.
- [B] X – S; Y – T; Z – U.
- [C] X – P; Y – S; Z – T.
- [D] X – U; Y – P; Z – P.

2.7.4 Question 2.4

LO-2.2.3 Know methods for user needs identification (K1)

Question

Which of the following techniques would be most effective to collect detailed information about specific business needs of users, including hidden needs?

Answer set

- [A] Mail questionnaire containing a large number of detailed questions
- [B] Qualitative and quantitative research, including surveys, with potential users
- [C] Direct interviews with key business representatives
- [D] Direct observation of user behavior followed by interviews with user representatives

2.8 Answers and Justifications

Question 2.1 – answer C

Justification

C – Correct. This answer refers to the definition of a vision, not a business goal.

A, B and D – Incorrect. All these answers are correct (as explained in IQBBA syllabus, section 2.2.1).

Question 2.2 – answer B

Justification

B – Correct. The statement has no information about the required level of increasing satisfaction and no time frame.

A – Incorrect. Business goal statement does not require providing business context related to project stakeholders.

C – Incorrect. Definition of business goal does not require feasibility evaluation.

D – Incorrect. Definition of business goal does not require specifying business actors.

Question 2.3 – answer A

Justification

A – Correct. X must be a start event (which is P); Y is a time-related intermediate event (Q), Z must be an end event (which is R).

B, C and D – Incorrect. See A.

Question 2.4 – answer D

Justification

D – Correct. Direct observation and interviews allow to identify, understand, analyze and confirm user's needs with interested parties

A and B – Incorrect. Questionnaires normally do not facilitate identification of hidden needs (which are untold and users are often not aware of them).

C – Incorrect. Interviews with key business representatives may not be a good solution for this scenario, as the business may not be aware of specific needs of users.

3. Management of Business Analysis Process

Terms

Agile, Communication Plan, Maturity Model, RACI

3.1 Introduction

The purpose of this chapter is to explain the main elements of planning and managing Business Analysis processes in a given context. Planning should consider the following factors:

- Development/maintenance method or culture of organization (e.g., traditional vs. Agile)
- Necessity for interdisciplinary approach
- Communication requirements and participants
- Definition of products from Business Analysis
- Organizational assets such as tools and techniques

In addition, planning the Business Analysis approach should also include the planning approach to Requirements Engineering (see: 4 Requirements Engineering in Business Analysis).

3.2 Approaches to Business Analysis

Establishing an approach to Business Analysis may be supported by maturity models and competency models. These models can help to determine activities, methods and skills necessary to meet specific objectives in a given context. [IIBA Competency]

Many maturity models are based on the concept of maturity levels, representing different structural levels of the Business Analysis process. These models often use other models, such as CMMI, to map Business Analysis processes, activities, tasks and methods into specific levels of maturity.

BA Practice Maturity Model

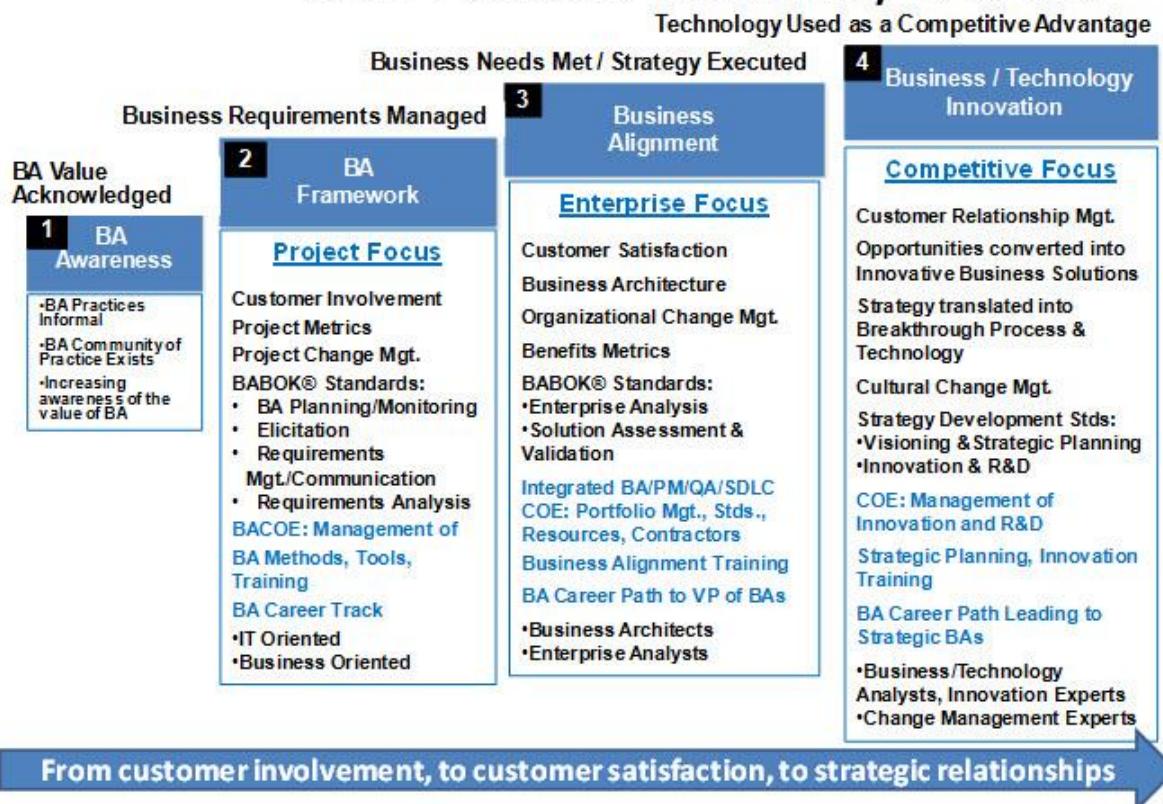


Figure 31 Sample maturity model [Hass]

The generic model for Business Analysis used in a given organization should be adjusted to the current context. In many cases it is necessary to consider consequences resulting from different approaches to development or maintenance efforts.

3.2.1 Traditional vs. Agile Environments

There are two main approaches to solution development and maintenance – traditional and Agile. Traditional methods (such as Waterfall, V-Model, Rational Unified Process) are characterized by upfront planning – requirements are collected and documented to the fullest extent, architecture of the solution is designed, then the implementation starts. The main assumption of the traditional approach is that there is a clear picture of the product before implementation works start.

Process Model:

- (1) A framework wherein processes of the same nature are classified into an overall model, e.g. a test improvement model.
- (2) A method-independent process description of development processes.

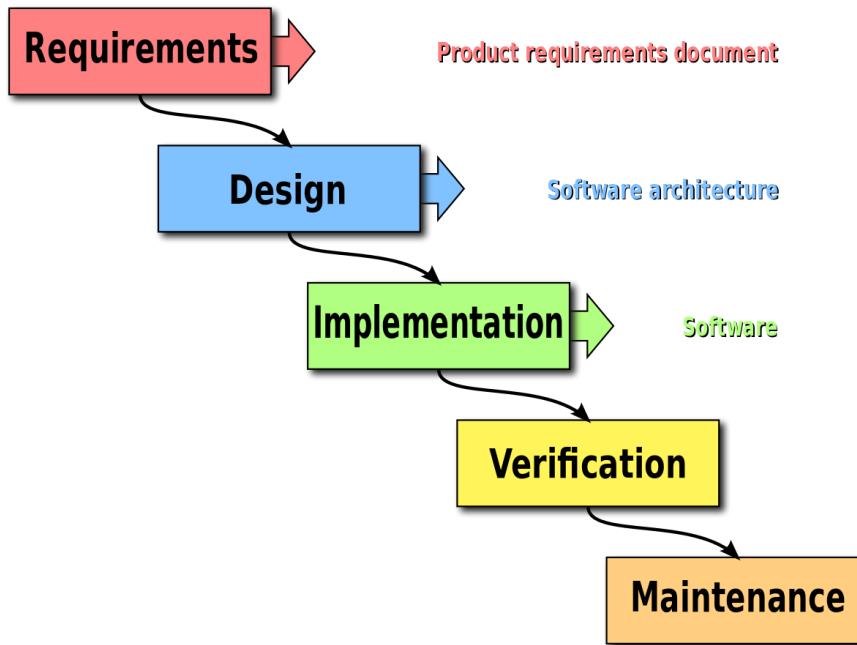


Figure 32 Waterfall model

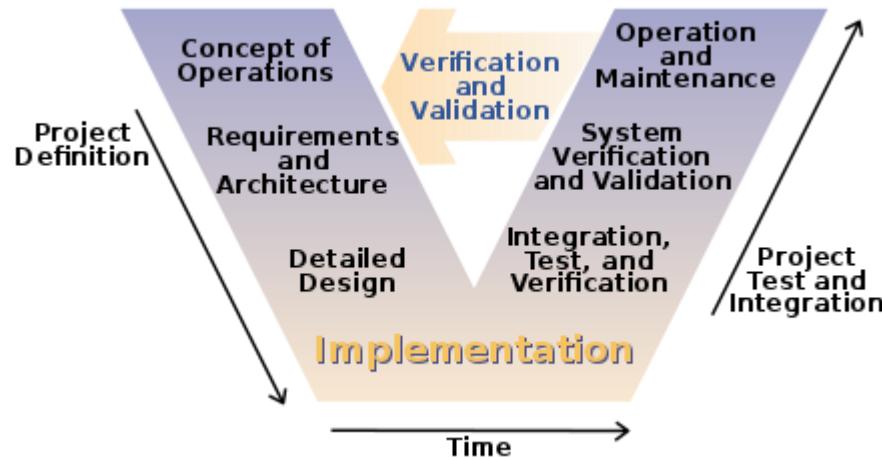


Figure 33 V-Model

Agile is based on the concept of incremental and iterative development with minimal planning. Agile recognizes the fact that business context and requirements may change and provides special practices to support these changes. The main ideas behind Agile:

- “Just in time”
- Adaptability
- Customer involvement during all development/maintenance
- Frequent communication

Manifesto for Agile Software Development

We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to value:

**Individuals and interactions over processes and tools
Working software over comprehensive documentation
Customer collaboration over contract negotiation
Responding to change over following a plan**

That is, while there is value in the items on the right, we value the items on the left more.

Agile Software Development – a group of software development methodologies based on iterative incremental development, where requirements and solutions evolve through collaboration between self-organizing cross-functional teams.

Currently many organizations and teams are transforming from a traditional to an Agile approach. This impacts not only processes, but also role definitions. In a traditional approach a Business Analyst was responsible for elicitation of needs and requirements, upfront planning and proposing solution options. Communication with delivery team was rather limited to interactions necessary in a given context.

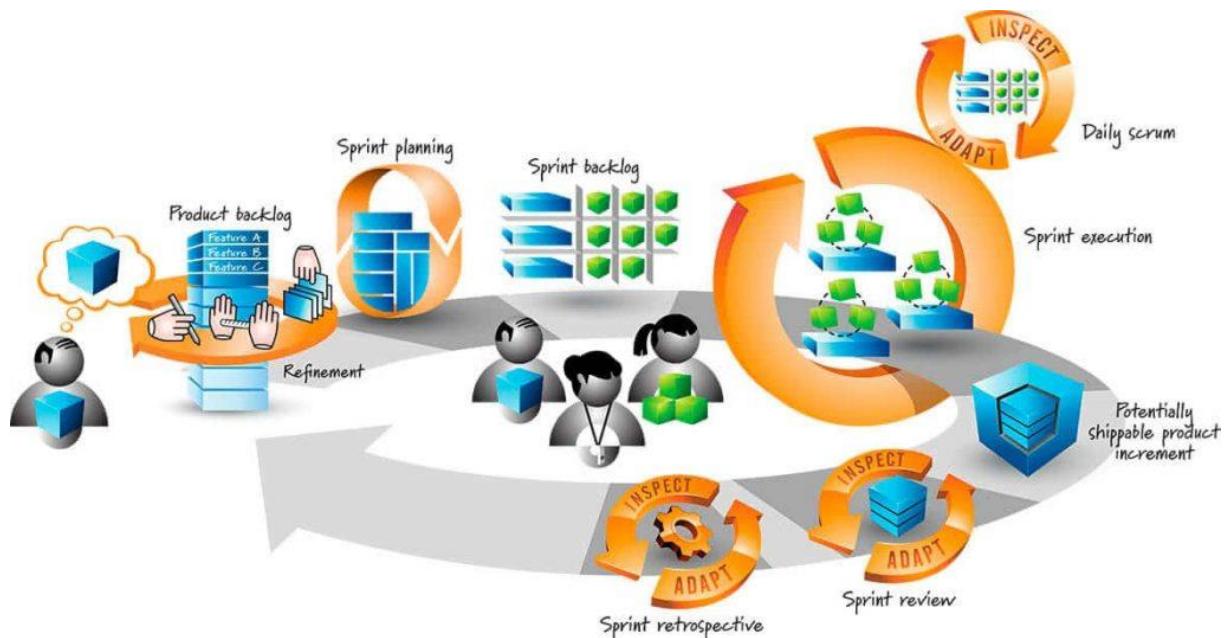


Figure 34 Scrum framework [Rubin]

In Agile, this way of working changes; the Business Analyst should follow the principle of “fit-for-purpose” or “just enough”. Stakeholders should be empowered to articulate their needs and assist the delivery team on a daily basis. An important consequence of an Agile transformation is rejecting formalities such as collecting and confirming all requirements before starting development or creating detailed requirements documents. In Agile, the Business Analyst will work with the customers, stakeholders and the development team in order to create a high-level requirements list. The requirements will be detailed and implemented in priority order – they will be refined only when it is a time for developers to start working on them.

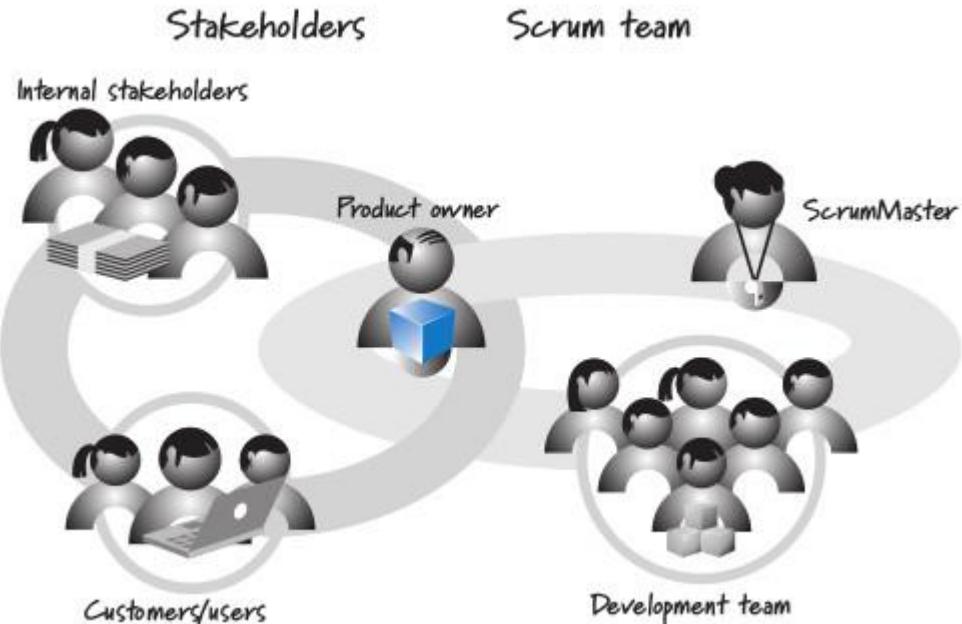


Figure 35 Product Owner in Scrum [Rubin]

In many organizations, the main challenge in an Agile transformation is not the process change, but the mindset change.

Adapting Business Analysis to Agile environments requires some changes in the process and work organization. However, the main tasks and responsibilities of Business Analysts remain the same:

- Providing expert knowledge in the business and/or product
- Defining the business goals, business context, risks and potential impacts of the solution on the organization and stakeholders
- Defining change, which is understood as the gap between AS-IS and TO-BE
- Supporting communication between business stakeholders and delivery team

Possible solutions for Business Analysis in Agile environments are:

- Business Analyst as a Product Owner, responsible for definition and realization of the product
- Business Analyst supporting the Product Owner in more technical tasks, when the Product Owner provides only business knowledge
- Business Analyst competencies in the development team, when the team supports the Product Owner with transforming high-level requirements into specific development tasks

In Agile, some specific tools and techniques will be used. Examples include: backlog, user story, story mapping, Kanban.

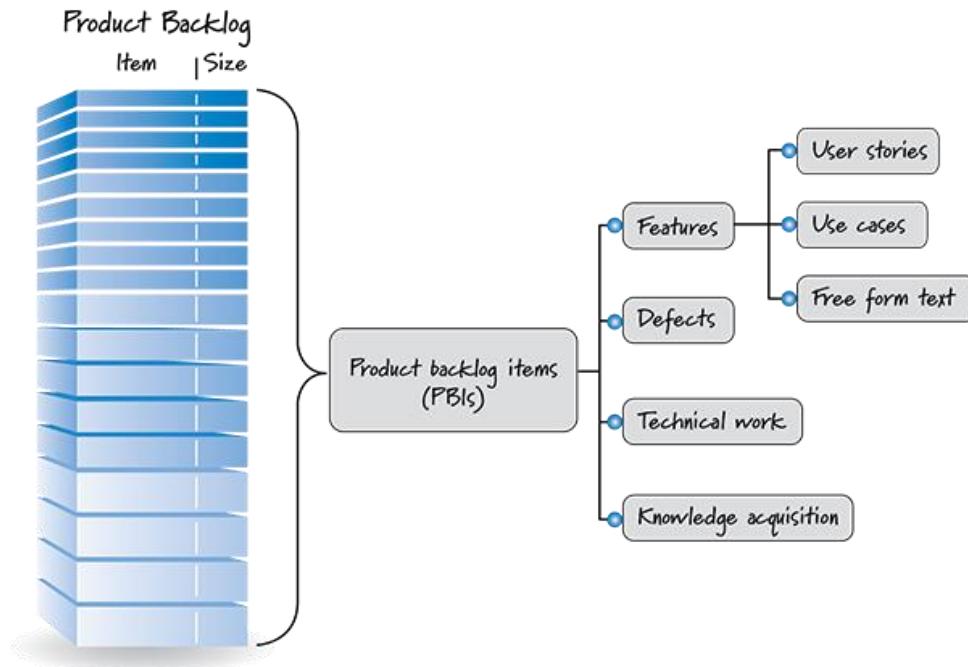


Figure 36 The concept of Product Backlog [Rubin]

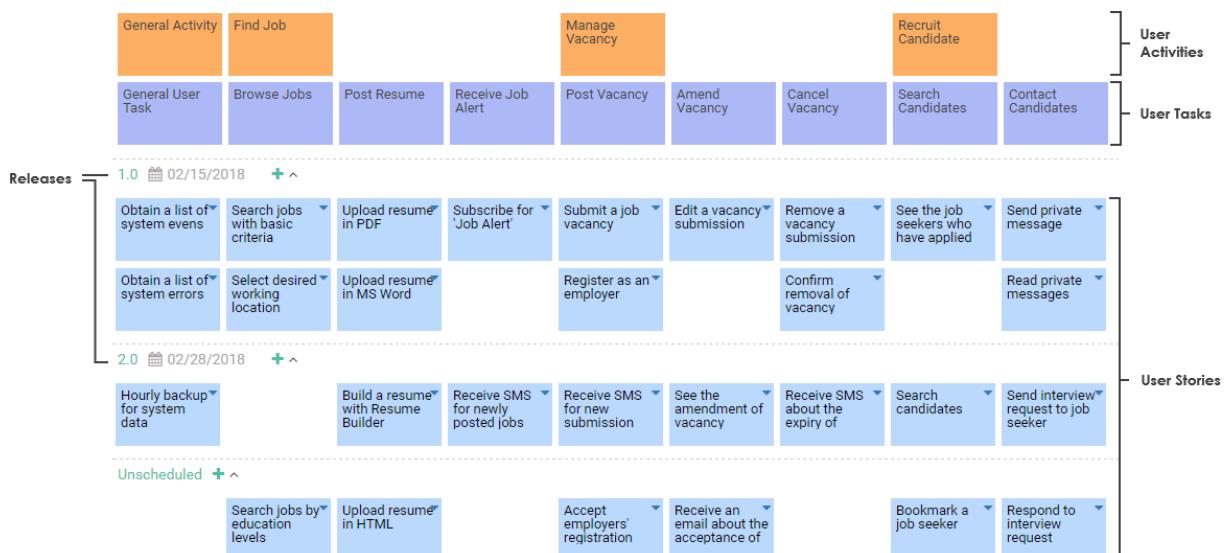


Figure 37 User story mapping (<https://www.visual-paradigm.com/guide/agile-software-development/what-is-user-story-mapping/>)

Questions

Recall the different approach to development and maintenance

Explain the difference between Business Analysis in Agile and non-Agile environments

Explain the different solutions for Business Analysis in Agile environments

Provide examples of methods and techniques specific to a given development approach

3.2.2 Interdisciplinary Approach

Effective Business Analysis requires adopting knowledge and skills from other disciplines. Such disciplines may be [IIBA Competency] [BABOK] [Brown]:

- UX and usability
- Service design
- Design thinking
- Innovation (see: 2.3.1 Market Research and Analysis)
- Digital design

User Experience (UX) – a person's perceptions and responses that result from the use or anticipated use of a product, system or service [ISO 9241-210].

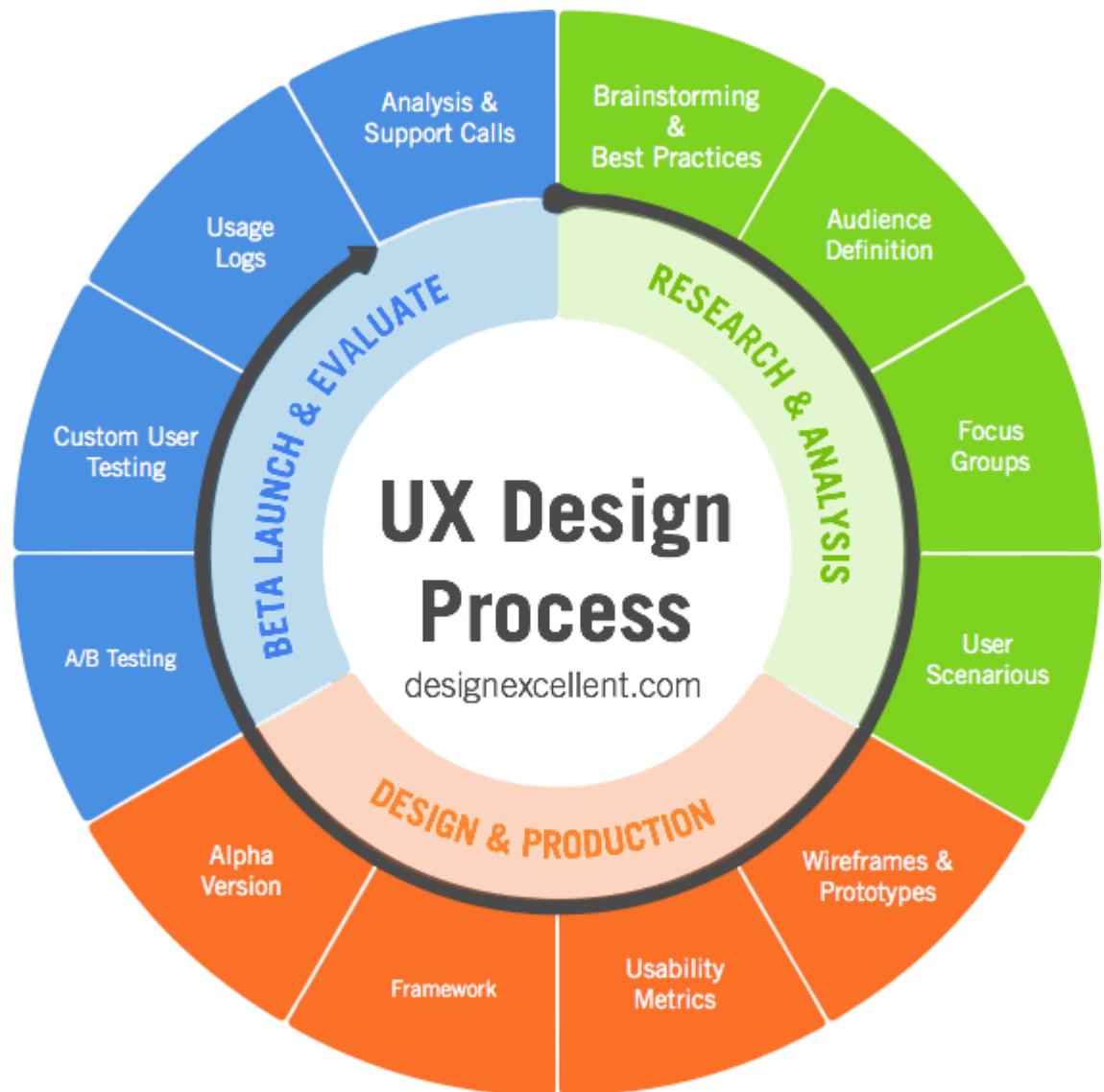
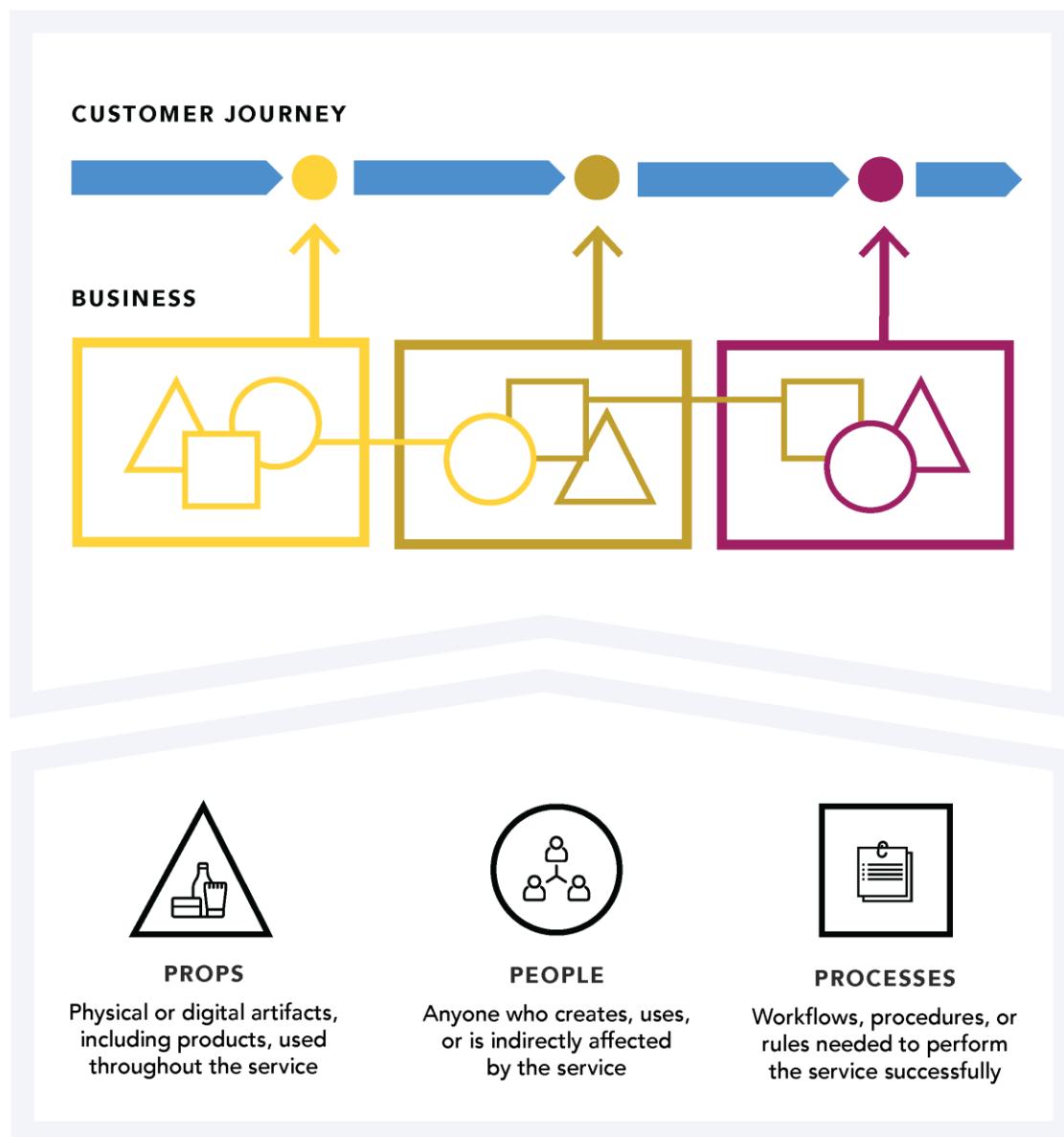


Figure 38 UX design process

SERVICE DESIGN 101



NNGROUP.COM **NN/g**

Figure 39 Service design

Design Thinking – a collaborative process by which the designer's sensibilities and methods are employed to match people's needs with what is technically feasible and a viable business strategy. In short, design thinking converts need into demand. The process is described in three major phases: inspiration, ideation, and implementation.

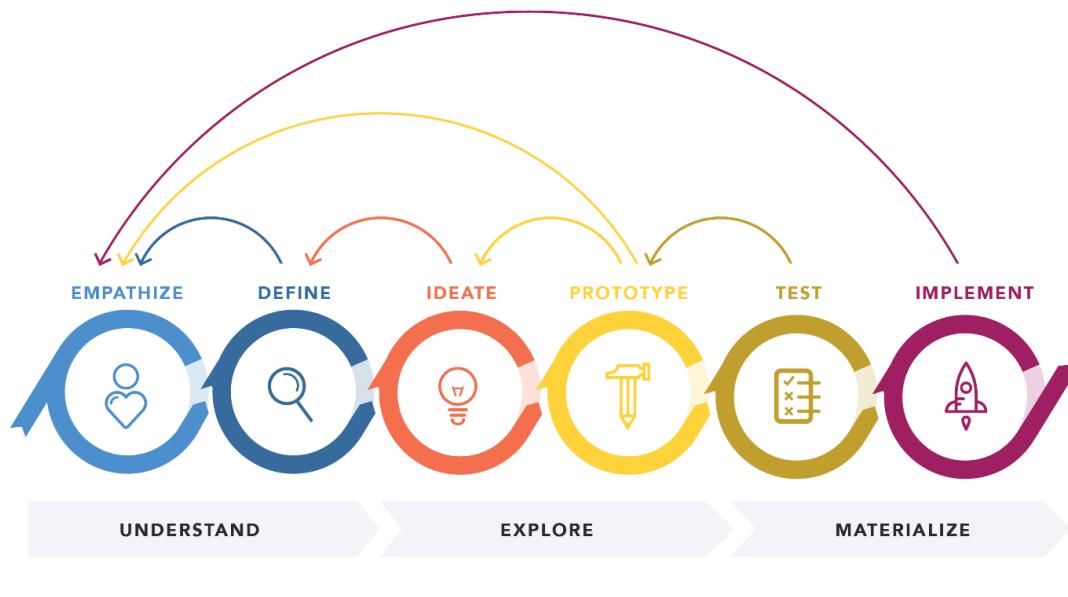


Figure 40 Design Thinking process (<https://www.nngroup.com/articles/design-thinking/>)

Digital Design

“Digital designers design and optimize by communicating and leading. A digital designer is someone who thinks about the future, someone who is capable of creating a vision for digital products, processes, services, business models, or even entire systems, free from technical or organizational obstacles as well as apparent reservations (outside-in thinking). Digital designers are also capable of ultimately turning this vision into reality. They transfer (technological) possibilities into (new) product/process/service/business model/system design. To do all of this, digital designers must be skilled in design and the available technologies and be capable of interacting with all stakeholders. The difference to previous approaches lies in the simultaneous and holistic consideration of all components and their design. Just like an architect has to think about the materiality, environment, and economic efficiency of a building as well as the actual layout, a digital designer will have to think about the same things for their product. This means that not only software and the associated interface design, but also the physical product design and aspects such as economic efficiency, psychology, cognitive sciences, social sciences, occupational sciences, ergonomics, marketing, and communication design and many other aspects must be understood and considered to the extent that, in case of doubt, corresponding expertise can be engaged constructively.” [DD Manifesto]

In addition, the following concepts may support effective Business Analysis:

- Multidisciplinary Teams (teams which members represent different background, skills and experience)
- Enlightened Trial and Error (a method invented by IDEO based on the following principle: learning from experience, and then trying again, using lessons learned)
- Lean startup

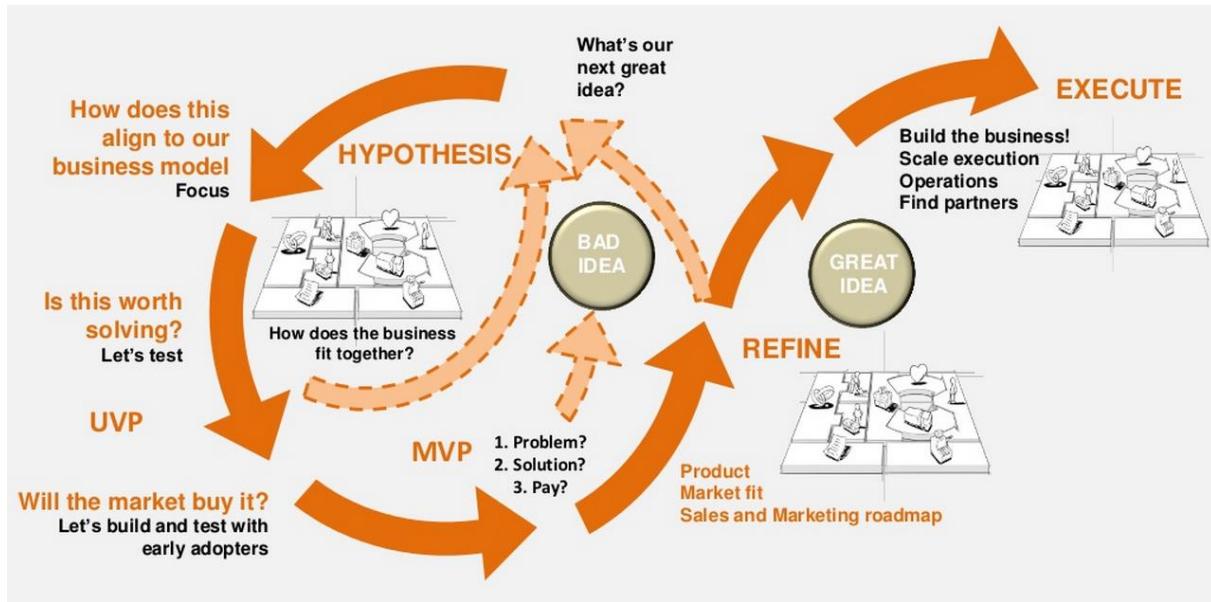


Figure 41 Lean Startup process (<http://value-first.be/category/lean/lean-startup/>)

Note: MVP: Minimum Viable Product; UVP: Unique Value Proposition

Questions

Provide examples of interdisciplinary knowledge and skills supporting Business Analysis activities

3.3 Communication

The main purpose of planning Business Analysis communication is to define how to receive, distribute, access, update and escalate information to and from the stakeholders, as well as how to organize the schedule and structure of the communication within a change or development program/project.

Communication – exchanging of information by speaking, writing, or using some other medium.

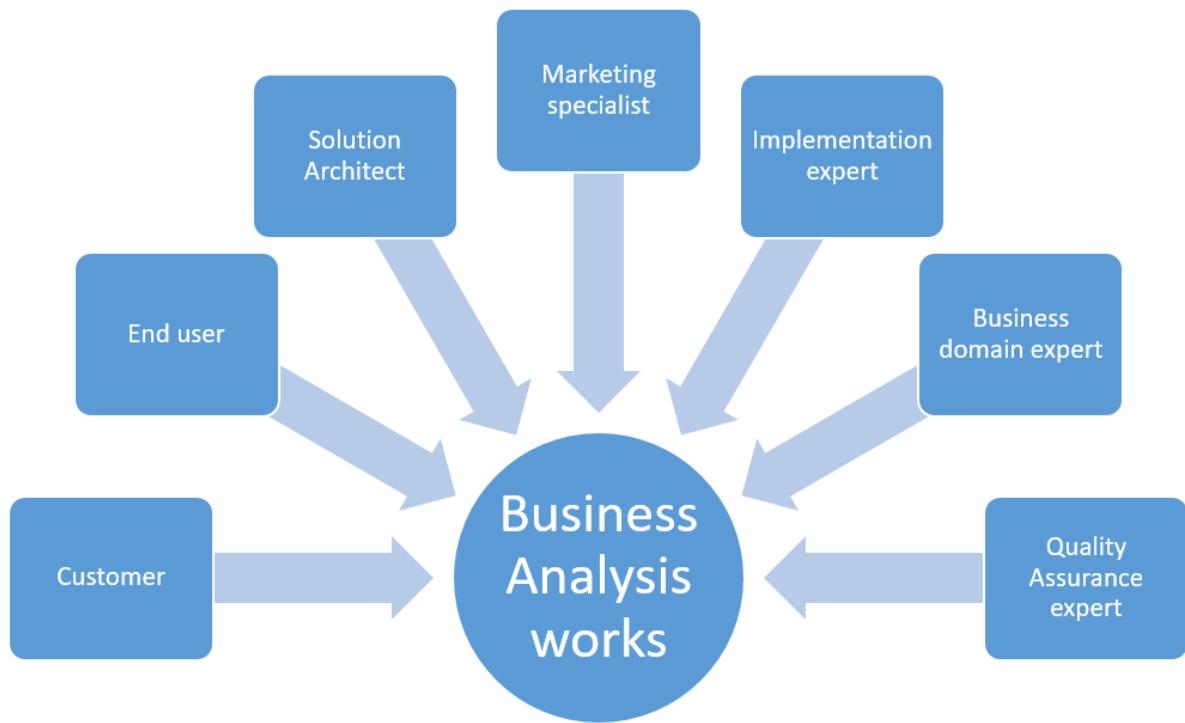


Figure 42 Sample stakeholders involved in Business Analysis activities

Business Analysis activities and deliverables can be communicated in both formal and informal ways.

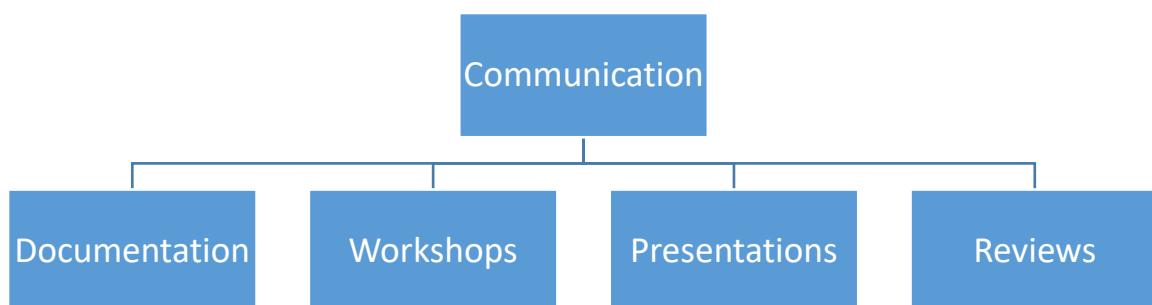


Figure 43 Common methods of communication

Any communication activity should take into consideration the focus of the communication (e.g., needs, information, and consequences). Having this information, the Business Analyst can decide what the appropriate delivery method is, the appropriate audience, and how to present the information.

For each communication, the Business Analyst must decide the most effective form of communication for both the topic and the stakeholder.

There are many different factors which should be considered when planning Business Analysis communication. These factors include:

- Type of initiative or business problem
 - Formal communication in case of safety critical projects
 - Less formal and direct communication in case of Agile projects
- Stakeholders' requirements
 - Stakeholders who expect direct communication
 - Stakeholders who expect written communication and formal channels of communication
- Required level of communication formality
 - Formal communication in case of communicating requirements, changes, risks, etc.
 - Less formal communication for daily team communication
- Communication frequency
 - More frequent communication with business stakeholders in the beginning of a project/initiative
 - More frequent communication with the team during solution development
- Geographical location
 - Different time zones may make the communication difficult
 - Face to face meetings may be difficult to organize and quite expensive
- Culture
 - Culture of an organization, including maturity level, may impact communication style and rules
 - Different cultures have different communication styles

Different types of initiatives require varying amounts of documentation, and often have diverse processes and different deliverables. Communication formality varies between initiatives, phases and stakeholders. Communication tends to be more formal when the initiative is large, is considered to be critical or strategic, is dependent on legislation, sector standards, or agreements, or if the business domain is complex. Some stakeholders may require formal communication regardless of other conditions. Communication frequency may vary among stakeholders for every form of communication. Geographic disparity can also be a factor that limits communication options, especially when stakeholders live in different time zones.

Communication plan – a plan formally defining the audience of given, specific information, the timetable for information delivery and communication channels to be used.

The communication plan explains rules of communication with the key stakeholders.

Communication plan

- Subject of communication (work product, task, etc.)
- Stakeholders involved (audience)
- Frequency of communication
- Medium of communication
- Person responsible for communication

Figure 44 Content of a communication plan

Communication	Frequency	Goal	Owner
Project team			
Project status report	Weekly	Review project status and discuss potential issues or delays	Project manager
Team standup	Daily	Discuss what each team member did yesterday, what they'll do today, and any blockers	Project manager
Task progress updates	Daily	Share daily progress made on project tasks	Project manager
Project review	At milestones	Present project deliverables, gather feedback, and discuss next steps	Project manager
Post-mortem meeting	At end of project	Assess what worked and what did not work and discuss actionable takeaways	Project manager
Project sponsor			
Project status report	Weekly	Review project status and discuss potential issues or delays	Project manager
Project review	At milestones	Present project deliverables, gather feedback, and discuss next steps	Project manager

Figure 45 Sample communication plan (<https://www.teambgantt.com/blog/project-management-communication-plan>)

The communication plan is often supported by a RACI matrix – a responsibility assignment matrix – allowing the definition of responsibilities of the different roles involved in completing tasks or deliverables for a given initiative.

Project Title		Deliverable or Task	Status	Roles and Responsibilities																																																																						
				Sponsor	Name or Role	Name or Role	Name or Role	Name or Role	Project Manager	Technical Lead	Name or Role	Name or Role	Consultant	Name or Role																																																												
Phase 1																																																																										
Deliverable/Task 1				A	R				I																																																																	
Deliverable/Task 2				A		R			I																																																																	
Phase 2																																																																										
Deliverable/Task 1				C	I				A	R																																																																
Deliverable/Task 2					I				A		R																																																															
Phase 3																																																																										
Deliverable/Task 1					I				A	I	R		C																																																													
Deliverable/Task 2					I				A	I	R		C																																																													
Phase 4																																																																										
Deliverable/Task 1						I			A	R			C																																																													
Deliverable/Task 2						I			A		R																																																															
Insert new rows above this one																																																																										
<table border="1"> <tr> <td>R</td><td>Responsible</td><td colspan="13">Assigned to complete the task or deliverable.</td></tr> <tr> <td>A</td><td>Accountable</td><td colspan="13">Has final decision-making authority and accountability for completion. Only 1 per task.</td></tr> <tr> <td>C</td><td>Consulted</td><td colspan="13">An adviser, stakeholder, or subject matter expert who is consulted before a decision or action.</td></tr> <tr> <td>I</td><td>Informed</td><td colspan="13">Must be informed after a decision or action.</td></tr> </table>															R	Responsible	Assigned to complete the task or deliverable.													A	Accountable	Has final decision-making authority and accountability for completion. Only 1 per task.													C	Consulted	An adviser, stakeholder, or subject matter expert who is consulted before a decision or action.													I	Informed	Must be informed after a decision or action.												
R	Responsible	Assigned to complete the task or deliverable.																																																																								
A	Accountable	Has final decision-making authority and accountability for completion. Only 1 per task.																																																																								
C	Consulted	An adviser, stakeholder, or subject matter expert who is consulted before a decision or action.																																																																								
I	Informed	Must be informed after a decision or action.																																																																								

RACI Matrix Template © 2018 by Vertex42.com

<https://www.vertex42.com/ExcelTemplates/raci-matrix.html>

Figure 46 Sample RACI matrix

Questions

Explain the role of communication in Business Analysis

Provide examples of factors influencing communication

Recall the definition of a communication plan

Explain the meaning of a communication plan

Recall the content of a typical communication plan

Provide examples of different roles involved in Business Analysis activities and explain their responsibilities

3.4 Products

The typical work products of Business Analysis activities are:

- Strategy definition
 - List of stakeholders
 - Business processes
 - Gaps
 - Market research results
 - Business needs
 - Business requirements

- Solution options
- List of business risks
- Opportunities
- Business constraints
- Business case
- Management of the Business Analysis process
 - Business Analysis approach
 - Communication plan
 - Business Analysis assets (templates, etc.)
 - Quality gates for requirements and/or solution design
- Requirements Engineering in Business Analysis
 - Stakeholders requirements
 - Solution/product requirements
 - Solution constraints
 - Solution design options
 - RTM (Requirements Traceability Matrix)
 - Requirements configuration
- Solution evaluation and optimization
 - Solution performance assessment
 - Improvement plan

These deliverables support the understanding of the vision and mission of the organization, as well as the goals and desired future state together with factors influencing the ability to achieve this future state.

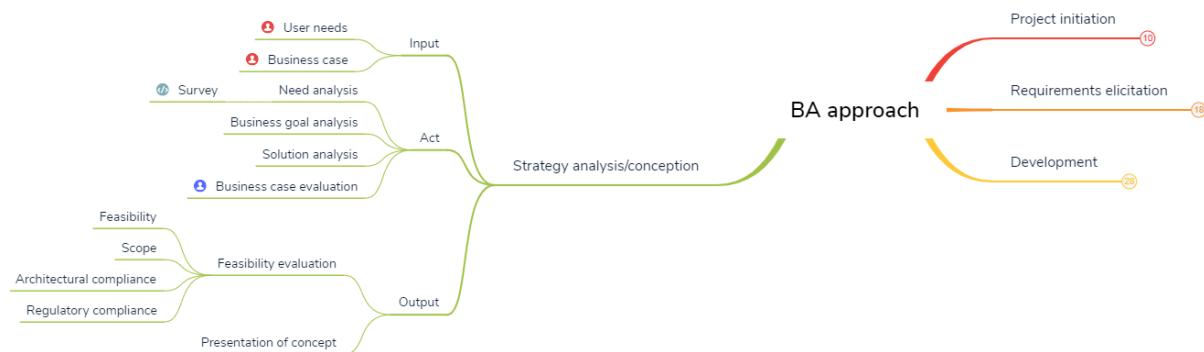


Figure 47 Sample Business Analysis approach – Strategy analysis

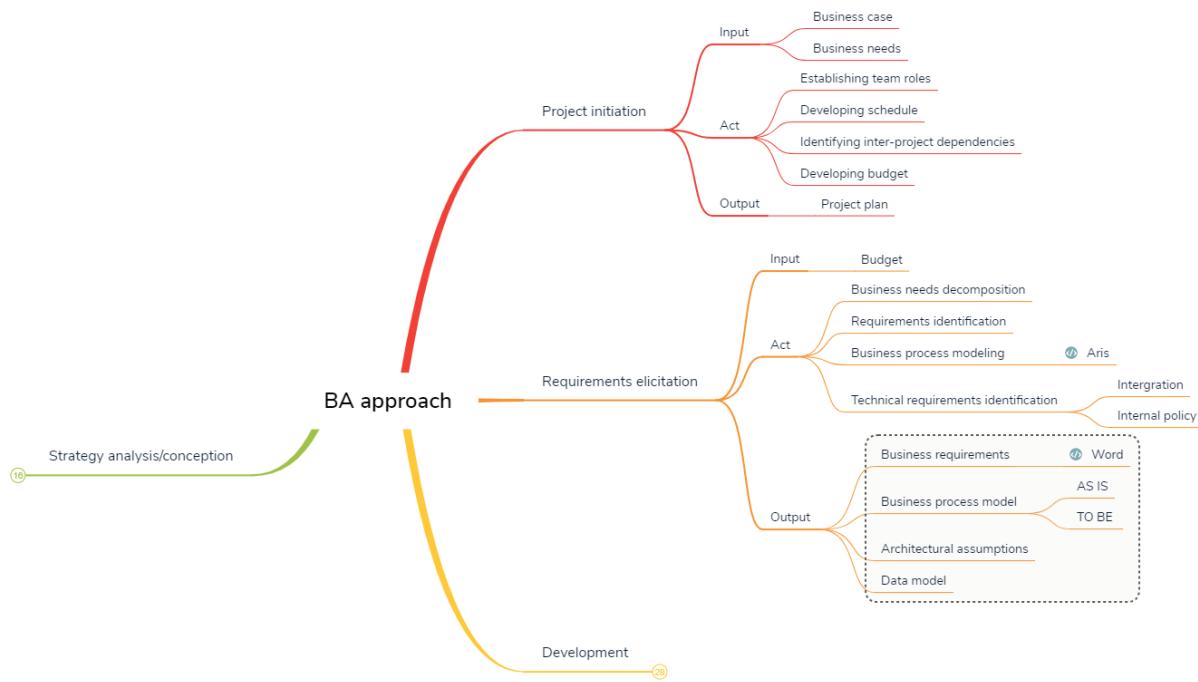


Figure 48 Sample Business Analysis approach – Project initiation and requirements elicitation

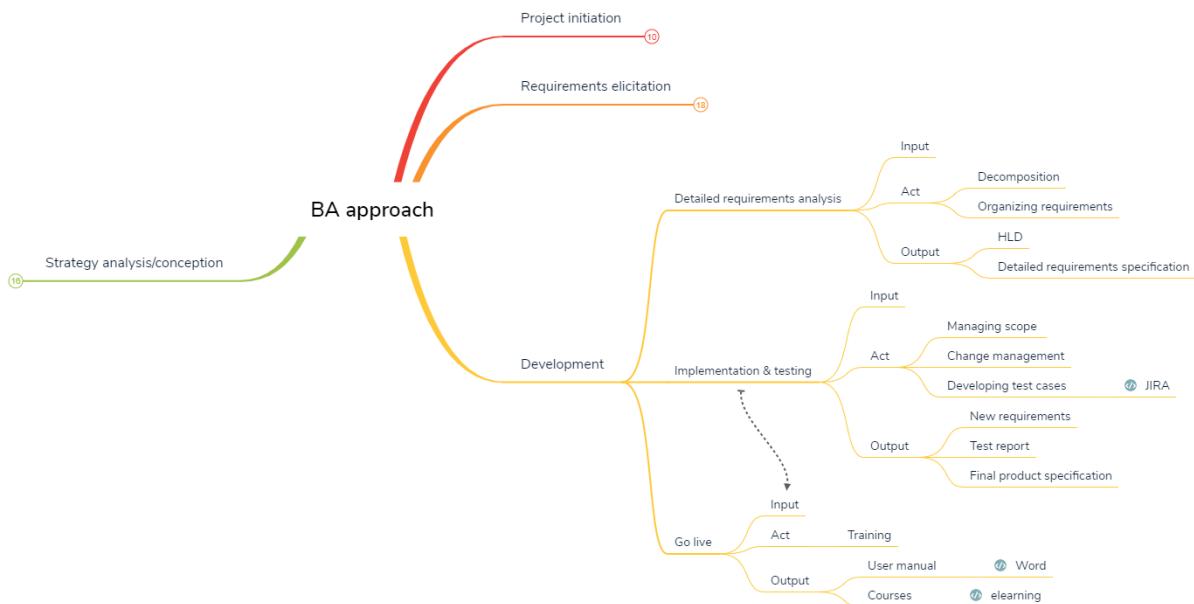


Figure 49 Sample Business Analysis approach – Development

One of the most important Business Analysis deliverables is the identified requirements, especially the business and stakeholder requirements. From the organizational point of view, business requirements express the major needs required to achieve the stated mission and goals (see: 2.2.1 Vision, Mission and Business Goals). From a project/program perspective, requirements define the scope of delivery and facilitate planning.

Organization perspective



Figure 50 Meaning of business requirements

Questions

Explain the role of a requirement and other key Business Analysis deliverables for an organization and a program/ project

Provide examples of typical Business Analysis products

3.5 Tools and Techniques

3.5.1 Tools and Techniques

Tools supporting Business Analysis activities:

- Problem analysis and solving tools
- Modeling tools
- Documentation tools
- Communication and team collaboration tools
- Knowledge base tools

Types of techniques supporting Business Analysis activities:

- Documentation techniques
- Communication and team collaboration techniques
- (Stakeholder) collaboration techniques
- Problem analysis techniques
- Problem modeling techniques
- Information elicitation techniques

Specific techniques are listed below.

SWOT Analysis



Figure 51 SWOT

MoSCoW, interview, survey and workshops (see: 4.1.2 Elicitation)

SMART (see: 2.2.1 Vision, Mission and Business Goals)

Gap Analysis (see: 2.2.4 Gap Analysis)

Process Modeling (see: 2.2.2 Business Process Analysis)

5 Why's

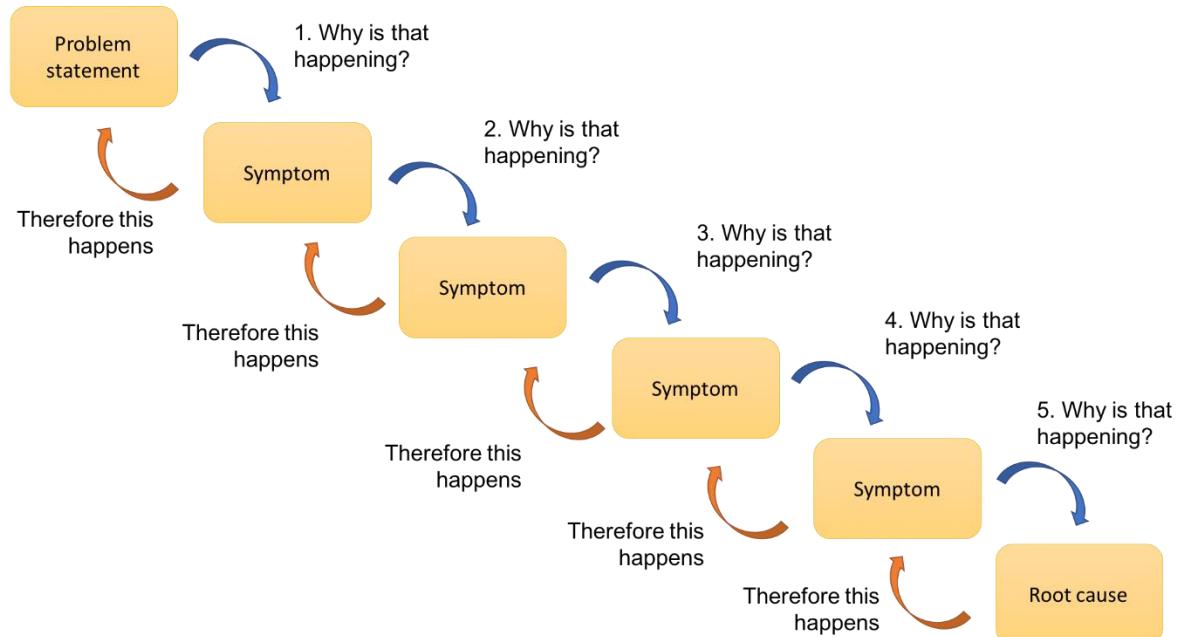


Figure 52 5 Why's (<http://worksmartertogether.ucd.ie/the-power-of-asking-why/>)

Ishikawa diagram

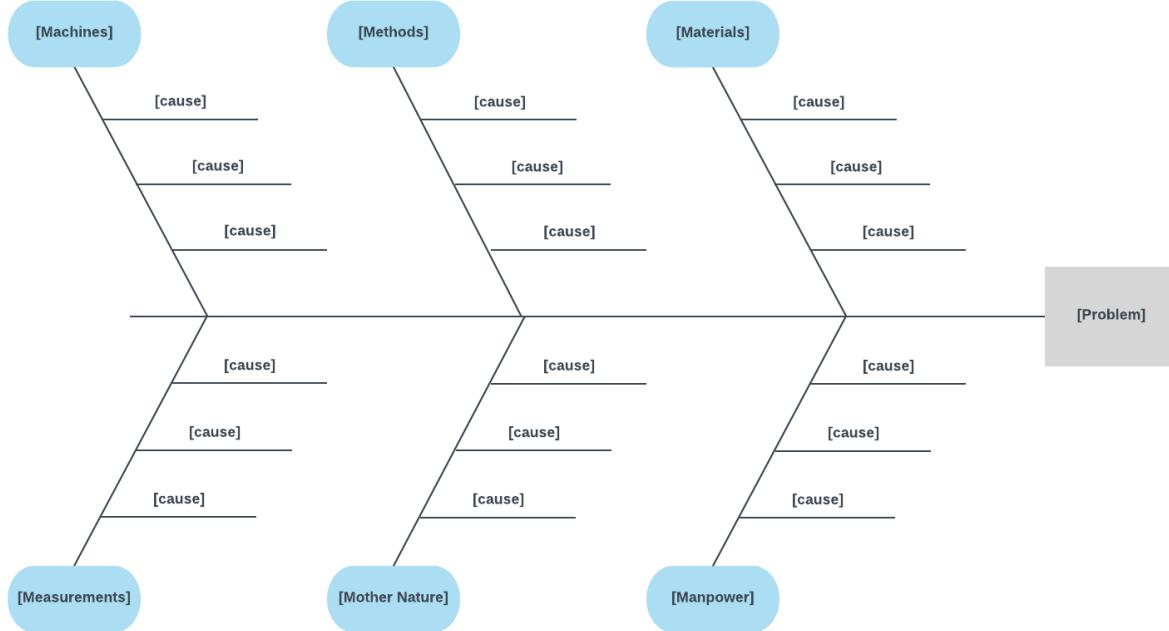


Figure 53 Ishikawa diagram with sample categories

Some Business Analysis products use tools, techniques and notations that also are used for Requirements Engineering (see: 3.5 Tools and Techniques)

Questions

Provide examples of different types of tools supporting Business Analysis activities and explain their application

Provide examples of different types of techniques supporting Business Analysis activities and explain their application

3.5.2 Notations

BPMN (Business Process Modeling Notation) is a standard language for expressing business procedures, workflows and communication between business participants. BPMN uses graphical notation to facilitate communication between stakeholders and provides a means to model and understand the business and its participants (see: 2.2.2 Business Process Analysis). Elements of the notation are quite intuitive, however they also are able to represent complex process semantics.

Business Process Modeling Notation (BPMN) – a graphical notation that depicts the steps in a business process. BPMN depicts the end to end flow of a business process. The notation has been specifically designed to coordinate the sequence of processes and the messages that flow between different process participants in a related set of activities [BPMN].

BPMN notation is based on a flowcharting technique and is dedicated to support modeling and communication for both technical users and business users.

3.6 Sample Exam Questions

3.6.1 Question 3.1

LO-3.2.1 Know the different approach to development and maintenance (K1)

Question

Which of the following statements best describes characteristics of the Agile development approach?

Answer set

- [A] Upfront planning, frequent communication with the customer
- [B] Frequent internal and external communication, minimal upfront planning, quick feedback on product's increments
- [C] Complete scope definition before starting implementation, upfront planning
- [D] Iterative development, documentation, user involvement

3.6.2 Question 3.2

LO-3.2.2 Understand the difference between Business Analysis in Agile and non-Agile environments (K2)

Question

Which of the following statements is true?

Answer set

- [A] Business analysis in both Agile and non-Agile environment requires extensive upfront planning.
- [B] Business analysis in an Agile environment is done in an iterative way, while in traditional projects it is done in a sequential way.
- [C] Business analysis in an Agile environment focuses on collecting needs from stakeholders and transforming them into a detailed solution design, while in non-Agile projects business analysis follows the "fit for purpose" concept and requires frequent communication.
- [D] Business analysis in an Agile environment follows the "fit for purpose" and "just enough" concepts while in non-Agile environments it assumes upfront planning and formality.

3.6.3 Question 3.3

LO-3.2.3 Select proper methods, techniques and approaches to Business Analysis in a specific context (K3)

Question

You are a Business Analyst working on a project that is currently being transformed from the waterfall model to Scrum. In your current role you are responsible for the following:

- Providing expert knowledge in the business and product
- Describing the gap between AS-IS and TO-BE, so that the change can be defined
- Supporting efficient communication between your team and all the business stakeholders
- Defining the business goals, business context, risk levels, and potential impact of the solution on the stakeholders

What must be changed, regarding your responsibilities, after the transformation?

Answer set

- [A] Nothing – the responsibilities of the Business Analyst may remain the same.
- [B] The Business Analyst must take over the role of the Product Owner, because this role corresponds to the responsibilities of Business Analyst in Scrum.
- [C] The Business Analyst should move to a more technical position supporting the Product Owner, as the Scrum team prefers technical team members.
- [D] The Business Analyst becomes the owner of the Kanban-related processes.

3.6.4 Question 3.4

LO-3.2.4 Know examples of interdisciplinary knowledge and skills supporting Business Analysis activities (K1)

Question

Which of the following disciplines would be the **least** useful in the work of a Business Analyst?

Answer set

- [A] Design Thinking
- [B] OCL (Object Constraint Language)
- [C] Service Design
- [D] UX (User Experience)

3.6.5 Question 3.5

LO-3.3.1 Explain why communication is an important part of Business Analysis activities and know factors influencing communication (K2)

Question

Assume you are a Business Analyst working in a small organization specializing in developing workflow systems supporting documentation management. Your organization is following an Agile approach. You and your team used to communicate on daily basis.

Your new customer is a large public administration organization with a huge number of business stakeholders involved in the project. They prefer a formal and documented way for communicating and confirming requirements.

What kind of influencing factor is demonstrated in this scenario?

Answer set

- [A] Stakeholder's culture and age impacting the communication formality
- [B] Type of business problem addressed by the project impacting the level of communication
- [C] Stakeholder's requirements regarding required level of communication formality
- [D] Geographical location impacting the communication frequency

3.6.6 Question 3.6

LO-3.3.2 Know the concept and application of communication plan (K1)

Question

Which of the following is not a typical content item of a communication plan?

Answer set

- [A] SWOT analysis
- [B] Audience of communication
- [C] Frequency of communication
- [D] RACI matrix

3.6.7 Question 3.7

LO-3.3.3 Use available information to create a communication plan (K3)

Question

You are a senior Business Analyst responsible for delivering a solution for a stated business problem. The problem refers to low usability of a solution supporting the sales process.

To ensure the new solution will meet customer expectations, you would like to involve the customer representatives in the solution development process.

In respect to the information above, which of the following statements is certainly true?

Answer set

- [A] To reduce the risk of failure, the customer representatives should be involved in all stages and activities of the solution development process.
- [B] You need to establish a communication plan defining what work products and activities will be communicated to the customer, the frequency and medium of communication, and the roles responsible for the communication.
- [C] You need to establish a communication plan involving the customer representatives in solution validation activities only, so that you can ensure all the expectations and needs of the representatives are met.
- [D] You need to establish a communication plan assuming the customer representatives are involved in the beginning of the project, so that their requirements are considered when planning the strategy.

3.6.8 Question 3.8

LO-3.3.4 Know the different roles involved in Business Analysis activities and their responsibilities (K1)

Question

Which of the following roles of stakeholders most likely would represent a technical perspective?

Answer set

- [A] Product Owner
- [B] User representative
- [C] Solution architect
- [D] Domain expert

3.6.9 Question 3.9

LO-3.4.1 Understand the role of a requirement and other key Business Analysis deliverables for an organization and a program/ project (K2)

Question

Which of the following statements describes the role of a requirement for a project?

Answer set

- [A] Business requirements specify the expected behavior of a software module.
- [B] Business requirements express major needs required to achieve a stated mission and goals.
- [C] Business requirements define the scope of delivery and facilitate project planning.
- [D] Business requirements define the future state of an organization

3.6.10 Question 3.10

LO-3.4.2 Know typical Business Analysis products (K1)

Question

Which of the following statements most likely describes products of *strategy definition* only?

Answer set

- [A] Communication plan, stakeholder descriptions, business solution options, business case
- [B] Definition of business processes, business needs, gap analysis, solution options
- [C] Business risks, stakeholders' requirements, solution performance assessment
- [D] Business Analysis tools and techniques, business analysis documentation templates, quality requirements for the process, improvement plan, RTM

3.6.11 Question 3.11

LO-3.5.2 Know different types of techniques supporting Business Analysis activities and their application (K1)

Question

Which of the following would **not** be a technique supporting core Business Analysis activities?

Answer set

- [A] MoSCoW
- [B] SWOT
- [C] 5 Whys
- [D] Deployment diagram

3.6.12 Question 3.12

LO-3.5.3 Understand the purpose and application of techniques supporting different BA activities (K2)

Question

You are working on creating a solution proposal for a given business problem. The problem is related to the low level of customer satisfaction – customers are complaining about low quality of services provided by your organization. You would like to understand the problem and its possible causes.

Which of the following set of tools and techniques would you choose to support this goal?

Answer set

- [A] Interviews with customer representatives, 5 Why's, gap analysis
- [B] SWOT analysis, UML sequence diagram, business case
- [C] SMART, gap analysis, risk analysis
- [D] Process modeling, workshops, MoSCoW

3.7 Answers and Justifications

Question 3.1 – answer B

Justification

B – Correct – as explained in the IQBBA syllabus, section 3.2.

A, C and D – Incorrect. These answers contain characteristics of non- Agile approach (upfront planning, scope definition). D can be present in both Agile and non-Agile approaches.

Question 3.2 – answer D

Justification

D – Correct. As stated in the IQBBA syllabus, section 3.2.1:

Concepts related to Agile:

- Fit for purpose
- Just enough
- Clear product/project vision
- Frequent communication
- Empowering stakeholders to express needs
- Prioritization of requirements

Non-Agile concepts:

- Upfront planning
- Monitoring and control
- Clear product/project vision
- High level of formality
- Detailed requirements documents

A – Incorrect. Agile does not value upfront planning.

B – Incorrect. Business analysis in non-Agile projects can be done in an iterative and incremental way (eg. RUP).

C – Incorrect. “Fit for purpose” concept is typical for Agile.

Question 3.3 – answer A

Justification

A – Correct. Some key responsibilities are the same.

B – Incorrect. PO is not the same as BA. The BA does not always become a PO – the scenario contains no information about the need of transforming the BA into the role of PO (no info about responsibility for the product).

C – Incorrect. There is a place for a BA in Agile, non-technical people are also needed.

D – Incorrect. There is nothing in the scenario suggesting there is a Kanban process that a BA should take care of. In addition, there is no rule that a BA should manage the Kanban-related process.

Question 3.4 – answer B

Justification

B – Correct. OCL, as a language used to define constraints for UML elements, would be useful for an architect or system analyst, but will not likely be used by a business analyst.

A, C and D – Incorrect. All these disciplines may support BA work

Question 3.5 – answer C

Justification

C – Correct. Key statement determining the answer “They prefer a formal and documented way of communicating and confirming requirements”. This means that the stakeholders require formal communication.

A, B and D – Incorrect. There is nothing in the scenario suggesting the factors mentioned in the answers can influence communication.

Question 3.6 – answer A

Justification

A – Correct. SWOT “is a strategic planning technique used to help a person or organization identify strengths, weaknesses, opportunities, and threats related to business competition or project planning” (https://en.wikipedia.org/wiki/SWOT_analysis)

B, C and D – Incorrect. These are typical contents of a communication plan, as explained in the IQBBA syllabus, section 3.3.

Question 3.7 – answer B

Justification

B – Correct. You need to create a communication plan explaining all the aspects of communication:

- Subject of communication (work product, task, etc.)
- Stakeholders involved (audience)
- Frequency of communication
- Medium of communication
- Person responsible for communication

(IQBBA syllabus, section 3.3.)

A – Incorrect. There is no need to involve the representative in ALL stages and activities of the solution development process. The level of involvement should be adjusted to the real needs and established in a form of a communication plan.

C – Incorrect. Involving the customer representatives in solution validation activities only will not ensure that the expectations and needs of the representatives are correctly collected and delivered. The level of involvement should be adjusted to the real needs and established in a form of a communication plan. In addition, this approach would not work in Agile environments.

D – Incorrect. See C.

Question 3.8 – answer C

Justification

C – Correct. Solution architect is a technically oriented role.

A, B and D – Incorrect. Key characteristic of PO is representing business. User representatives represent business perspective. Domain expert can represent either business or other point of view – this is not specified here.

Question 3.9 – answer C

Justification

C – Correct. It refers to project point of view, as explained in the IQBBA syllabus, section 3.4.

A – Incorrect. Business requirements express needs of a business, they do not focus on software functions.

B – Incorrect. It refers to organization point of view, as explained in the IQBBA syllabus, section 3.4.

D – Incorrect. It is a definition of a vision.

Question 3.10 – answer B

Justification

B – Correct – as explained in the IQBBA syllabus, section 3.4.

A, C and D – Incorrect. These answers contain products belonging to other areas.

Question 3.11 – answer D

Justification

D – Correct. This is not a technique, but one of UML diagrams used to “model the physical deployment of artifacts on nodes” (https://en.wikipedia.org/wiki/Deployment_diagram).

A, B and C – Incorrect. These are common techniques supporting Business Analysis, as explained in the IQBBA syllabus, section 3.5.2.

Question 3.12 – answer A

Justification

A – Correct. The problem to be resolved is defined as follows “you would like to understand the problem and its causes correctly”. Root cause techniques like 5 Why’s supported by interviews with representatives would be a good solution. Also gap analysis would be helpful to establish what is needed to move from AS-IS state to TO-BE.

B, C, D – Incorrect. All these answers contain techniques not appropriate for the stated goal – SWOT is a method for evaluating organization, project or business venture; SMART is for defining business goals, MoSCoW is for prioritization.

4. Requirements Engineering in Business Analysis

Terms

Assumption, Baseline, CCB (Change/Configuration Control Board), Change Management, Change Request, Configuration Item, Configuration Management, Conflict, Conflict Management, Constraint, Elicitation, Information Architecture, Quality Assurance, Requirements Development, Requirements Document, Requirements Engineering, Requirements Management, Requirements Modeling, Traceability

4.1 Requirements Development

4.1.1 Introduction

The purpose of Requirements Development (RD) is to elicit, analyze, and establish business and solution requirements [CMMI].

Requirements Development – a collection of activities, tasks, techniques and tools to identify, analyze and validate requirements. Includes the process of transforming needs into requirements.

Requirements Development includes activities aiming to:

- Elicit requirements with the aim to clarify the scope and collect all required features and qualities of the solution
- Analyze and validate requirements to confirm the understanding of stakeholders on the content and scope of delivery
- Model requirements and solutions to create solution options
- Specify requirements in a defined form
- Validate and verify requirements and other Business Analysis and Requirements Engineering work products

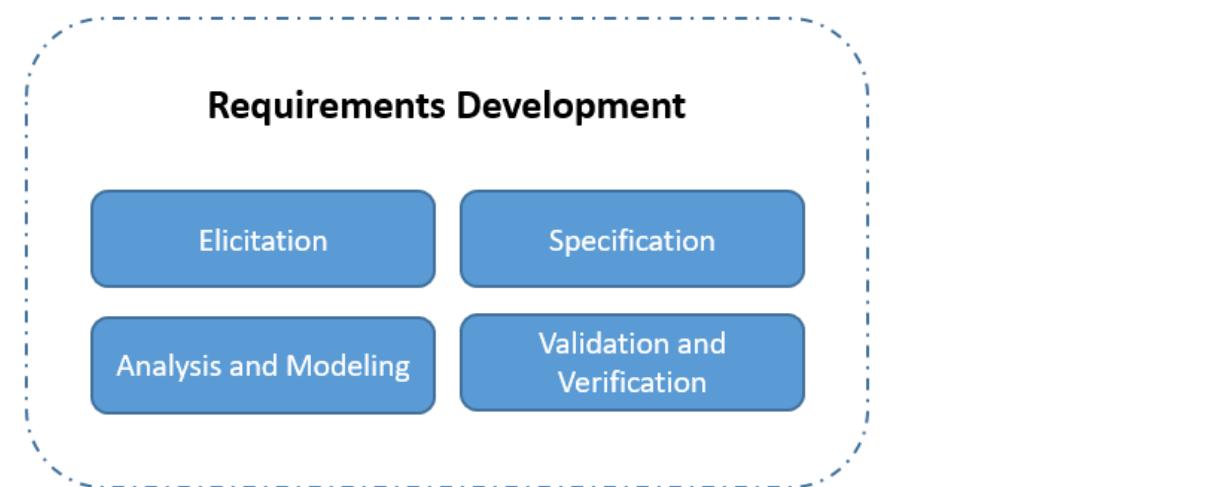


Figure 54 Elements of Requirements Development

Questions

Recall the definition of Requirements Development

Explain the main activities, products and methods used in Requirements Development

4.1.2 Elicitation

Business Requirements Elicitation is defined as a set of approaches, techniques, activities, and tasks used to capture the business requirements of a planned solution from the stakeholders and other available sources.

Elicitation – the act of obtaining information from other people. In the context of Requirements Engineering, elicitation is the process of gathering requirements from stakeholders.

Business
Requirements
Elicitation
purposes

- Establishing capabilities required to meet the stated Business Need
- Identifying the desired capabilities of the planned solution
- Establishing the final scope and business design of the solution
- Identifying limitations and risks impacting the ability to meet business requirements

Figure 55 Business Requirements Elicitation purposes

Requirements source – the source from which requirements have been derived. Requirements sources can be stakeholders, documents, business processes, existing systems, market, etc.



Figure 56 Requirements sources

These sources can influence the chosen technique for Requirements Elicitation. Requirements Elicitation is not only collecting stakeholders' needs by asking questions – very often the information collected has to be interpreted, analyzed, modeled and validated before a complete set of requirements for a solution can be established. The elicitation techniques and tools to be used are sometimes driven by the choice of the modeling diagrams or the general analysis approach. Many modeling techniques imply the use of a particular kind of elicitation technique as well.

The following techniques are used during Requirements Elicitation:

Questionnaire

A questionnaire consists of a several questions to be answered by the respondent. These can be open-ended or closed-ended questions. An open-ended question requires from the respondent to formulate his own answer. In case of a closed-ended question the respondent is asked to choose an answer from a number of possible options. These options should be mutually exclusive.

The following are the principles of constructing a questionnaire:

- Using clear and easily understandable wording
- Formulating questions and answers in an unambiguous way to avoid misinterpretation
- Avoiding assumptions about the respondent's opinions and personality
- Ensuring one question is asking about only one problem
- Ensuring that answers to a specific question are clearly different

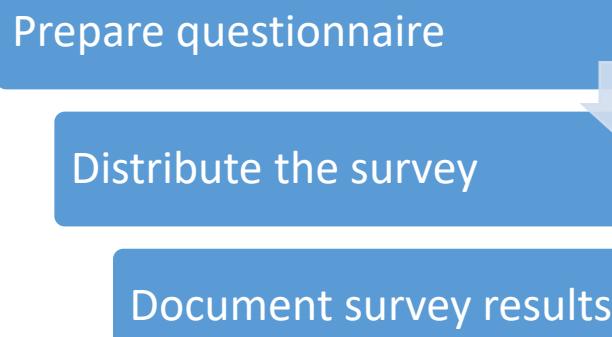


Figure 57 Questionnaire process

Sample question

About how many books are there in your home?

(Do not count newspaper or magazines)

- None**
- 1-10**
- 11-50**
- 51-100**
- 101-200**
- More than 200**

Interview

An Interview is a conversational technique where the interviewer is asking the responder questions to obtain information on specified topic. This technique is interactive and permits the interviewer to modify the order in which previously prepared questions are asked depending on the responder's answers and the situation.

The following are three primary forms of an interview:

- Structured interview (standardized interview) – interview consists of a set of exactly the same questions which are asked in the same order
- Semi-structured interview – new questions can be brought up during the interview as a result of what the responder says
- Unstructured interview – questions do not include a predefined and limited set of answers to be chosen by the respondent and can be changed during the interview

Persona and user story

Creating personas can help to understand users and their characteristics. A persona represents a group of users of the planned solution and is one of user-centered design methods.

User stories express requirements from a user's point of view in the following form: *As a [role], I want [feature] so that [benefit]*. Persona, user stories and user scenarios are often used together.

See also: 4.1.4 Specification

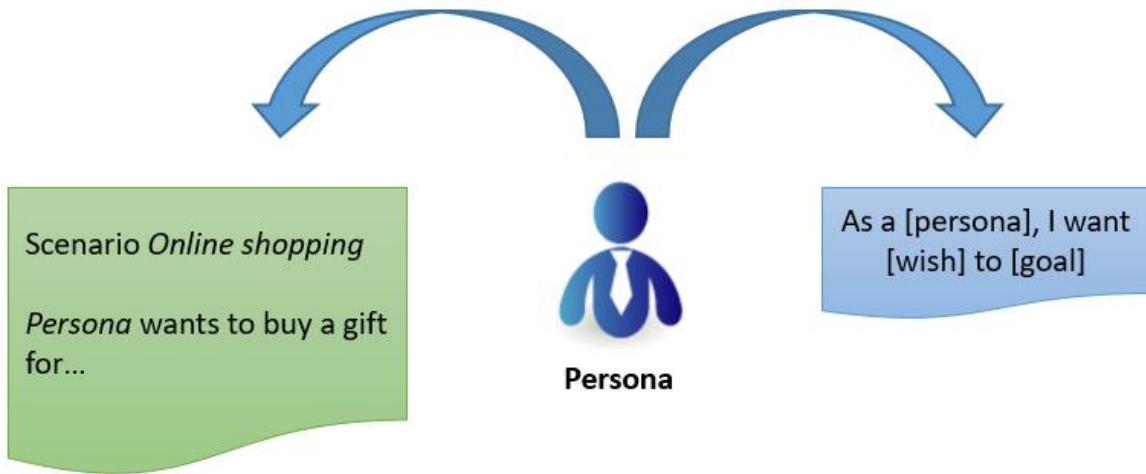


Figure 58 Using personas with user story and scenarios

Use case

A use case is a form of expressing functional requirements perceived from an actor perspective. A use case specification contains a list of actions or event steps defining the interactions between a role (actor) and a system to achieve a given goal. See also: 4.1.3 Analysis and Modeling

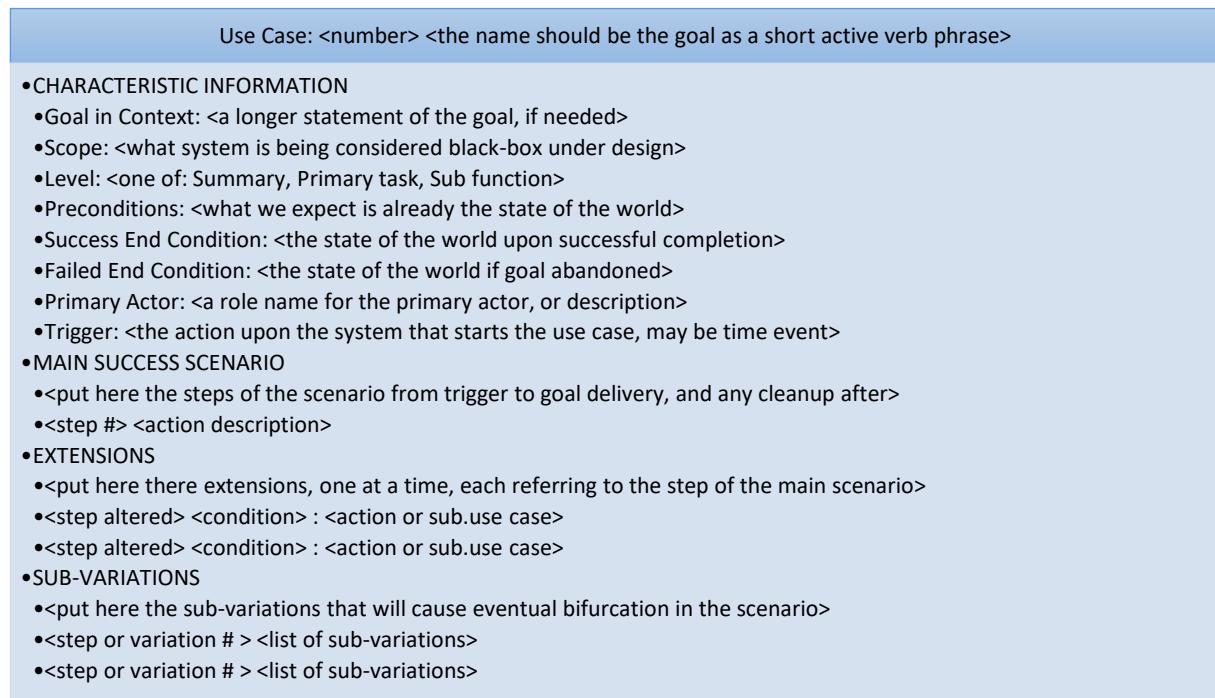


Figure 59 Use case scenario template

User scenario

A user scenario is a description of user-system interaction in the form of a realistic example. Scenarios are created based on the high-level requirements. Scenario covers a specific task to be done by a user and is written in a narrative form.

Cheryl – The seasoned assessor																		
	<p>Age: 42 Job: Teaches History at Grammar School Teaching experience: Over 20 years Assessor experience: 10 years (off and on) Computer & IT experience: Not very confident using computers Personality: Outgoing, considerate, dependable Likes: Social aspect of being an assessor Dislikes: All the admin associated with marking</p> <p><i>"Being an assessor helps my students and helps me to pay for our summer holiday"</i></p>	<p>Needs to be able to:</p> <ul style="list-style-type: none"> • Be reminded of tasks, dates and milestones • Easily get in contact with OCR • View details of her commissions and activities • Find out exactly what a commission entails • Get help and advice 																
Scenario 3 – Cheryl marking a June 2011 GCSE History question paper (using Scoris)																		
	<p>Cheryl initially started marking when she had her second child and has been an assessor off and on for the last 10 years. She has previously marked paper question papers (i.e. sent to her) and is a little bit nervous about having to mark on screen.</p>	<p>Importance: High Frequency: Low</p>																
<table border="1"> <thead> <tr> <th data-bbox="234 765 266 787">Id</th><th data-bbox="282 765 488 787">Scenario steps</th><th data-bbox="568 765 710 787">Comments</th><th data-bbox="853 765 1028 787">Outstanding questions</th><th data-bbox="1131 765 1274 787">Required functionality</th></tr> </thead> <tbody> <tr> <td data-bbox="234 799 266 821">3.1</td><td data-bbox="282 799 552 877">Cheryl receives an email informing her that OCR have an opportunity for her to undertake some assessor activities (i.e. marking answers for a GCSE history paper) that she might be interested in.</td><td data-bbox="568 799 837 990"> <ul style="list-style-type: none"> ○ Assuming that Cheryl has already had her system checked to ensure that it's compatible with Scoris (e.g. as part of the sign up process) ○ Assuming that Cheryl already has an assessor account with OCR (i.e. for the assessor portal) and has agreed to receive email alerts from OCR – she can switch these off in her preferences (or even request to receive Text alerts) </td><td data-bbox="853 799 1107 922"> <ul style="list-style-type: none"> ○ When would this happen? ○ Is Cheryl likely to sign up with a work email address or home email address? ○ How do we ensure that alerts don't go to Cheryl's spam inbox? </td><td data-bbox="1131 799 1337 855"> <ul style="list-style-type: none"> ○ Send email alerts to assessors (e.g. commission opportunity) </td></tr> <tr> <td data-bbox="234 1001 266 1023">3.2</td><td data-bbox="282 1001 552 1057">Cheryl logs in to the assessor portal (using a link in the email) and can see the new commission opportunity.</td><td data-bbox="568 1001 837 1102"> <ul style="list-style-type: none"> ○ If Cheryl hadn't seen the email she might also see an alert on logging in to the assessor portal to inform her that a new commission opportunity is available ○ If Cheryl has forgotten her password </td><td data-bbox="853 1001 1107 1057"> <ul style="list-style-type: none"> ○ What will 'commissions' be called on the assessor portal? ○ How often is this likely to happen for Cheryl? </td><td data-bbox="1131 1001 1337 1102"> <ul style="list-style-type: none"> ○ New commission opportunity alert on login (e.g. like email) ○ Forgotten password option to reset a password using a registered email address ○ View commission </td></tr> </tbody> </table>				Id	Scenario steps	Comments	Outstanding questions	Required functionality	3.1	Cheryl receives an email informing her that OCR have an opportunity for her to undertake some assessor activities (i.e. marking answers for a GCSE history paper) that she might be interested in.	<ul style="list-style-type: none"> ○ Assuming that Cheryl has already had her system checked to ensure that it's compatible with Scoris (e.g. as part of the sign up process) ○ Assuming that Cheryl already has an assessor account with OCR (i.e. for the assessor portal) and has agreed to receive email alerts from OCR – she can switch these off in her preferences (or even request to receive Text alerts) 	<ul style="list-style-type: none"> ○ When would this happen? ○ Is Cheryl likely to sign up with a work email address or home email address? ○ How do we ensure that alerts don't go to Cheryl's spam inbox? 	<ul style="list-style-type: none"> ○ Send email alerts to assessors (e.g. commission opportunity) 	3.2	Cheryl logs in to the assessor portal (using a link in the email) and can see the new commission opportunity.	<ul style="list-style-type: none"> ○ If Cheryl hadn't seen the email she might also see an alert on logging in to the assessor portal to inform her that a new commission opportunity is available ○ If Cheryl has forgotten her password 	<ul style="list-style-type: none"> ○ What will 'commissions' be called on the assessor portal? ○ How often is this likely to happen for Cheryl? 	<ul style="list-style-type: none"> ○ New commission opportunity alert on login (e.g. like email) ○ Forgotten password option to reset a password using a registered email address ○ View commission
Id	Scenario steps	Comments	Outstanding questions	Required functionality														
3.1	Cheryl receives an email informing her that OCR have an opportunity for her to undertake some assessor activities (i.e. marking answers for a GCSE history paper) that she might be interested in.	<ul style="list-style-type: none"> ○ Assuming that Cheryl has already had her system checked to ensure that it's compatible with Scoris (e.g. as part of the sign up process) ○ Assuming that Cheryl already has an assessor account with OCR (i.e. for the assessor portal) and has agreed to receive email alerts from OCR – she can switch these off in her preferences (or even request to receive Text alerts) 	<ul style="list-style-type: none"> ○ When would this happen? ○ Is Cheryl likely to sign up with a work email address or home email address? ○ How do we ensure that alerts don't go to Cheryl's spam inbox? 	<ul style="list-style-type: none"> ○ Send email alerts to assessors (e.g. commission opportunity) 														
3.2	Cheryl logs in to the assessor portal (using a link in the email) and can see the new commission opportunity.	<ul style="list-style-type: none"> ○ If Cheryl hadn't seen the email she might also see an alert on logging in to the assessor portal to inform her that a new commission opportunity is available ○ If Cheryl has forgotten her password 	<ul style="list-style-type: none"> ○ What will 'commissions' be called on the assessor portal? ○ How often is this likely to happen for Cheryl? 	<ul style="list-style-type: none"> ○ New commission opportunity alert on login (e.g. like email) ○ Forgotten password option to reset a password using a registered email address ○ View commission 														

Figure 60 Sample scenario (<http://www.uxforthemasses.com/scenarios-part-one/#>)

Self-recording

A stakeholder (end user, business representative) documents his activities performed to complete a specific task or process. The procedure may require documenting all steps, inputs and resources needed to complete a given task.

A recommended practice is to document not only "AS-IS" activities but also changes, desires and needs.

The main disadvantage of this technique is that automated activities may be forgotten or neglected and therefore not documented and considered as requirements.

Consultancy

Elicitation driven by a representative of the end user, SME, business stakeholder, etc. A representative does the following:

- Provides user-centered requirements
- Monitors the progress
- Validates correctness of the design
- Provides quick feedback and additional information wherever necessary

This technique allows close cooperation and direct communication with the customer and is one of the most effective requirements identification (and validation) methods.

Analysis of existing business documents

This technique is used when there is existing documentation that can help in identifying requirements within an organization.

The basis for analysis can be:

- Process models and maps

- Process descriptions
- Organization structure
- Product specification
- Work procedures
- Standards and instructions

Such documents may serve as a basis for requirements identification for a new solution.

Collect all valid documents related to the area under investigation

Read the documents making initial notes and proposals for new requirements

Check the identified requirements together with a SME

Document all requirements approved by the customer

Figure 61 Procedure of Elicitation based on existing documents

The requirements identified are the basis for further requirements analysis and needs to be detailed and extended with other, related and linked requirements.

Brainstorming

Brainstorming is a creativity technique used to collect requirements related to areas of the organization's activity or planned solution functionality that are not well known or are new. The technique is used to collect many ideas from various stakeholders in a short time and with low cost. During the brainstorming session the participants submit ideas and concepts regarding a given problem. These ideas are noted down and then analyzed in order to select those most appropriate and feasible.

Preparation

- Develop a clear definition of the area of interest.
- Determine a time limit for the group to generate ideas.
- Identify facilitator and participants for the session.
- Establish criteria for evaluating and rating the ideas.

Session

- Share new ideas without any discussion, criticism or evaluation.
- Visibly record all ideas.
- Encourage participants to be creative, share exaggerated ideas, and build on the ideas of others.

Wrap-up

- Create a condensed list of ideas, combine ideas where appropriate, and eliminate duplicates.
- Rate the ideas. Distribute the final list of ideas to appropriate parties.

Figure 62 Brainstorming procedure [BABOK]

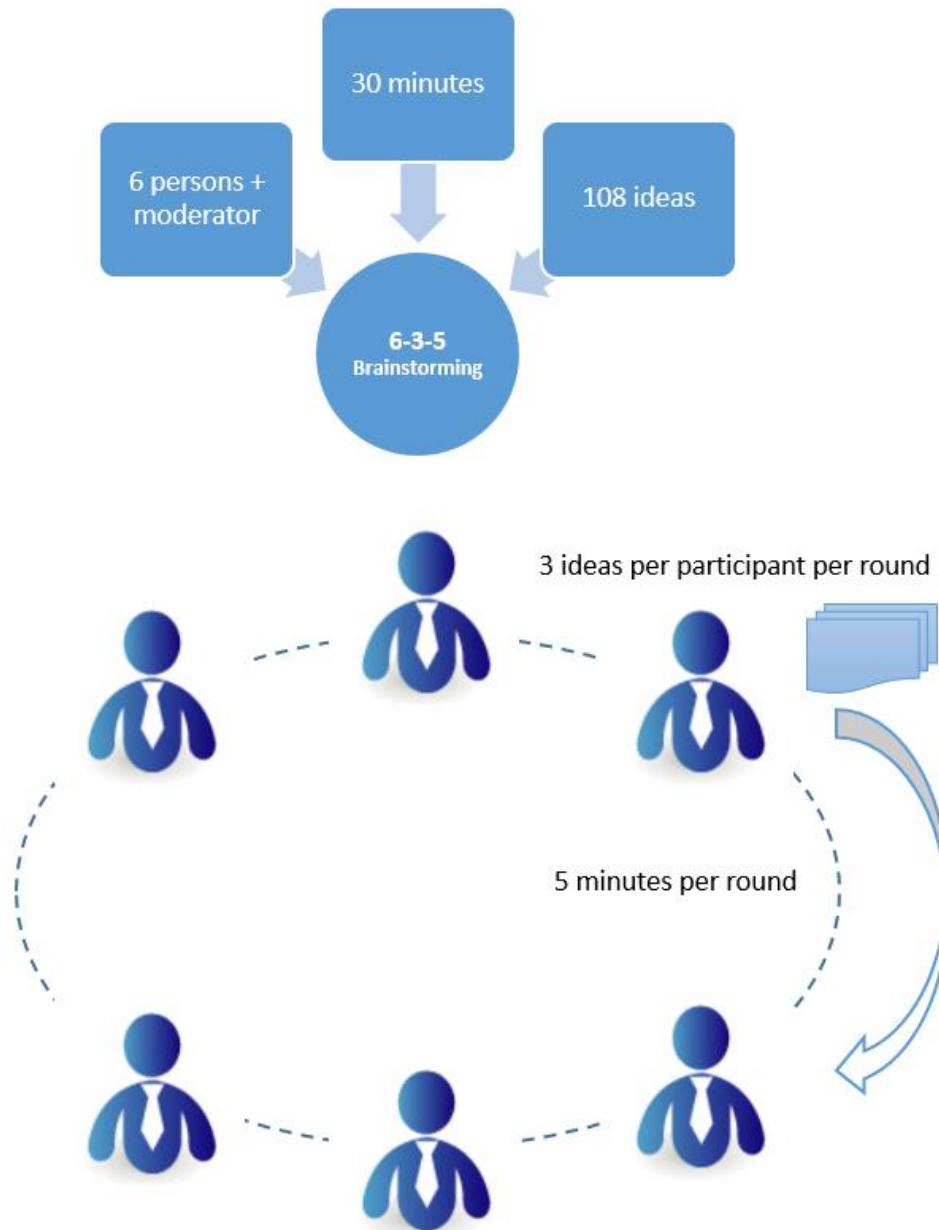


Figure 63 6-3-5 method

Field observation

Field observation is a technique used to conduct an observation of the target work environment and recognize and understand processes to be improved or supported by the solution.

Variations on observation:

- Participating in the actual work as an end user
- Becoming a temporary apprentice for someone
- Watching a demonstration of what should be done

Prepare for observation

- Determine what sampling of users to observe and which activities
- Prepare questions to ask during or after the observation

Observe

- Introduce yourself to the person being observed
- Conduct observation, take notes

Post observation wrap-up – documentation and confirmation

- Obtain answers to original questions, or new questions
- Provide a summary of notes to the user

Figure 64 Field observation procedure

Apprenticing

Apprenticing is a process of learning from a given person (end user, customer) his job. The person who knows the process, teaches the Business Analyst – this approach is also known as “Master and student”. The “student” is sitting down and watching the “master” working, asking questions in case of problems, and explaining the tasks being performed.

Workshops with stakeholders

Conducting workshops is a structured way to discuss and make decisions and can involve stakeholders representing different areas and/or domains.

Workshops may be used to:

- Identify requirements
- Uncover hidden requirements
- Develop requirements in a newly identified area
- Prioritize requirements
- Reach consensus on requirements when it comes to requirements agreement (sign off)
- Review results of a specified process or activity and resolve issues that might have appeared

Requirements Elicitation at all levels

Requirements Elicitation should apply to all levels of requirements.

When eliciting requirements, it is important to ask not only about functions, but about quality attributes as well. Non-functional requirements (NFR) describe the quality attributes of the solution and have a great impact on the overall perception of the solution quality. In addition, collected information should be properly classified. A common technique for requirements prioritization is MoSCoW.

MoSCoW – a technique that allows the prioritization of requirements by allocating an appropriate priority expressed in the following terms: *Must have*, *Should have*, *Could have* and *Won't have (Would like to have in the future)*.

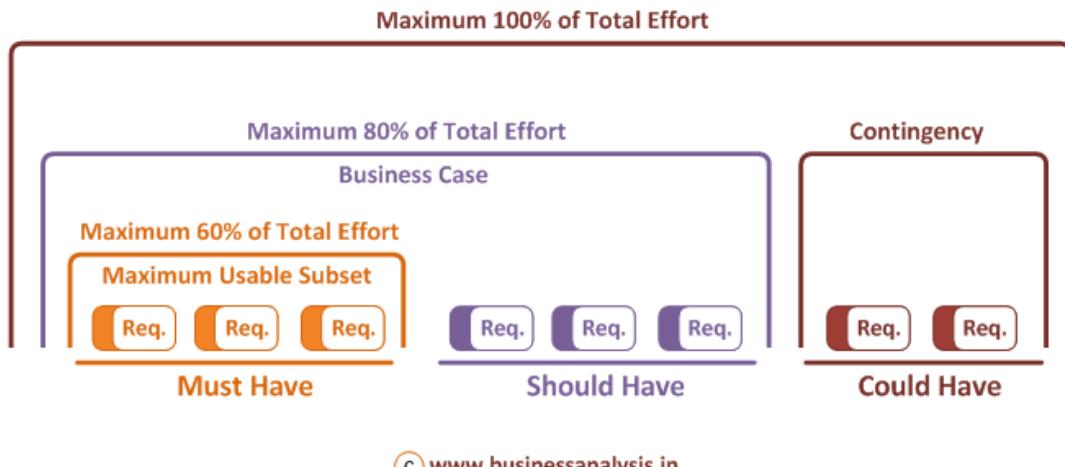


Figure 65 MoSCoW method

Elicitation results – requirements – should be properly documented to allow further tracking and Requirements Analysis. It is important to remember that common language has some limitations and disadvantages. This may cause the description of the requirements to be unclear and ambiguous. Therefore, proper standards and templates should be used wherever possible. In addition to standards and templates, using published vocabularies is an important tool to facilitate communication between different stakeholders and to introduce some control over the natural language's ambiguity.

Questions

Recall the definition of elicitation

Explain the role of business needs and business requirements in elicitation and solution planning

Provide examples of different techniques for elicitation and explain their application

4.1.3 Analysis and Modeling

Requirements analysis

Analysis is done to detail and structure the collected information so that a solution design can be defined.

Specific techniques supporting analysis are decomposition and structuring.

- ◀  **Business Model**
 - ▷  Domain
 - ▷  Goals
 - ▷  Context
 - ▷  Stakeholders
 - ▷  Business Workflows
 - ▷  Business Process BPMN
- ◀  **Requirements Model**
 - ▷  Requirements Model
 - ▷  Functional Requirements
 - ▷  Non-Functional Requirements
 - ▷  Transition Requirements
- ▷  **System Analysis Model**

Figure 66 Sample organization of requirements and other artifacts

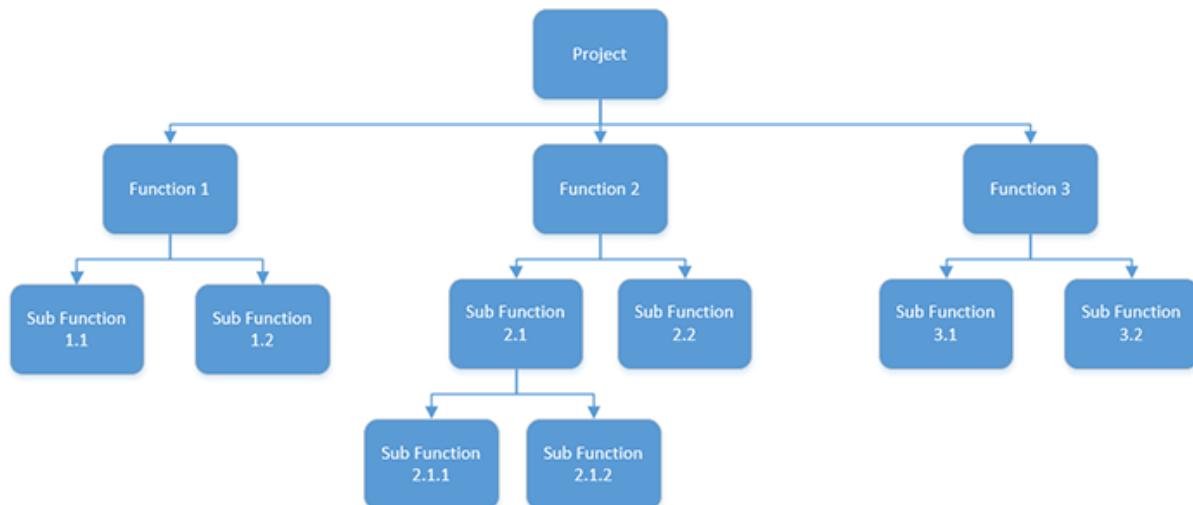


Figure 67 The concept of decomposition

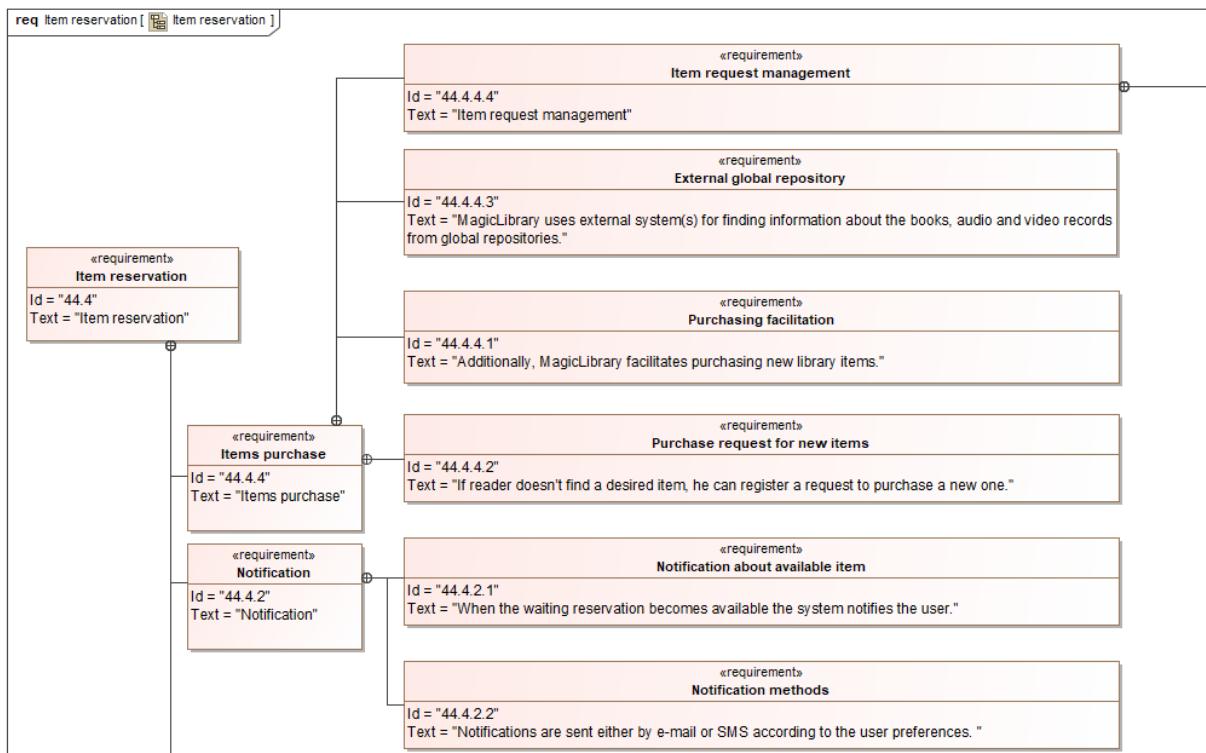


Figure 68 Requirements decomposition using requirements diagram
(<https://docs.nomagic.com/display/SYMLP190/Requirements+decomposition>)

A common technique for requirements organization and grouping in Agile is Story mapping.

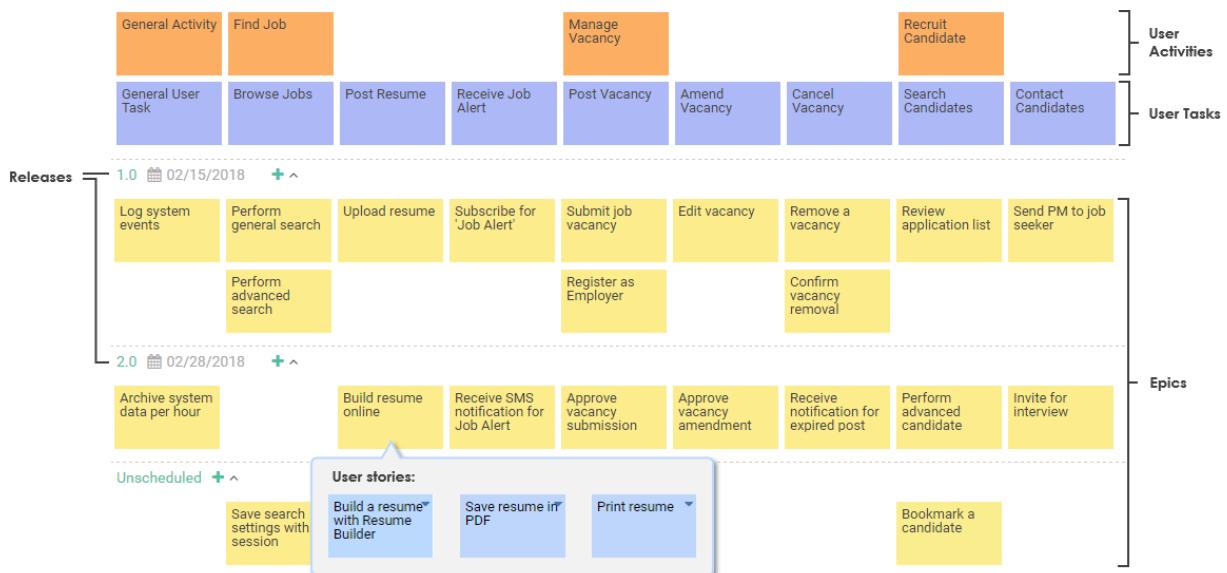


Figure 69 Sample Story mapping (<https://www.visual-paradigm.com/guide/agile-software-development/what-is-user-story-mapping/>)

During analysis, additional information impacting the solution, such as constraints and assumptions, may be identified.

Requirements Analysis – a set of tasks, activities and tools to determine whether the stated (elicited) requirements are unclear, incomplete, ambiguous, or contradictory, and then documenting the requirements in a form of a consistent model.

Constraints and assumptions

Constraints (limitations) are specific types of requirements that explicitly and intentionally act to restrict any system or process [TGilb]. Defining constraints allows the stakeholders to be aware that options they would normally think could be considered are not viable.

Assumptions are unproven conditions that are believed to be true, but have not yet been confirmed. It is important to define assumptions as they may have a negative effect and might impair the ability to achieve the proposed solution [TGilb].

Assumptions and constraints identify aspects of the problem domain that can limit or impact the design of the solution, but are not functional requirements. In some cases, assumptions become constraints of the solution.

Element	Example
Constraint	System must be built in Java Product must go live before the start of the next business year
Assumption	Users have experience with similar products Integration with CRM should be ready on time

Conflict management

During Requirements Analysis, conflicts may be discovered. A conflict is when two or more values, perspectives or opinions are contradictory in nature and have not yet been agreed or aligned.

Conflict – a situation appearing when different values, perspectives or opinions are contradictory in nature.

Some of common conflicts in Requirements Engineering include:

- Business requirements and their ability to be implemented
- Stakeholders having contradictory requirements
- The proposed solution for requirements' implementation may be contradictory

Conflict Management is a process which details a variety of methods by which people handle and resolve conflicts.

Conflict Management – the process of limiting the negative aspects of conflict while increasing the positive aspects of conflict.

One of the most popular models of Conflict Management suggests the following techniques to deal with a conflict:

- Collaborating: win/win
- Compromising: win some/lose some
- Accommodating: lose/win
- Competing: win/lose
- Avoiding: no winners/no losers

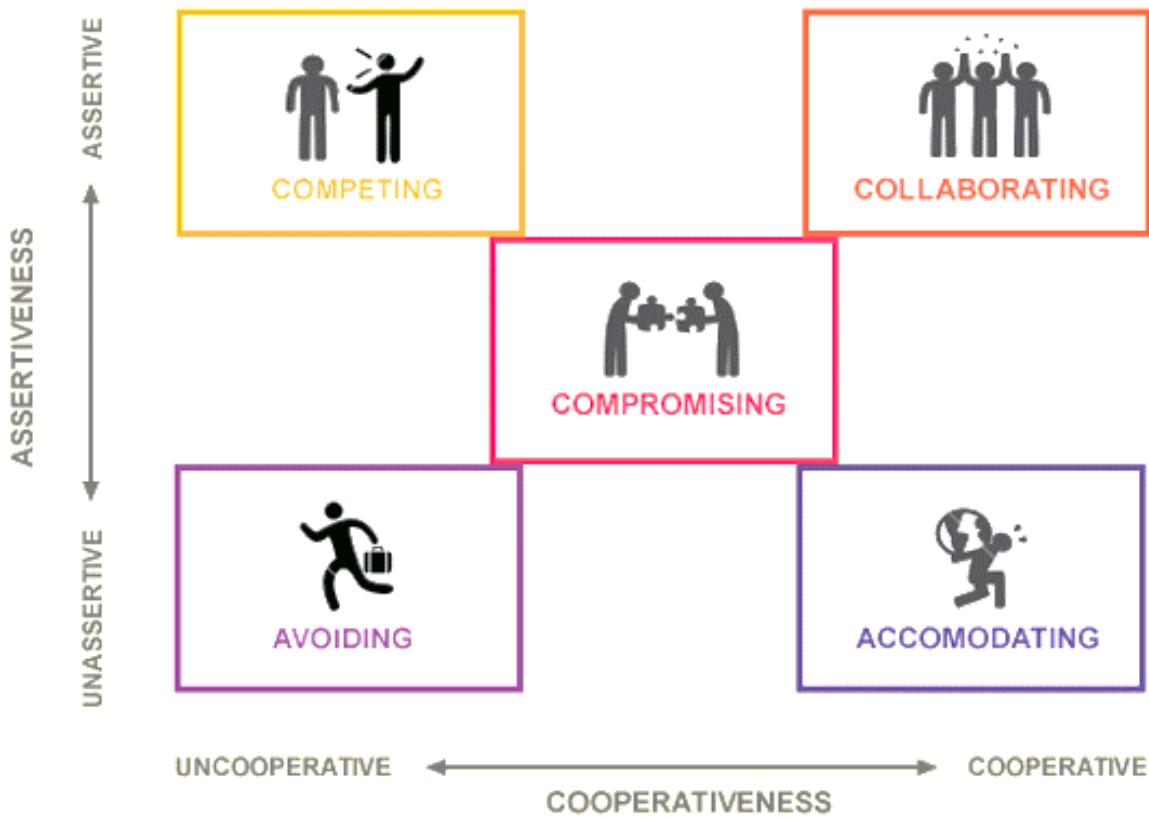


Figure 70 Thomas-Kilmann Conflict Mode Instrument

Conflict identification

Conflict analysis

Conflict resolution

Figure 71 Conflict Management process

Some techniques supporting conflict resolution include:

- Interviews with involved stakeholders, listening and understanding the nature of the conflict
- Root cause analysis (RCA)
- Group meeting
- Analyzing needs and priorities (based on results of stakeholder analysis)
- Involving external parties

It is recommended that key information related to conflicts, their sources, methods for resolution and results be documented. This information may help in further process improvement.

Modeling

Analysis often includes modeling activities. Modeling is a way of expressing real objects by representing parts or the whole of the proposed solutions. Models may contain textual elements, matrices and diagrams, and are used to reflect the relationships and dependencies between the requirements that fulfill the identified business needs. In the case of large and complex solutions, modeling is helpful in expressing the overall structure of the solution. In addition, presenting complex requirements and relationships in the form of a model, especially in some graphical form such as diagrams, helps ensure the solution is understood by other stakeholders. Models are often easier to read and comprehend than written text.

Solution Modeling can use several types of models, but in general three basic levels of models exist.

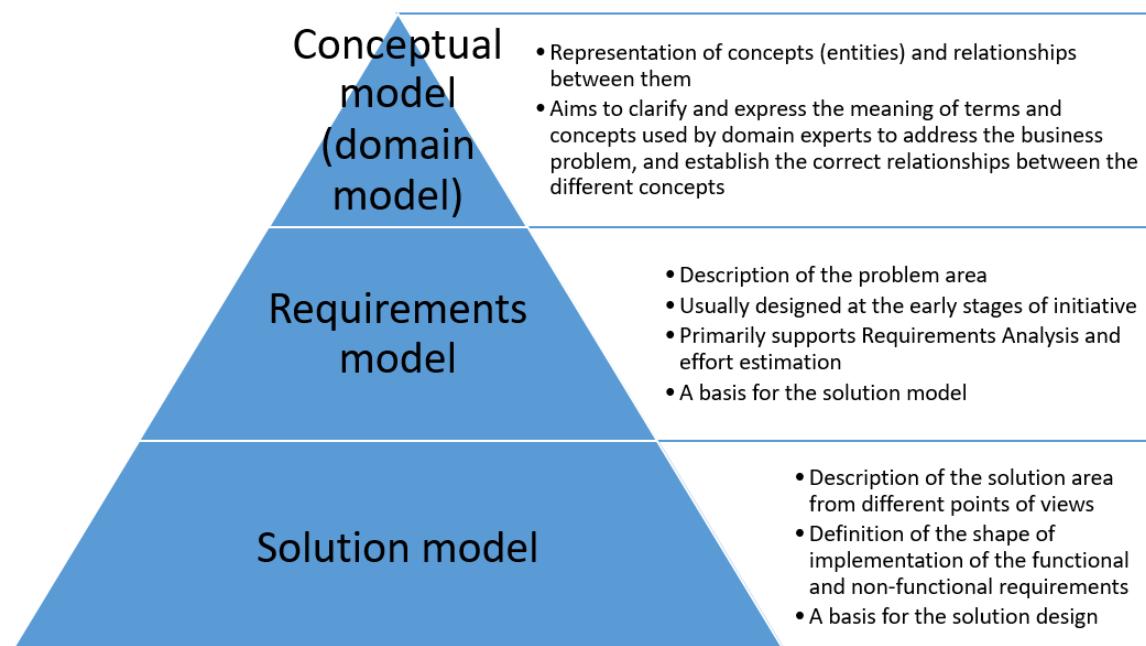


Figure 72 Levels of modeling

Different model perspectives may be used for the above levels depending on the point of view to be presented via the specific model. Common perspectives applicable to modeling the problem or solution domain include the following:

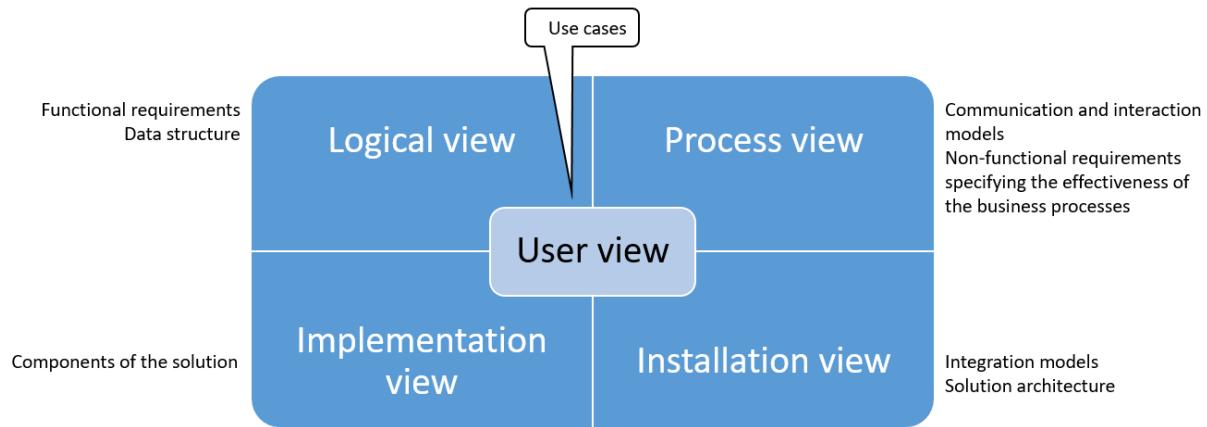


Figure 73 Different perspectives of modeling

Different levels of modeling and different views of the solution can be described by different diagrams. To get a full picture of the solution, usually a combination of different views is used. This results in using different diagrams describing the solution model from specific perspectives.

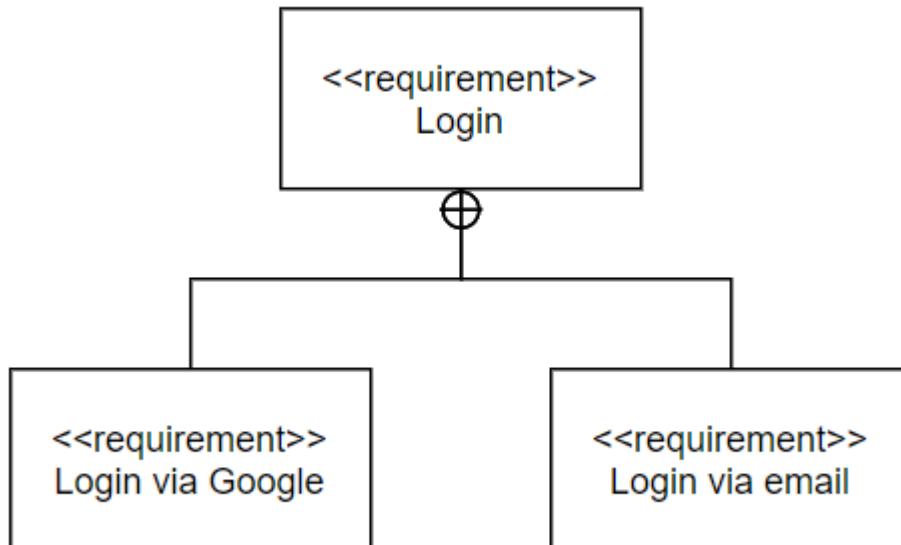


Figure 74 Sample SysML requirements diagram

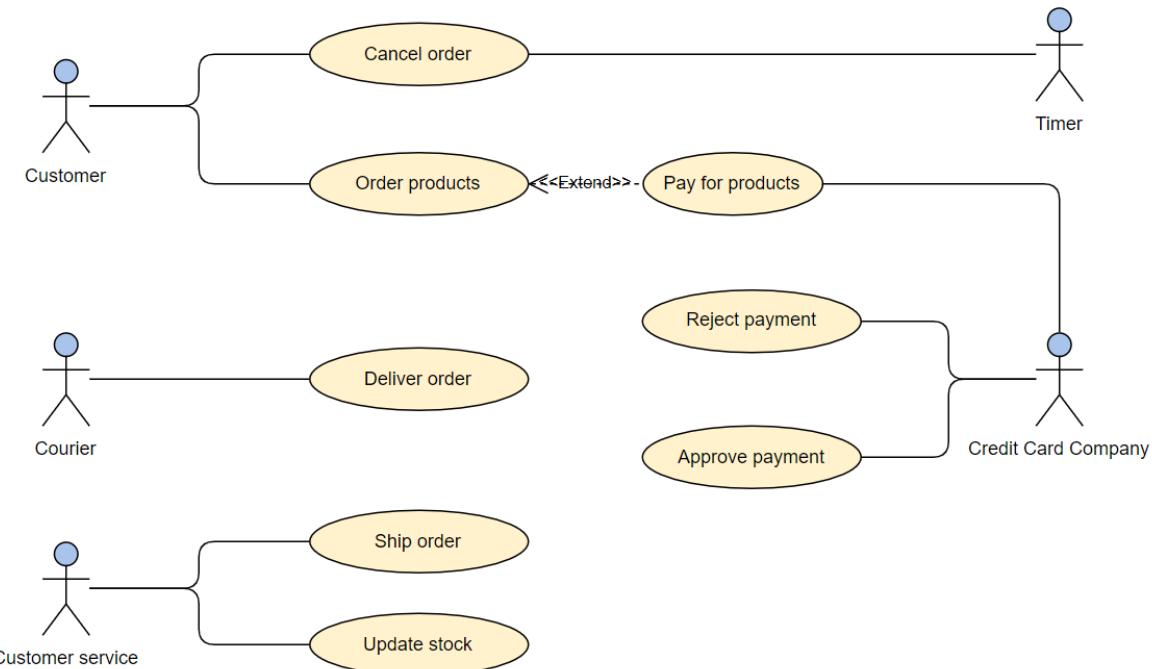


Figure 75 Sample UML use case diagram - user view

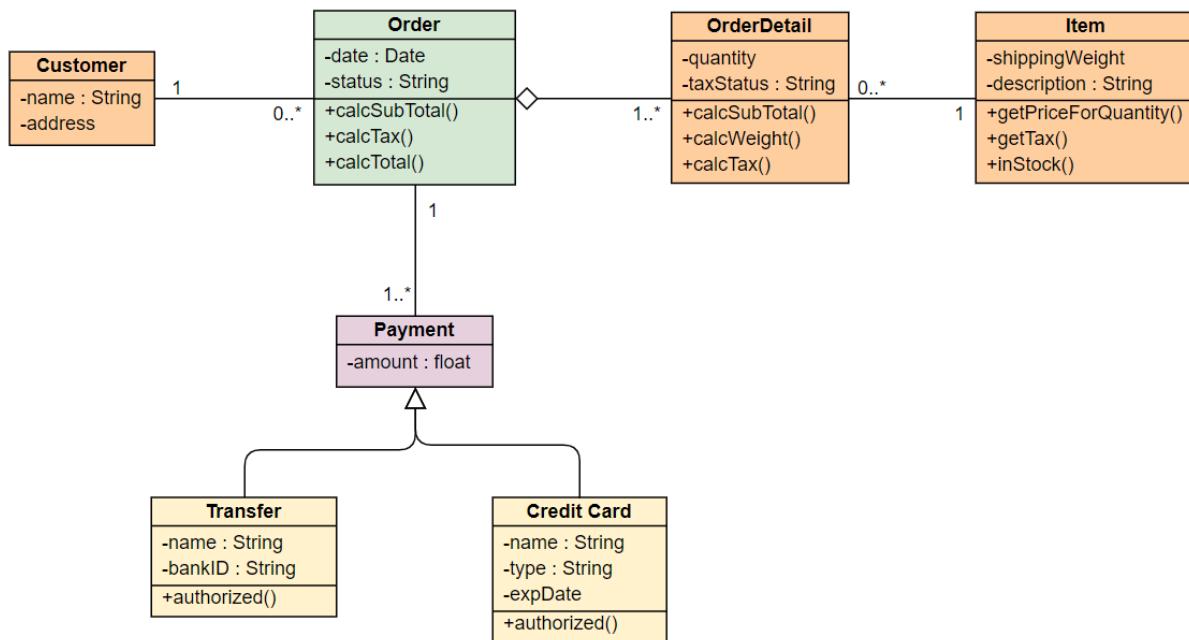


Figure 76 Sample UML class diagram

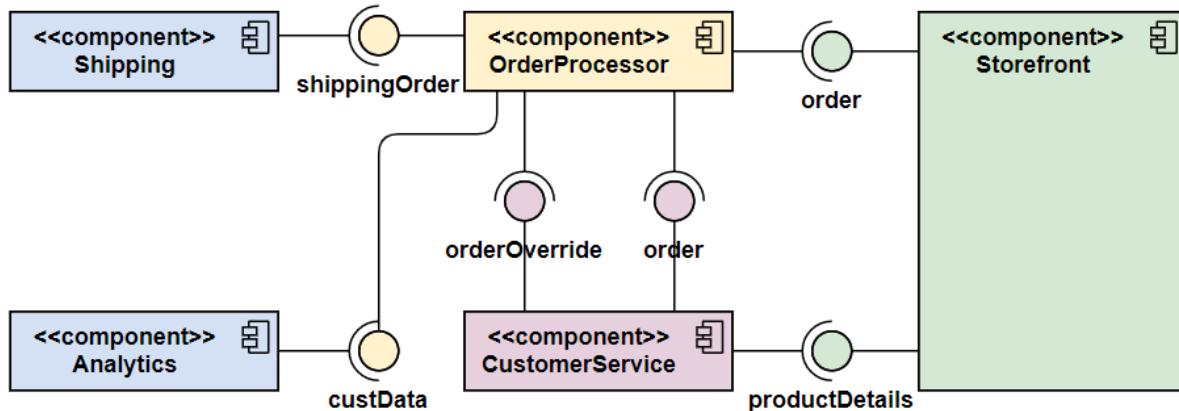


Figure 77 Sample UML component diagram

The benefits of using requirements modeling are:

- Models are perceived as a simplified expression of real processes and allow the Business Analyst and other stakeholders to focus on the important aspects and areas of the solution
- Models describe a complex solution in the clearest and most unambiguous way
- Models are more readable than written text
- Models present the whole solution and its context in a single diagram and therefore help to look at the problem from the overall perspective

Common techniques of modeling requirements and solutions include:

- Using UML notation to express requirements as use case diagrams, activity diagrams, state machine diagrams, etc.
- Using BPMN notation to express business processes
- Using SysML requirements diagrams to express requirements and relationships between them
- Using prototyping as a technique of GUI modeling and/or creating prototypes of solution concepts

For more information on modeling languages and examples, see: 4.3.2 Notations.

Unified Modeling Language – a standardized general-purpose software engineering modeling language. UML includes a set of graphic notation techniques to create visual models of software-intensive systems like use case diagrams, activity diagrams, class diagrams and many more.

Systems Modeling Language – a general-purpose modeling language for systems engineering applications. It supports the specification, analysis, design, verification and validation of a broad range of systems and systems-of-systems

Prototype – an early sample or model built to test a concept or process or to act as something that can be replicated or learned from. In Requirements Engineering, prototypes can be used for requirements elicitation and validation.

Common types of prototyping:

- Throwaway prototyping – the prototype serves as a help in requirements analysis and solution design but is not developed into a real product
- Evolutionary prototyping – the prototype is iteratively refined and developed into the final product

Prototyping methods include:

- Paper

- Card sorting
- Wireframe
- Screen layout
- Programmed prototype

Order Registration Form

Name	*	<input type="text"/>			
Customer ID	*	<input type="text"/>			
Purchasing Location		<input type="text"/>			
#	Item Name *	Quantity	Price	Tax	Total Cost
1	<input type="text"/>				
2	<input type="text"/>				
3	<input type="text"/>				
4	<input type="text"/>				
5	<input type="text"/>				

* Mandatory fields

Figure 78 Sample prototype created using Excel

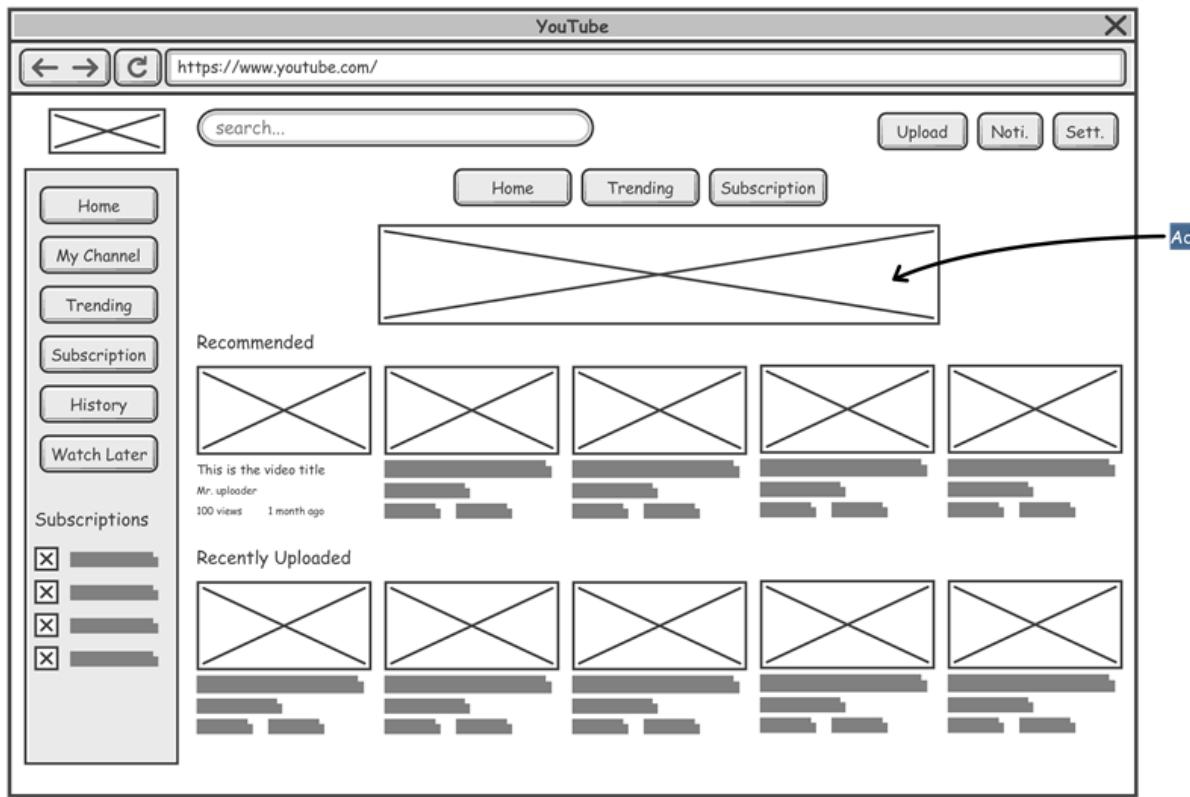


Figure 79 Sample wireframe (<https://www.visual-paradigm.com/learning/handbooks/agile-handbook/wireframe.jsp>)

During modeling activities, especially when modeling data content and structure, practices derived from Information Architecture are often applied (see: 4.2.2 Information Architecture).

Questions

Recall the definition of requirements analysis and modeling

Explain the process of prioritization and its application in terms of solution design and development

Recall the definition of an assumption and limitation

Explain the impact of assumptions and limitations on solution scope and design

Provide examples of different solution modeling methods

Provide examples of the different views of requirements/solution modeling

Explain the concept, elements and application of UML activity, use case and state machine diagrams

Recall the definition of a conflict, conflict management and conflict resolution

Explain the role of conflict management in requirements analysis and negotiation

4.1.4 Specification

Requirements Specification describes the problem area of interest (a business solution proposal for a given business problem, need, or objective, etc.) and contains at least the following information:

- Business requirements together with their acceptance criteria
- Limitations and assumptions

Requirements Specification – a specification describing the business problem area. (Customer requirements specification is usually provided by the customer and contains a description of the required capabilities of a solution from the customer's point of view.)

In the specification, requirements are described in a structured way and are modeled separately. The specification serves to track and manage the individual requirements. An approved requirements specification serves as a formal agreement on the solution scope and capabilities, and provides input information for the other members of the solution delivery or maintenance team.

Depending on the abstraction level, requirements can be described with more or less detail. In some development models, business requirements can be written in the form of high-level use cases (for example, Rational Unified Process), or user stories (Agile approaches).

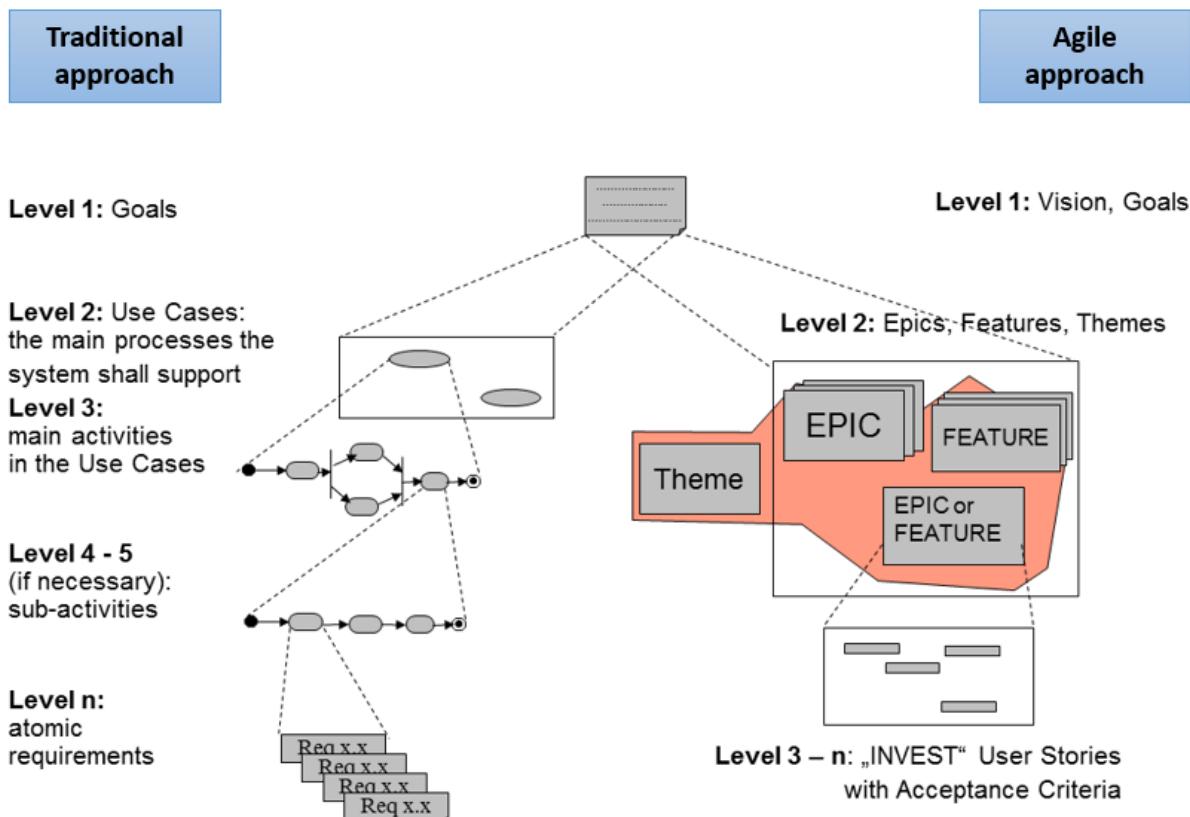


Figure 80 Different approaches to specification (IREB Certified Professional for Requirements Engineering-RE@Agile Primer - Syllabus and Study Guide, Version 1.0, March 15, 2017)

Requirement #: 75	Requirement Type: 9	Event/BUC/PUC #: 7, 9
Description: The product shall record all the roads that have been treated		
Rationale: To be able to schedule untreated roads and highlight potential danger		
Originator: Arnold Snow - Chief Engineer		
Fit Criterion: The recorded treated roads shall agree with the drivers' road treatment logs and shall be up to date within 30 minutes of the completion of the road's treatment		
Customer Satisfaction: 3	Customer Dissatisfaction: 5	
Dependencies: All requirements using road and scheduling data		Conflicts: 105
Supporting Materials: Work context diagram, terms definitions in section 5		
History: Created February 29, 2010		 <small>Copyright © Atlantic Systems Guild</small>

Figure 81 Sample requirement specification (<https://www.volere.org/templates/volere-requirements-specification-template/>)

In general, the typical structure of a business requirement statement should cover the following aspects:

- The user – who would need and/or use this requirement?
- The result – what is the result the stakeholders are looking for?
- The object – what is the object the requirement addresses?
- The qualifier – what is the qualifier that is measurable?

Another type of a specification is a User Story. User Stories are often used with Agile development methodologies. User Stories are a quick way of handling customer/user requirements. The intention of the User Story is to be able to respond faster and with less overhead to rapidly changing real-world requirements.

User Story – a short, simple description of a feature told from the perspective of the person who desires the new capability, usually a user or customer of the system.

User Story

As a [role], I want [feature] so that [benefit]

A User Story describes the functionality that will be valuable to the customer. It is composed of three aspects [Cohn]:

- A written description of the story used for planning and as a reminder (usually in a form of a statement “As a [role], I want [feature] so that [benefit]”)
- Conversations about the story that serve to flesh out the details of the story
- Tests that convey and document details and are used to determine when a story is complete

CCC – Card, Confirmation, Conversation

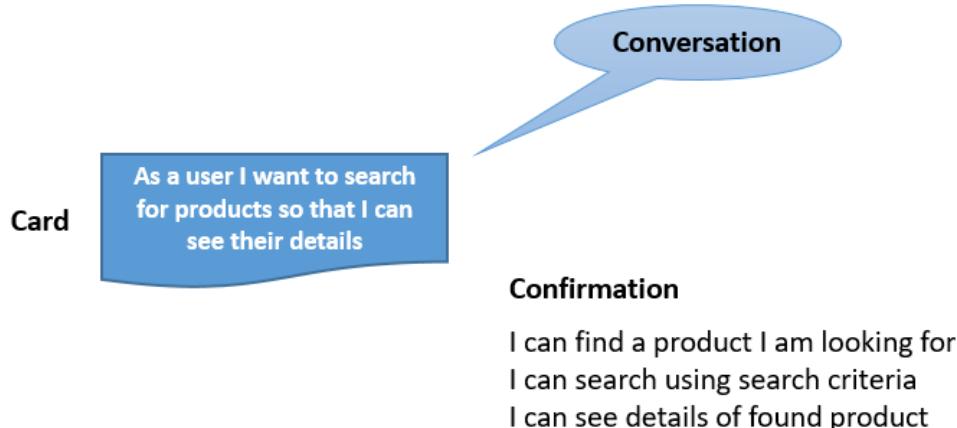


Figure 82 The concept of CCC

User Stories are often used together with Personas (i.e., archetype characters) representing a specific type of end user role.

Persona – a fictional character, an archetype description, which represents the different types of users who will be using the final product or solution. A persona should represent a group of people with the same needs, attitude, behavior or expectations towards the product.

PICTURE & NAME	DETAILS	GOAL
<p>What does the persona look like? What is its name?</p> <p>Choose a picture and a name that are representative, and that allow you to develop sympathy for the persona.</p>	<p>What are the persona's relevant characteristics and behaviours?</p> <p>Consider demographics, job, lifestyle, spare time activities, attitudes, and common tasks, for instance.</p>	<p>Why would the persona want to buy or use the product?</p> <p>What problems should the product solve?</p> <p>What benefits does the persona want to achieve?</p> <p>If there are multiple problems or benefits, identify the main one and put it at the top.</p>

<http://www.romanpichler.com/>

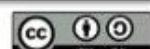


Figure 83 Persona [Pichler]

ROMAN'S PERSONA TEMPLATE

 romanpichler

 PICTURE & NAME	 DETAILS	 GOAL
<p>What does the persona look like? What is its name? Choose a realistic and believable picture and name.</p>  <p>Peter</p>	<p>What are the persona's relevant characteristics and behaviours? For instance, demographics, such as age, gender, occupation, and income; psychographics, including lifestyle, social class, and personality; and behavioural attributes like usage patterns, attitudes, and brand loyalty. Only list relevant details.</p> <p>Works as product manager for a mid-sized company.</p> <p>Is 35 years old, holds a marketing degree.</p> <p>Has got experience working as a product owner.</p> <p>Has managed mature products successfully.</p>	<p>What problem does the persona want to solve or which benefit does the character seek? Why would the persona want to use or buy the product?</p> <p>Needs to know how to determine the right strategy for a brand-new digital product.</p>

www.romanpichler.com
Template version 04/17

This work is licensed under a Creative Commons Attribution-ShareAlike 3.0 Unported License 

Figure 84 Sample persona [Pichler]

When documenting particular requirements, the Business Analyst should follow common standards and guidelines [ISO/IEC/IEEE 29148]. Some examples of these are shown below.

Title page
Revision chart
Preface
Table of contents
List of figures
List of tables
1. Scope
1.1 Identification
1.2 Document overview
1.3 System overview
2. Referenced documents
3. Current system or situation
3.1 Background, objectives, and scope
3.2 Operational policies and constraints
3.3 Description of the current system or situation
3.4 Modes of operation for the current system or situation
3.5 User classes and other involved personnel
3.6 Support environment
4. Justification for and nature of changes
4.1 Justification of changes
4.2 Description of desired changes
4.3 Priorities among changes
4.4 Changes considered but not included
5. Concepts for the proposed system
5.1 Background, objectives, and scope
5.2 Operational policies and constraints
5.3 Description of the proposed system
5.4 Modes of operation
5.5 User classes and other involved personnel
5.6 Support environment
6. Operational scenarios
7. Summary of impacts
7.1 Operational impacts
7.2 Organizational impacts
7.3 Impacts during development
8. Analysis of the proposed system
8.1 Summary of improvements
8.2 Disadvantages and limitations
8.3 Alternatives and trade-offs considered
9. Notes
Appendices
Glossary

Figure 85 IEEE 1362 Concept of Operations outline

Table of Contents

- 1. Introduction
 - 1.1 Purpose
 - 1.2 Scope
 - 1.3 Definitions, acronyms, and abbreviations
 - 1.4 References
 - 1.5 Overview
- 2. Overall description
 - 2.1 Product perspective
 - 2.2 Product functions
 - 2.3 User characteristics
 - 2.4 Constraints
 - 2.5 Assumptions and dependencies
- 3. Specific requirements (See 5.3.1 through 5.3.8 for explanations of possible specific requirements. See also Annex A for several different ways of organizing this section of the SRS.)
- Appendices
- Index

Figure 86 IEEE 830 SRS outline

3. Specific requirements
3.1 External interface requirements
3.1.1 User interfaces
3.1.2 Hardware interfaces
3.1.3 Software interfaces
3.1.4 Communications interfaces
3.2 Functional requirements
3.2.1 User class 1
3.2.1.1 Feature 1.1
3.2.1.1.1 Introduction/Purpose of feature
3.2.1.1.2 Stimulus/Response sequence
3.2.1.1.3 Associated functional requirements
3.2.1.2 Feature 1.2
3.2.1.2.1 Introduction/Purpose of feature
3.2.1.2.2 Stimulus/Response sequence
3.2.1.2.3 Associated functional requirements
.
.
3.2.1.m Feature 1.m
3.2.1.m.1 Introduction/Purpose of feature
3.2.1.m.2 Stimulus/Response sequence
3.2.1.m.3 Associated functional requirements
3.2.2 User class 2
.
.
3.2.n User class n
.
.
3.3 Performance requirements
3.4 Design constraints
3.5 Software system attributes
3.6 Other requirements

Figure 87 IEEE 830 SRS – sample elaboration of chapter 3

Important guidelines for the creation of the requirements document include the following:

- Each requirement must be unambiguous, precise, and understandable
- Superfluous information should be avoided
- Templates should be used as an aid
- Models and diagrams should be used to make the specification document clear and more understandable for readers
- Formal graphical notation should be used as a method for presenting complex requirements, dependencies, and relationships

When creating a requirements document, the Business Analyst should remember that requirements specifications must be complete, consistent, modifiable, and traceable [Wiegers].

A requirements specification does not have to be a formal “specification” document. For example, it could be a sprint backlog or a set of requirements maintained in a requirements management tool.

Questions

Recall the definition of requirements specification

Explain the meaning and application of requirements documentation

Provide examples of different requirements specification templates and methods

4.1.5 Verification and Validation

As the requirements are the basis for solution design and development, any error or missing requirement will propagate to the other development processes in the initiative.

Defects resulting from low quality requirements are more expensive to fix in later phases of development than other types of defects. In addition, the later defects are detected, the higher the cost to fix them. Therefore the use of verification ("are we producing the product correctly") and validation ("are we producing the right product") of the requirements are critical activities.

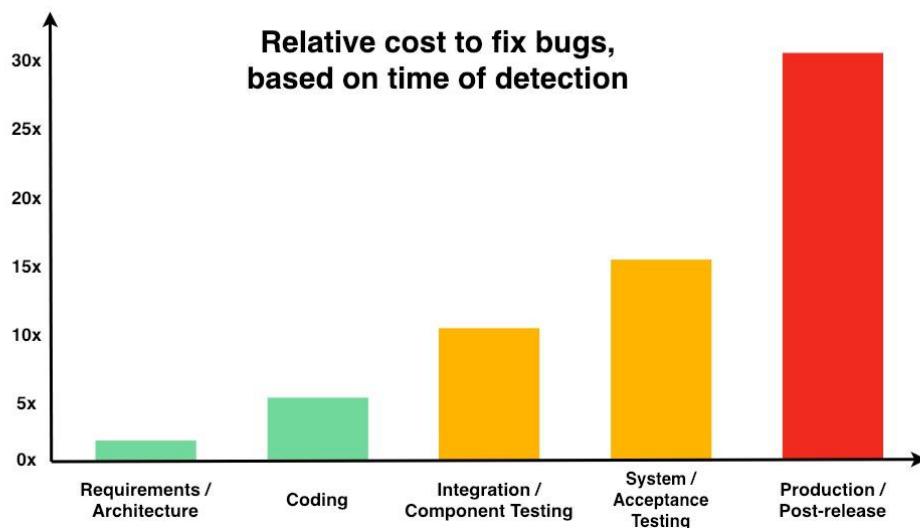


Figure 88 Relative cost of defects

Validation – confirmation by examination and through provision of objective evidence that the requirements for a specific intended use or application have been fulfilled [ISO 9000].

Verification – confirmation by examination and through provision of objective evidence that specified requirements have been fulfilled [ISO 9000].

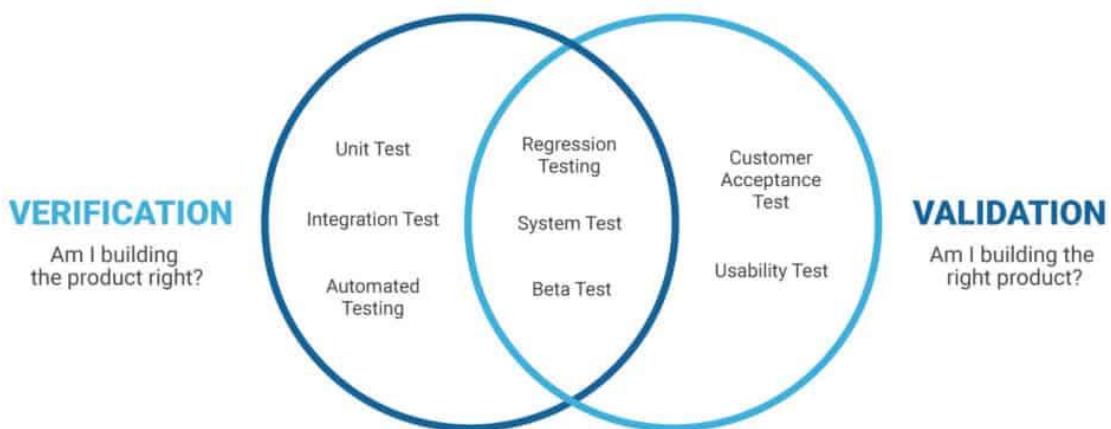


Figure 89 Validation and verification {<https://www.plutora.com/blog/verification-vs-validation>}

Requirements validation and verification should be done continuously during the development of the solution to ensure that the product being developed meets the quality criteria and will satisfy the stakeholders' needs. The best practice is to plan and perform validation and verification of requirements from the early phases of solution development – ideally starting with requirements elicitation.

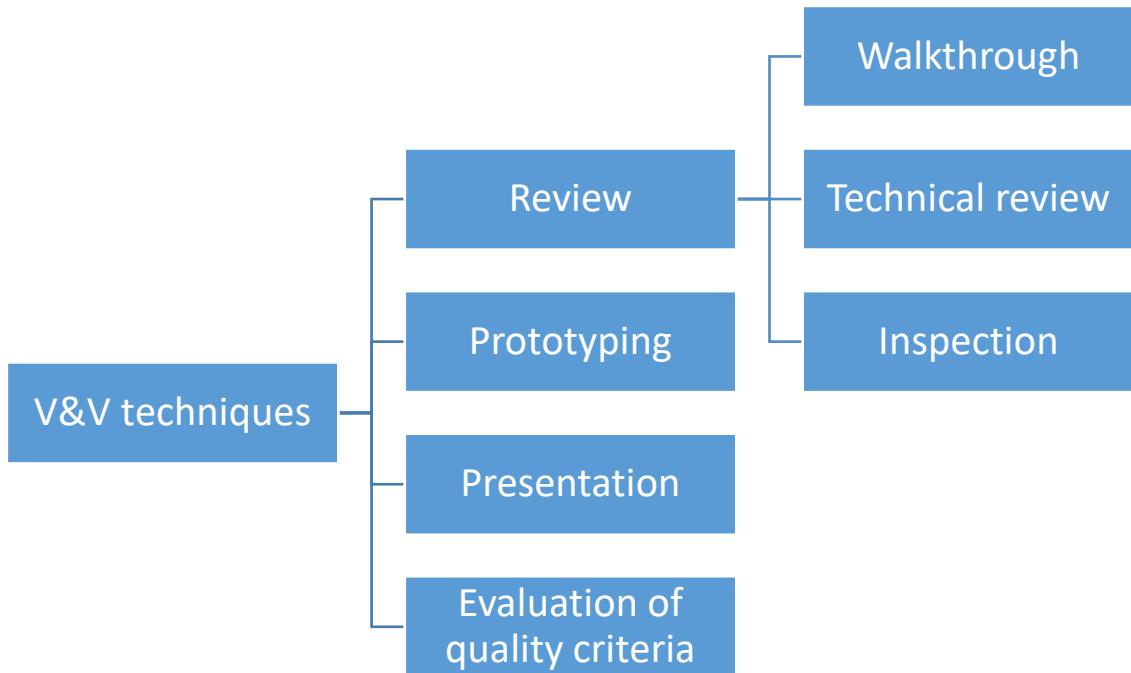


Figure 90 V&V techniques

Common techniques for validation and verification include different types of reviews and/or prototyping or presentations of the proposed solutions or requirements to the stakeholders with the goal of receiving feedback. Validation and verification activities should also include ensuring that the requirements and/or requirements/solution specifications conform to company standards (templates) and are documented and then tested against the quality criteria.



Figure 91 Quality criteria for requirements

Requirements Checklist 1	
<input type="checkbox"/>	Atomic
<input type="checkbox"/>	Attainable
<input checked="" type="checkbox"/>	Cohesive
<input checked="" type="checkbox"/>	Complete
<input type="checkbox"/>	Current
<input type="checkbox"/>	Independent
<input type="checkbox"/>	Modifiable
<input checked="" type="checkbox"/>	Traceable
<input checked="" type="checkbox"/>	Unambiguous
<input type="checkbox"/>	Verifiable

Figure 92 Sample requirements checklist

It is also important to validate the models developed during the requirements analysis and specification activities. As requirements are the basis for solution development and testing, their quality is crucial for the success of the change or development. As they help define the appropriate levels and coverage of testing, clear, complete, consistent and testable requirements reduce the risk of product (or even more importantly, project) failure. It is therefore recommended to involve testers in reviews of requirements, as they can significantly help improve the quality of the requirements and/or solution specifications by identifying weak points and possible defects.

Testability of requirements is supported by acceptance criteria. Acceptance criteria describe criteria that must be met to approve the solution and should be agreed on by stakeholders before starting

solution realization. Every high-level requirement must have at least one acceptance criterion and each of the criterion must be measurable by a realistic and agreed upon means. Such criteria often create the basis for the quality plan and acceptance testing.

Questions

Recall the definitions of validation and verification

Explain the role of validation and verification in assuring quality of Business Analysis work products

Provide examples of different validation and verification methods and techniques

Provide examples of quality criteria for requirements

4.2 Requirements Management

4.2.1 Introduction

The purpose of Requirements Management (REQM) is to manage the requirements of the change or development project's products and product components and to ensure alignment between those requirements and the project's plans and work products [CMMI].

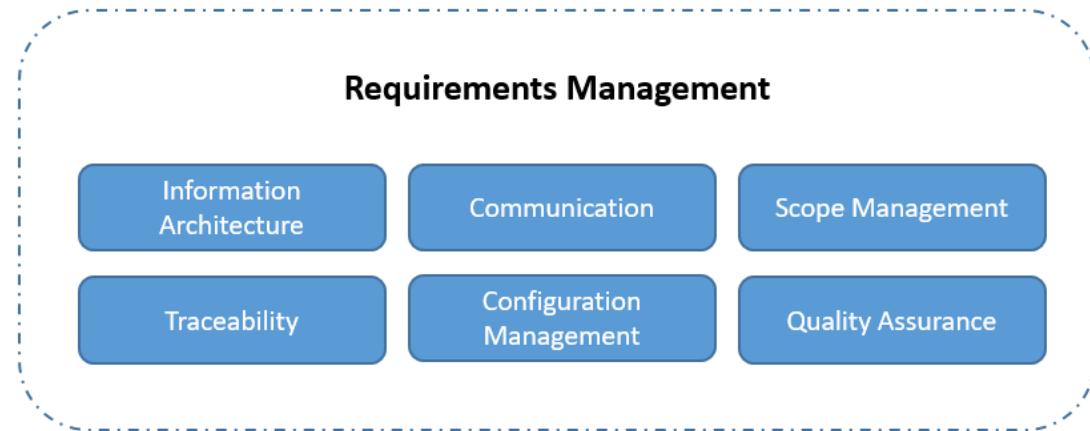


Figure 93 Elements of Requirements Management

Requirements Management includes activities with the aim to:

- Define and maintain the information architecture
- Effectively understand and communicate the requirements
- Maintain traceability
- Manage configuration of the requirements and other Business Analysis work products
- Ensure quality of the requirements and other Business Analysis work products

Questions

Recall the definition of Requirements Management

Explain the main activities, products and methods used in Requirements Management

4.2.2 Information Architecture

Information architecture (IA) is a set of practices whose goals are to organize, arrange and label content (information) in an effective and understandable way. Having an Information Architecture helps people and organizations to consider their structures and language thoughtfully [IA Institute].

Information Architecture – structure and rules for organizing information in an organization or project.

This discipline is often considered as part of designing the structure of information on web pages [Web Style Guide], however its main principles should be applied to build a structure for the Business Analysis information (deliverables and work products) as well.

The main components of IA are [Rosenfeld, Morville]:

- Organization schemes and structures – method of categorizing and structuring information
- Labeling systems – method of representing information
- Navigation systems – specification of how to browse and move through the information
- Search systems – methods allowing to search for information

Creating a useful architecture of information requires understanding some aspects such as those shown in the diagram below.

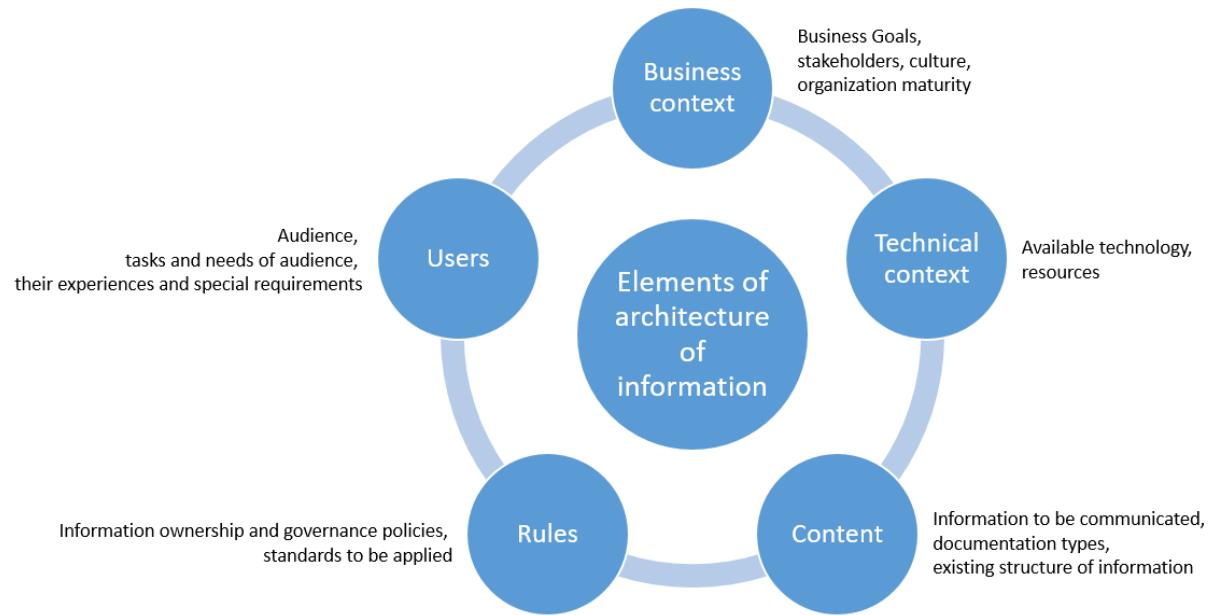


Figure 94 Elements of Information Architecture

In the context of Business Analysis and Requirements Management, IA can be applied to understand and structure information collected in a way that would be accessible and understandable for all key stakeholders and users of this information. Sample applications of IA include:

- Defining appropriate levels of information (e.g., strategy analysis, business requirements, solution requirements, design options)
- Defining relevant deliverables for specific activities
- Defining required content and structure for analysis deliverables and work products (e.g., templates, available methods of representing information)
- Establishing communication methods for accessing, browsing and navigation through the information

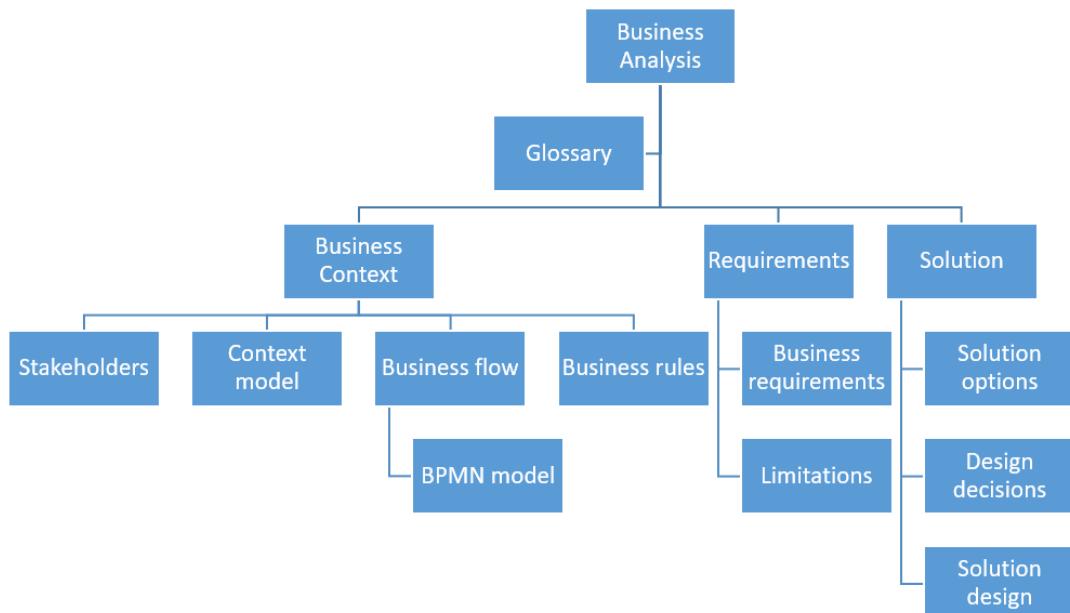


Figure 95 Sample Information Architecture for Business Analysis works

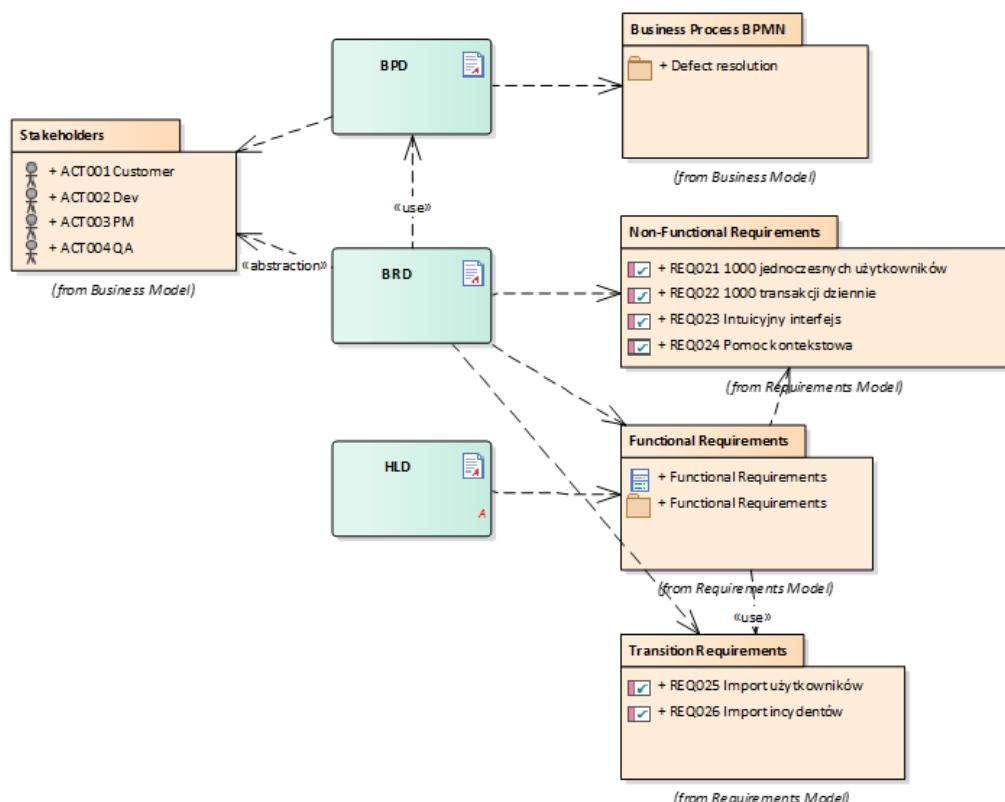


Figure 96 Sample design of Business Analysis artifacts

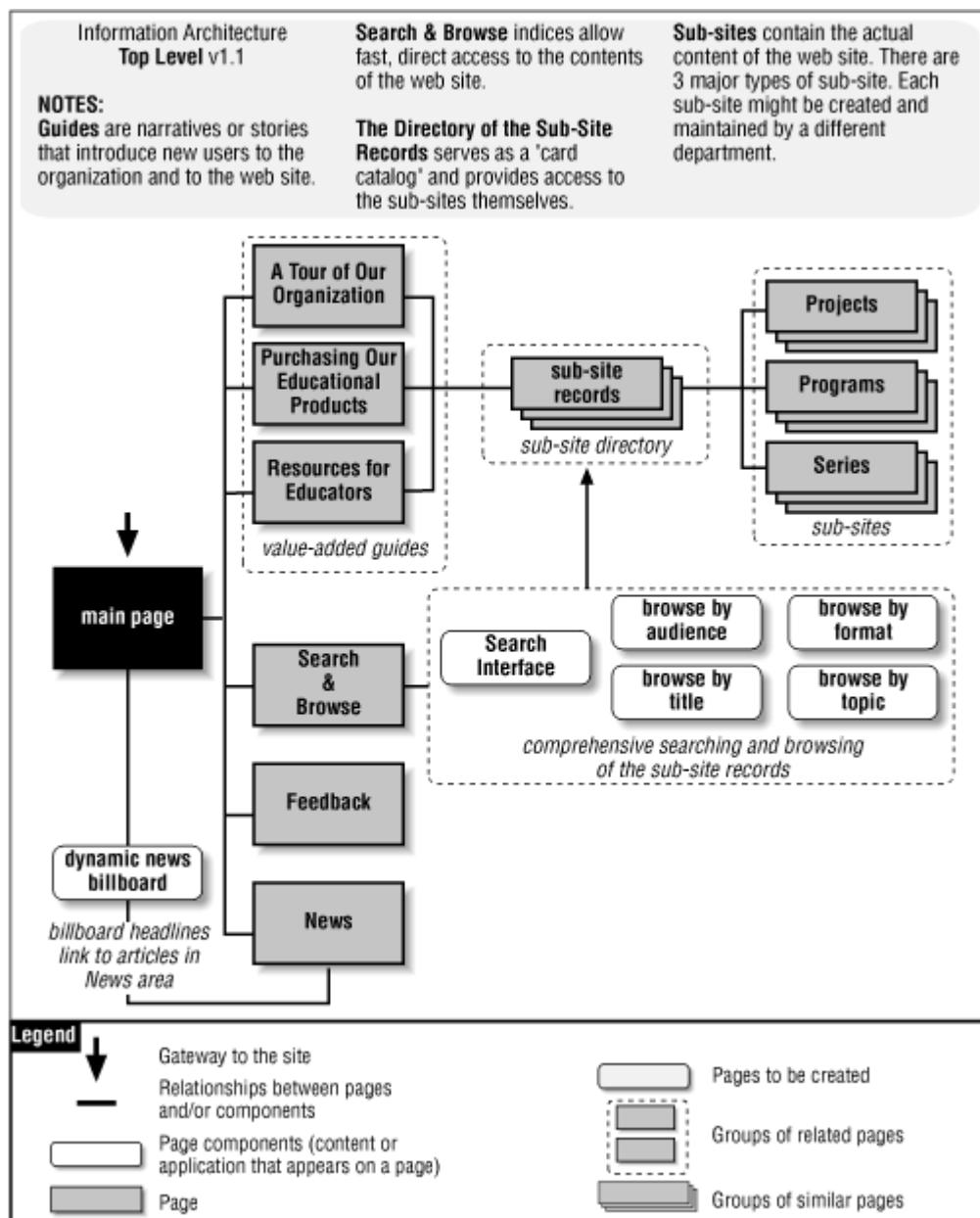


Figure 97 Sample Information Architecture for a website (https://docstore.mik.ua/oreilly/web2/infoarch/ch08_04.htm)

Questions

Recall the definition of information management

Explain the concept, purpose and methods of establishing an information architecture

Provide examples of elements of an effective information architecture

4.2.3 Requirements Communication

Requirements Communication includes activities for expressing the output of the requirements engineering products to the stakeholders. Communication of requirements is an ongoing and iterative activity, including presenting, communicating, verifying, and obtaining approval of the requirements from the initiative stakeholders. Communicating requirements is one of the major tasks of the Business

Analyst as his/her responsibility is to not only identify and document the business and stakeholders' requirements, but also to bring the stakeholders to a common understanding of the requirements and resulting solution. Clear and effective communication is essential, as the stakeholders may have different knowledge levels and represent different domains. The role of a Business Analyst is to communicate requirements in such a way that allows all stakeholders to gain the same understanding of a particular requirement. To ensure this, the Business Analyst must consider what communication approach is appropriate in a given situation.

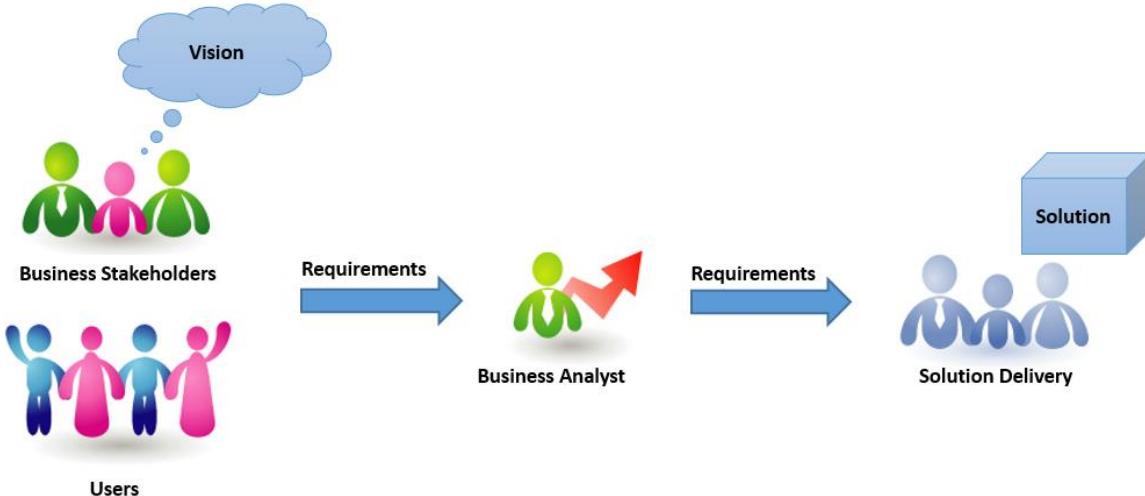


Figure 98 Requirements communication

Typical activities of requirements communication include:

- Preparing the requirements communication plan (see: 3.3 Communication)
- Determining the most appropriate communication methods and tools
 - Written vs. verbal communication
 - Documentation as a means for communication
- Determining the most appropriate format of requirements and other communication work products
 - Establishing required content and form of work products
 - Aligning the format of work products with the development/maintenance approach
- Establishing methods for resolving requirements conflicts (see: 4.1.3 Analysis and Modeling)
- Distributing and collecting information
 - Establishing sources of information and methods for storing information
 - Establishing ways of distributing information
- Conducting requirements presentations in order to collect feedback and ensure understanding
 - Formal vs. informal presentation
- Performing reviews of requirements and other communication work products
 - Formal vs. informal reviews
- Obtaining requirements approvals (Sign-off)
 - Ensuring requirements are accepted by key stakeholders before moving to the next step in the process

Requirements should be agreed to and accepted by all key stakeholders involved in solution realization. It is extremely important to ensure that all requirements are approved since the formal agreement provides a starting point for a further detailed solution specification, designing the architecture, and other aspects of the planned solution.

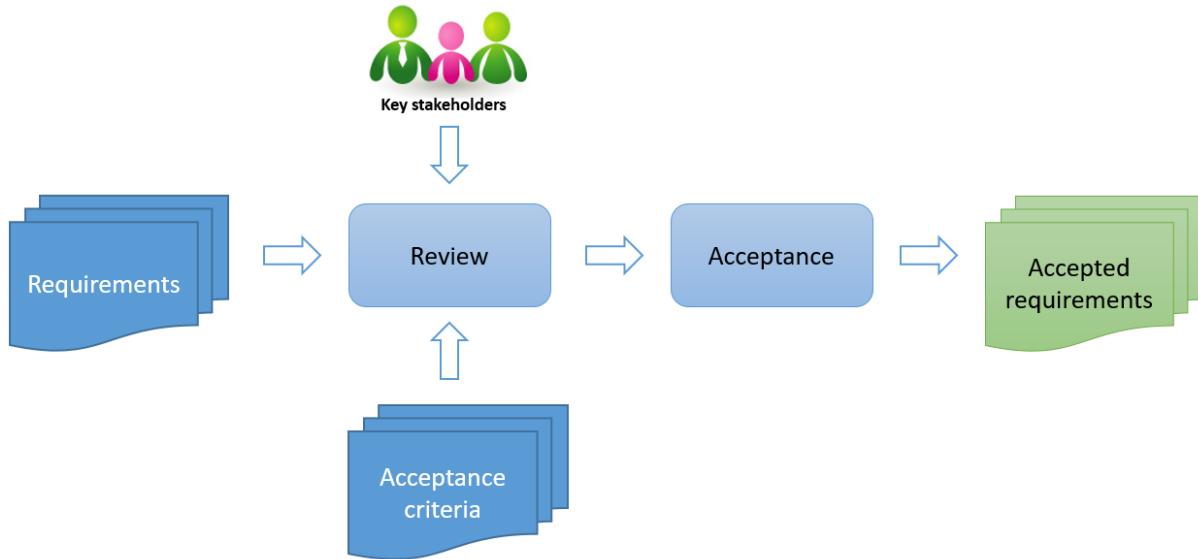


Figure 99 Sample requirements acceptance process

Questions

Recall the definition of communication

Explain the concept, purpose and methods for requirements approval

Provide examples of activities of requirements communication

4.2.4 Traceability

Traceability is the association existing between artifacts on different abstraction levels. In the context of Business Analysis, traceability can exist between high level Business Needs, and business requirements, then between business requirements and solution requirements, etc.

Traceability – the ability to identify related items in documentation and software, such as requirements, with associated tests

Requirements traceability – the ability to define, capture and follow the tracing left by requirements on other elements of the software development environment and the trace left by those elements on requirements [Pinheiro F.A.C. and Goguen J.A].

Tracing allows proper management of artifacts, especially in the areas of managing evolution, changes and coverage analysis. Traceability between requirements, and other solution delivery artifacts (such as design elements to test cases), allows the Business Analyst to ensure all requirements have been fulfilled.

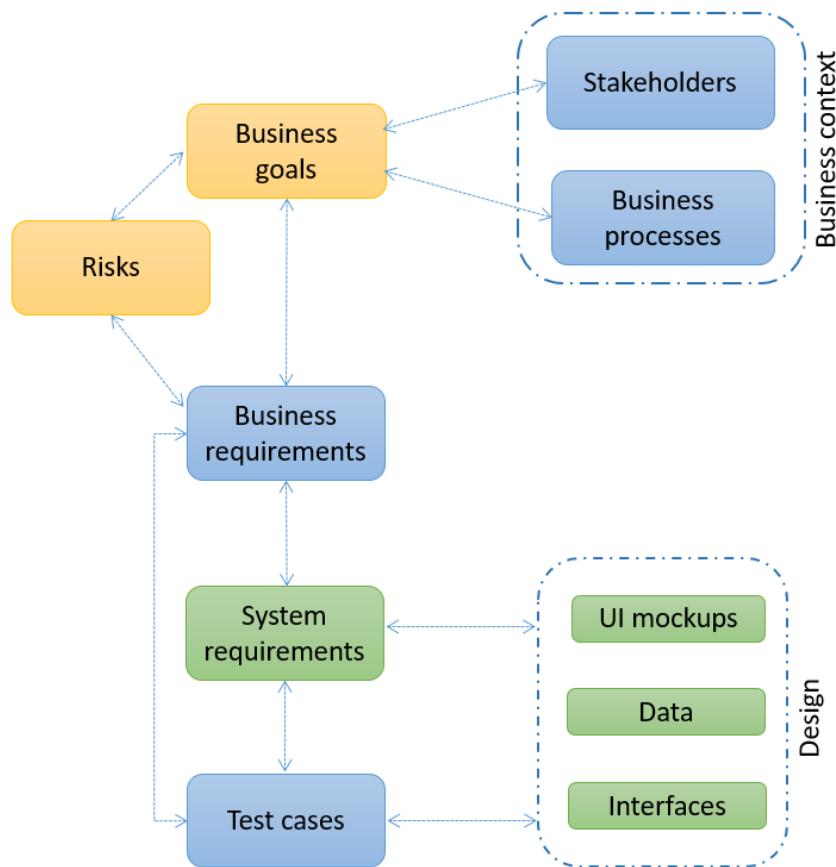


Figure 100 Sample structure for traceability

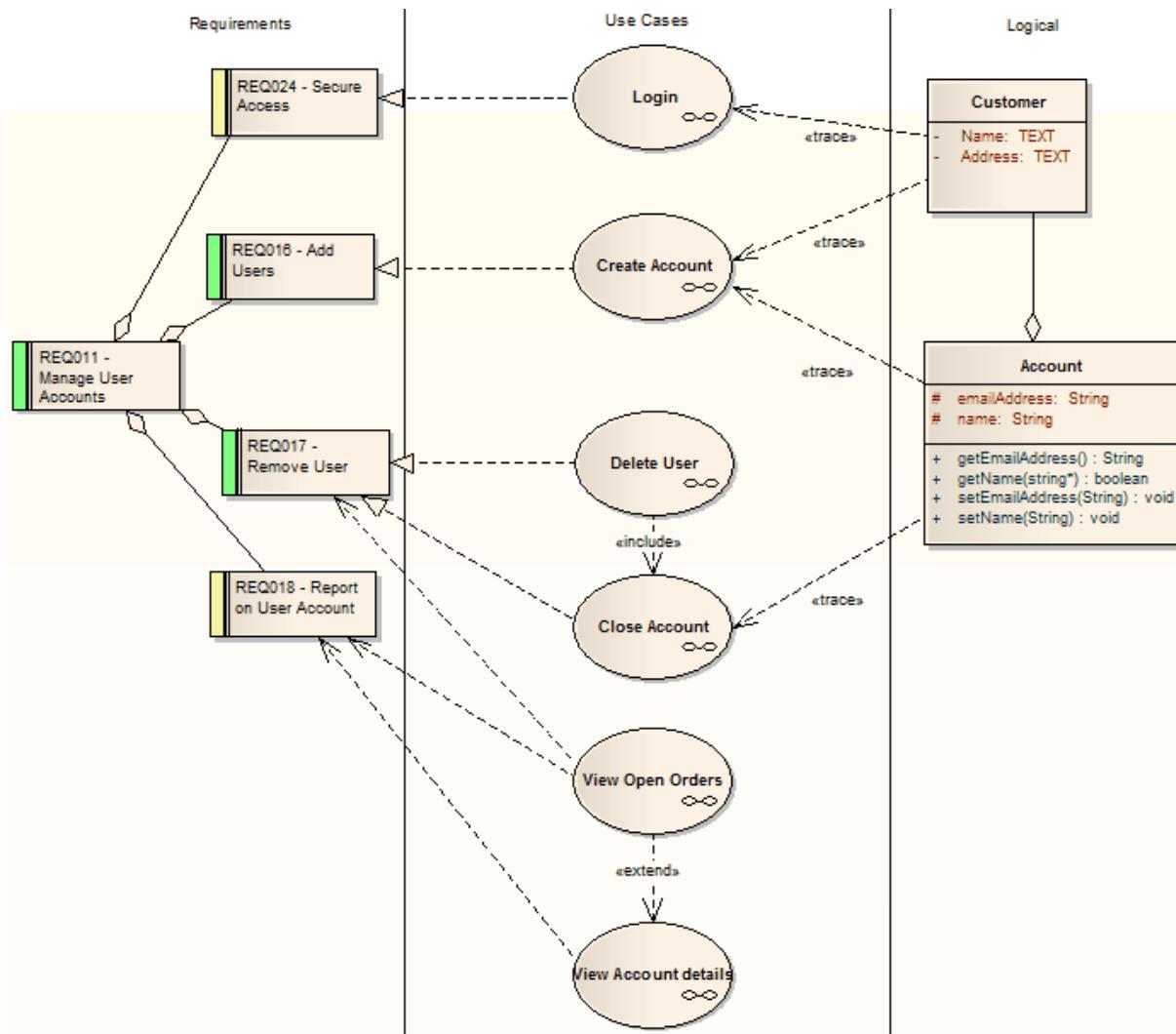


Figure 101 Sample traceability between artifacts
(https://sparxsystems.com/enterprise_architect_user_guide/14.0/model_navigation/create_traceability_diagrams.html)

Traceability affects the organization in the following areas:

- Scope management
- Impact analysis
- Coverage analysis
- Use of the requirement

Example

Consider online shopping system allowing customers to search for products, place orders and make payments.

The following diagrams show different applications of traceability.

Scope management

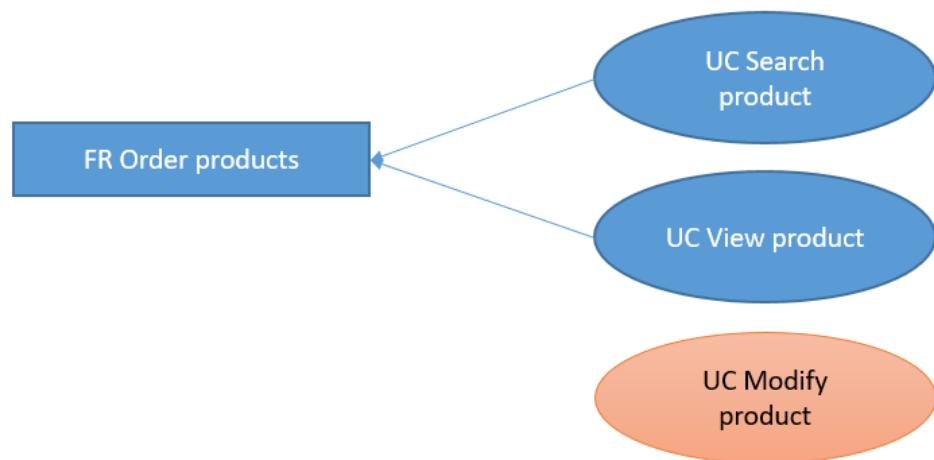


Figure 102 Traceability and scope management – UC Modify product may be out of scope

Coverage analysis

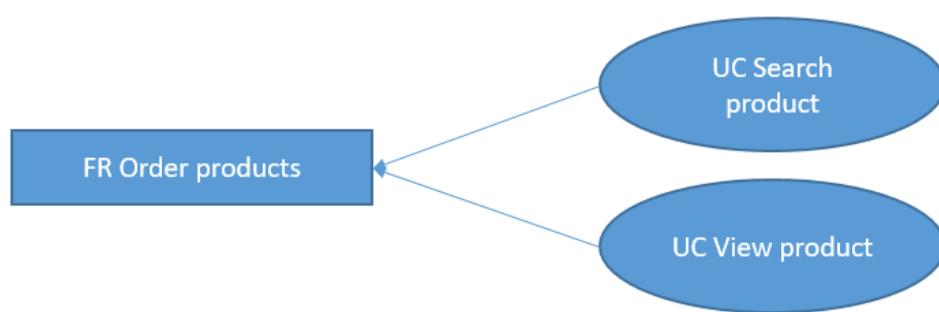


Figure 103 Traceability and coverage analysis – FR Order products is covered by two use cases

Impact analysis

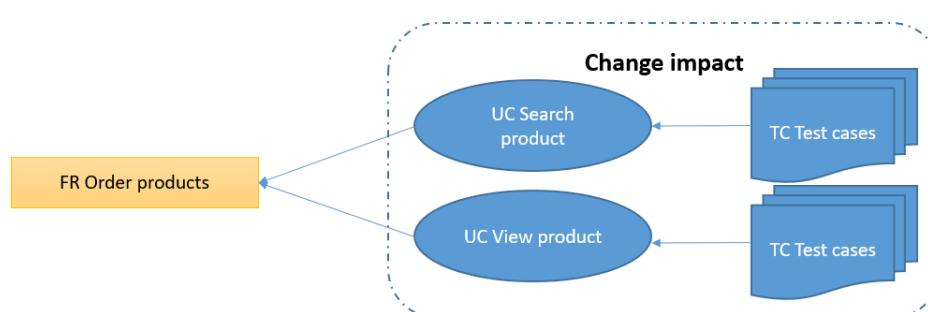
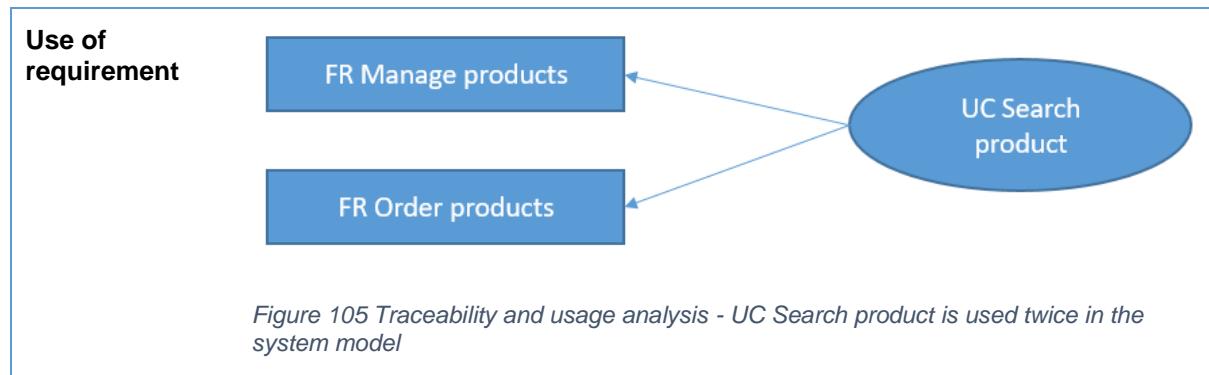


Figure 104 Traceability and impact analysis - impact of change in FR Order products



Traceability is often supported by tools used to manage requirements or managed via a Requirements Traceability Matrix (RTM).

REQUIREMENTS TRACEABILITY MATRIX							
Project Name: Order system							
Business Requirements Document BRD		Functional Specification Document FSD			Test Case Document		
Business Requirement ID#	Business Requirement / Business Use case	Functional Requirement ID#	Functional Requirement / Use Case	Priority	Test Case ID#	Execution Status	Defect#
BR_1	Order module	FR_1	Search product	High	TC#001 TC#002	pass	
		FR_2	View product		TC#003 TC#004	pass	
		FR_3	Order product	High	TC#005 TC#006	Fail	Defect# 1233
BR_2	Payment Module	FR_4	Pay by credit card	High	TC#007 TC#008	pass	
		FR_5	Pay by transfer	High	TC#009	pass	
		FR_6	Pay by cash on delivery	Medium	TC#010 TC#011	pass	

Figure 106 Sample RTM

Questions

Recall the definition of traceability and RTM

Provide examples of the applications of traceability

4.2.5 Configuration Management

Configuration Management

To ensure proper requirements management, a Configuration Management process must be implemented. In many cases business requirements are not stable, and the subsequent changes may affect other artifacts. The Business Analyst must manage changes in the requirements, and ensure that all affected items have been properly adjusted. The approach for resolving such issues must also be included in the Business Analysis process planning.

Configuration – the composition of a component or system as defined by the number, nature, and interconnections of its constituent parts.

Configuration Management – a discipline applying technical and administrative direction and surveillance to: identify and document the functional and physical characteristics of a configuration item, control changes to those characteristics, record and report change processing and implementation status, and verify compliance with specified requirements [IEEE 610].

The purpose of Configuration Management is to establish and maintain the integrity of the products (components, data, and documentation) and the system artifacts, throughout the development and product life cycle. Configuration Management makes use of technical and administrative tools and techniques.

Configuration attribute	Example
Id	REQ 001
Name	Search product
Version	1.0
Status	New
Priority	1
Owner	John Doe
Creation date	10.02.2019
Last edition date	19.09.2019
Last edited by	Jane Smith

Table 5 Sample configuration of a requirement

Configuration Management takes place for the following reasons:

- Identify and document the functional and physical characteristics of a configuration item (which define the version of the configuration item)
- Control changes to those characteristics
- Record and report change processing and implementation status
- Verify compliance with specified requirements [IEEE 610]

The complete process of Configuration Management includes the following activities [IEEE 1042]:

1. Configuration Identification – a process aiming to determine the attributes that describe every aspect of a configuration item. These attributes are recorded in the configuration documentation and baselined.
2. Configuration Change Control – a set of processes and approval stages that are required to change a configuration item's attributes, and to establish a new baseline for the changed item.
3. Configuration Status Accounting – the ability to record and report on the configuration baselines that are associated with each configuration item at any moment of time.
4. Configuration Audits – there are two types of Configuration Audits:
 - Functional Configuration Audits which ensure that functional and performance attributes of a configuration item are achieved
 - Physical Configuration Audits which ensure that a configuration item is installed in accordance with the requirements of its detailed design documentation

Configuration Item – an aggregation of hardware, software, or both, that is designated for configuration management and treated as a single entity in the configuration management process [IEEE 610].

Configuration Identification – an element of configuration management, consisting of selecting the configuration items for a system and recording their functional and physical characteristics in technical documentation [IEEE 610].

Configuration Control – an element of configuration management, consisting of the evaluation, co-ordination, approval or disapproval, and implementation of changes to configuration items after formal establishment of their configuration identification [IEEE 610].

Configuration Auditing – the function to check on the contents of libraries of configuration items, e.g., for standards compliance [IEEE 610].

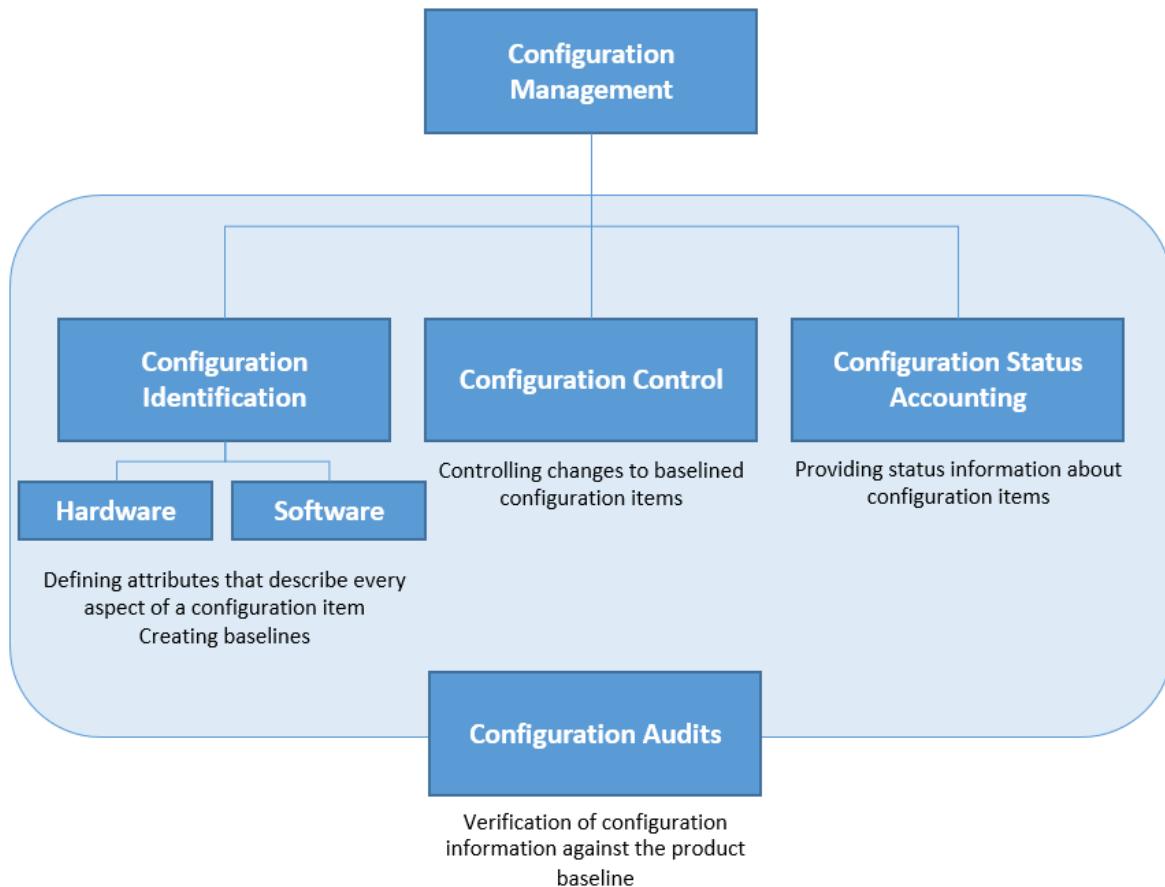


Figure 107 Configuration Management

Business Analysis activities produce many work products, and typically all of them must be identified as configuration items, baselined and controlled. Sample Configuration Items for Business Analysis include:

- Single requirements (business requirements, solution requirements)
- Business Needs
- Requirements specifications and other documents
- Business models

In the context of Business Analysis, Configuration Management ensures that all work products (outcomes) of Business Analysis are identified, version controlled, tracked for changes, related to each other, and related to other items (e.g., development artifacts) so that traceability can be maintained throughout the realization or maintenance process.

Configuration Management procedures and infrastructure (tools) should be defined and documented at both the organizational and initiative level.

Change Management

Change Management can be considered as a sub-discipline of Configuration Management, and supports managing changes of the requirements in an effective way.

Change Management:

(1) A structured approach to transitioning individuals, teams, and organizations from a current state to a desired future state.

(2) A controlled way to effect a change, or a proposed change, to a product or service.

Changes can result from:

- New or changing business requirements (resulting from new regulations, changes within the business domain, new capabilities requested by stakeholders, etc.)
- Solution improvement efforts
- Business process improvement initiatives
- A defect found in the code, documentation or requirements
- External changes (regulatory, legal, etc.)

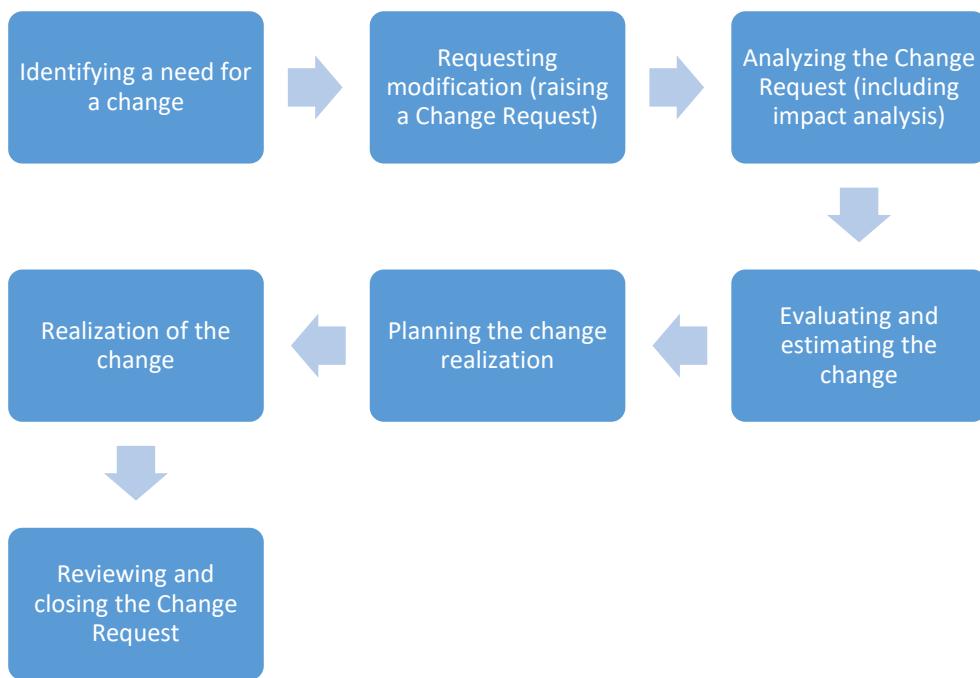


Figure 108 Basic Change Management process

When the need for a change appears, there should be a Change Request raised by the stakeholder requesting the modification. Requested changes are analyzed by Change Control Board.

Configuration (Change) Control Board (CCB) – a group of people responsible for evaluating and approving or disapproving proposed changes to configuration items, and for ensuring implementation of approved changes [IEEE 610].

Change Request – an official document requesting modification of existing features, requirements, or functions, or new ones. A Change Request should contain a description of the current solution, justification for the change and the suggested (desired) solution.

Important elements of a change request are a unique identifier, the author, the deadline (if applicable), an indication whether the change is required or optional, the change type, and an abstract or description of the proposed change.

Change Request Form Example			
Project Name	House build		
Requested By	Project Sponsor	Date	18th April
Request No	5	Name of Request	Add Pool
Change Description	The addition of a 15x5 metre pool to the rear of the property. To include a fence around the pool to make it safe for children in the garden, and also a singular diving board.		
Change Reason	This is a new requirement from the project sponsor.		
Impact of change	Minimal groundwork required, but it is estimate the pool with cost \$25,000 and the fence a further \$2,500. Additionally, the completion of the project will be delayed by 2 weeks to complete this work.		
Proposed Action	Accept the change and the cost associated with however. However, complete this work after the rest of the house is finished. This way this work can be done after the owner has moved in and is not on the critical path.		
Status	In review	Approved	Rejected
Approval Date	YES		
Approved By	N/A		

Table 6 Sample Change Request (<https://expertprogrammanagement.com/2017/06/change-request-template/>)

Questions

Recall the definition of configuration, configuration item, Configuration Management and baseline

Explain the process of Configuration Management and its main outputs

Provide examples of configuration items

Recall the definition of version, change management and change request

Explain the typical content of a change request

Explain the process of Change Management and its main outputs

4.2.6 Solution Scope Management

The solution scope, defined in the Business Case and Project Initiation documentation, serves as a basis for managing requirements during the realization or maintenance effort. The requirements determining the solution scope should support the Business Goals and Needs.

Scope – the extent of influence of something. Scope can apply to anything, like a specification, or a specified system or project [TGilb].

Solution scope – definition of the set of capabilities a solution must deliver in order to meet stated business requirements and business needs.

Typical activities of scope management include the following activities [BABOK]:

- Selecting the requirements to determine the solution scope
- Establishing the requirements baseline
- Creating a structure for traceability
- Identifying interfaces with external solutions, processes and other areas of the realization/maintenance work
- In case of change of Business Need – identifying changes in the scope (requirements)
- Maintaining scope approval by the stakeholders

Agile approaches typically do not require formal configuration and change management procedures for requirements and related work products. Priorities of realization and the scope of solution to be implemented during a specific iteration are established at the beginning of each iteration. Normally no change is allowed during an iteration. In case of the need for change, a new requirement is added to the requirements list (e.g., Product Backlog).

Questions

Explain the concept of requirements scope

Explain the process of scope management

4.2.7 Quality Assurance

When defining the Requirements Management process, it is also necessary to define necessary Quality Assurance (QA) activities to ensure that the different Requirements Engineering processes and their products are of good quality.

Quality – the degree to which a component, system or process meets specified requirements and/or user/customer needs and expectations [IEEE 610].

Quality Assurance – part of quality management focused on providing confidence that quality requirements will be fulfilled [ISO 9000].

Quality Assurance is defined as “all the planned and systematic activities implemented within the quality system, and demonstrated as needed, to provide adequate confidence that an entity will fulfill requirements for quality” [ISO 9000]. This definition implies that the actions taken are “planned and systematic” and they “provide adequate confidence” that the desired level of quality will be achieved. These actions include operational techniques and activities used to fulfill the requirements for quality.

To achieve the required level of quality, Quality Control is needed as well. The main goal of Quality Control is to steer and control the quality of products or services through use of operative methods so that they meet specified standards. The operative methods involved in Requirements Engineering include Project Management, Risk Management, Change Management, Verification and Validation, reviews, and Configuration Management and Tracing of Requirements.

In the context of Requirements Engineering, Quality Control may also focus on verifying whether the produced requirements documentation meets relevant quality criteria.

In order to ensure the required level of quality, verification and validation should be planned and executed from the beginning of the initiative.

Quality Assurance and Quality Control of requirements and related work products may be supported by the following means:

- Standards and templates
- Traceability to manage scope
- Different types of reviews

- Prototyping to evaluate alternative solution design options
- Evaluation of requirements/specification quality criteria, especially testability

Questions

Recall the definition of Quality Assurance

Provide examples of methods and techniques for Quality Assurance of requirements and other Business Analysis work products

Explain the meaning of Quality Assurance in building the right approach to Business Analysis

4.3 Tools and Techniques

4.3.1 Tools and Techniques

Tools supporting Requirements Engineering activities can be classified as follows:

- Requirements management tools
- Requirements and solution modeling tools
- Solution prototyping tools

Many tools facilitate more than one activity, for example modeling tools can offer a requirements repository with configuration and change management facilities supporting different modeling notations, documentation generation, and statistics.

Types of techniques supporting Requirement Engineering activities include:

- Documentation techniques
- Information elicitation techniques
- Communication and team collaboration techniques
- Solution modeling and design techniques

Specific techniques are listed below.

Brainstorming, Persona, User story, Use case, User scenario, Survey (questionnaire), Workshop

See: 4.1.2 Elicitation

Prototyping, Decomposition, Story mapping

See: 4.1.3 Analysis and Modeling

5 Whys

See: 3.5.1 Tools and Techniques

Questions

Provide examples of different types of tools supporting Requirements Engineering activities and explain their application

Provide examples of different types of techniques supporting Requirements Engineering activities and explain their application

4.3.2 Notations

One common method of solution modeling is UML (Unified Modeling Language). UML is a unified notation for the analysis and design of systems. The notation provides several types of diagrams to describe different views of the solution. These diagrams are divided into behavior and structure diagrams, where behavior diagrams depict behavioral features of a system or business process, and structure diagrams depict the structural elements composing a system or function.

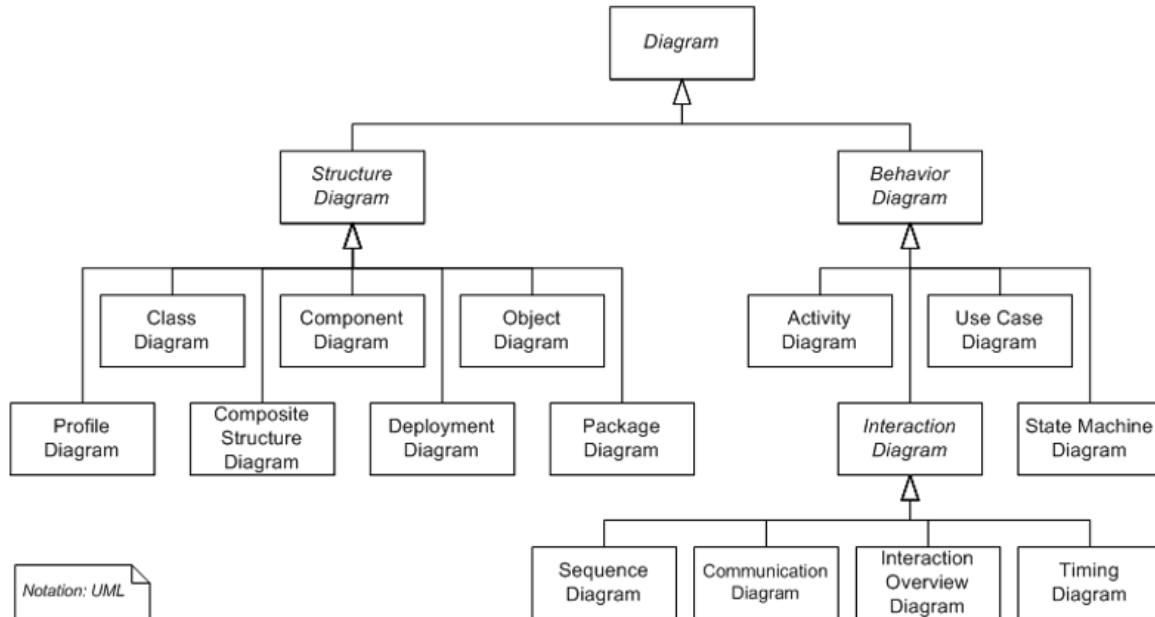


Figure 109 UML diagrams

To model more complex solutions, especially in System Engineering, another unified modeling notation can be used – SysML (System Modeling Language). SysML allows for modeling a wide range of systems which include hardware, software, information, processes, personnel and facilities.

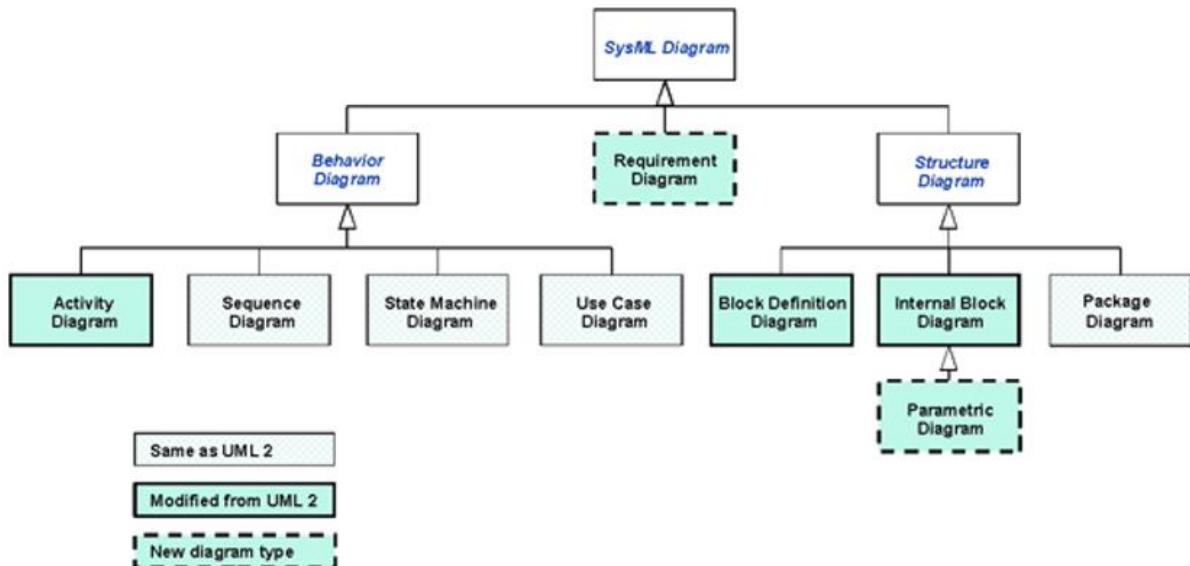


Figure 110 SysML diagrams

SysML reuses seven of UML's diagrams and provides two new diagrams: a requirement diagram which captures functional, performance and interface requirements and a parametric diagram to define performance and quantitative constraints.

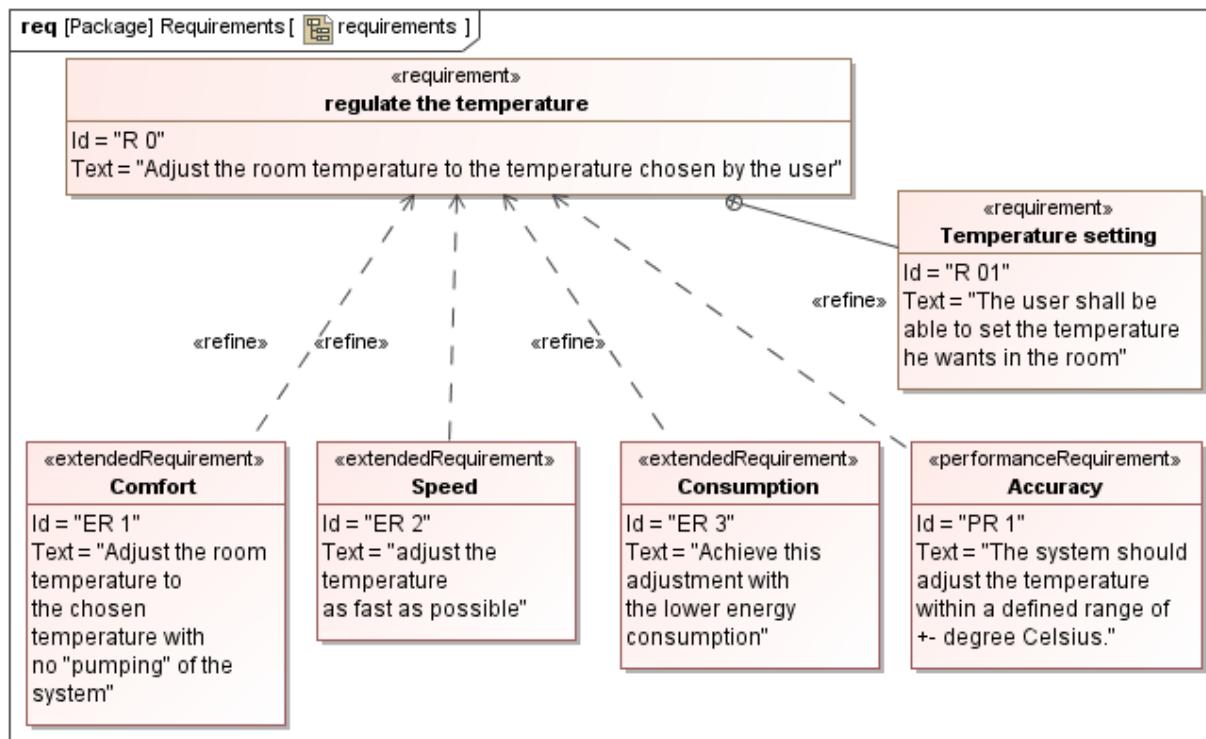


Figure 111 SysML requirements diagram (<https://docs.nomagic.com/display/SYMLP183/Requirement+Diagram>)

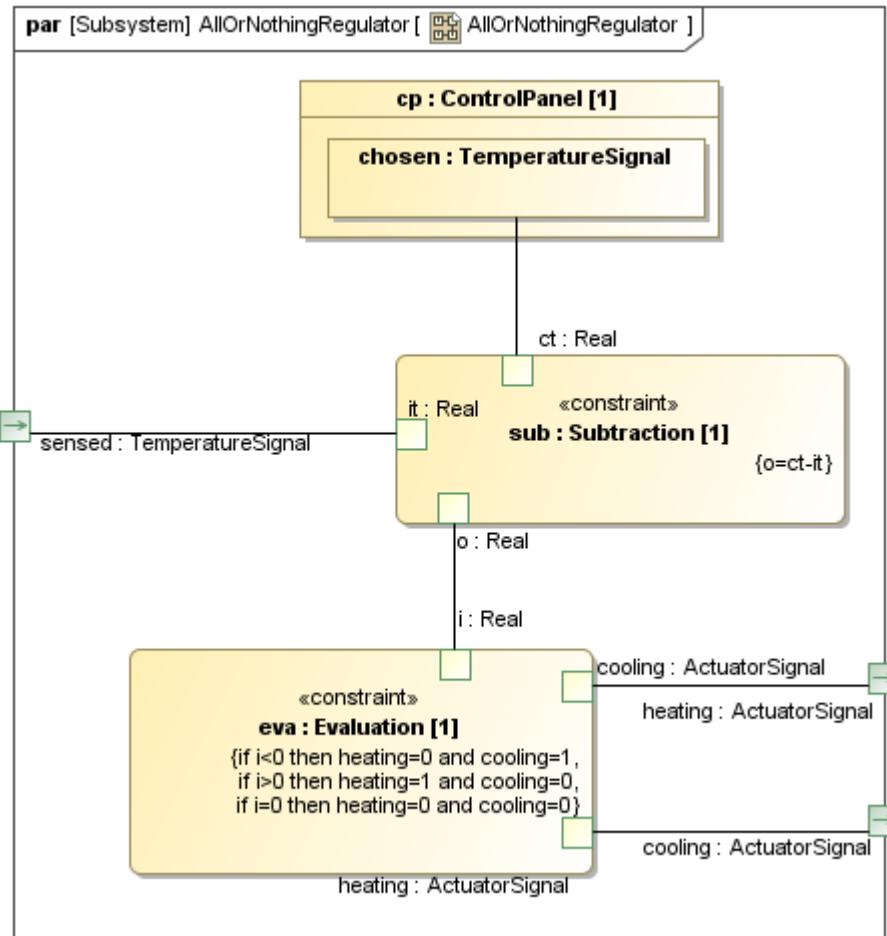


Figure 112 SysML parametric diagram
(<https://docs.nomagic.com/display/SYMLP183/SysML+Parametric+Diagram>)

Questions

Explain the purpose and application of formal modeling notations (UML and SysML)

Explain basic elements of UML diagrams: activity, use case, state machine, and class diagram

4.4 Sample Exam Questions

4.4.1 Question 4.1

LO-4.1.1 Know main activities, products and methods used in requirements development (K1)

Question

Which of the following activities is one of the main activities of requirements development?

Answer set

- [A] Requirements quality assurance
- [B] Requirements tracing
- [C] Requirements prototyping and documentation
- [D] Requirements modeling and specification

4.4.2 Question 4.2

LO-4.1.2 Understand the purpose, activities, methods and results of elicitation (K2)

Question

You are working on requirements elicitation. You are analyzing business documentation and interviewing stakeholders to collect specific needs and expectations regarding the planned solution.

What task of requirements elicitation is most probably addressed by your activities?

Answer set

- [A] Analyzing collected information in order to establish the final design of the solution
- [B] Identifying risks impacting the ability to meet business requirements
- [C] Identifying desired capabilities of the planned solution needed to meet stated business needs
- [D] Establishing business context, including customers and market, and business processes affected by the solution

4.4.3 Question 4.3

LO-4.1.2 Use different techniques for elicitation and communicate elicitation results (interview, workshops, questionnaire, user story, use case, persona) (K3)

Question

You are a senior business analyst responsible for delivering a solution for a stated business problem. The problem refers to low usability of a solution supporting the sales process.

In order to understand the problem correctly and to be able to identify potential areas for improvement, you decided to collect more information about the customers and their expectations.

You would like to collect the following information:

- Who are the customers (age, background, experience, preferences, etc.)?
- What kind of problems do the customers experience?
- What are the expectations of the customers?
- What business operations should be covered by the solution?

Which of the following answers define a useful set of techniques to be used to support your goal?

Answer set

- [A] Direct observation of customers' behavior, workshops, solution prototyping
- [B] Questionnaire to collect information about the customers, scenarios and prototypes to detail the scope and shape the solution, workshops with customer representatives to validate and confirm requirements
- [C] System use cases to be validated by project team, questionnaire to collect information about the customers and their usability requirements, prototyping

- [D] Workshops with randomly selected customers in order to collect information about target business process, personas and user story defined by the lead of the development team, interviews with all outstanding business stakeholders

4.4.4 Question 4.4

LO-4.1.5 Understand the purpose, activities, methods and results of requirements analysis (K2)

Question

You are working on detailing and structuring already collected requirements. During this work, you are learning new information – some limitations and dependencies that were not known before.

Which activity of the requirements engineering process is covered by this scenario?

Answer set

- [A] Elicitation
- [B] Analysis and modeling
- [C] Solution design
- [D] Risk management

4.4.5 Question 4.5

LO-4.1.8 Understand the purpose, methods and application of solution modelling (K2)

Question

Which of the following statements is true?

Answer set

- [A] Requirements models clarify the meaning of terms and concepts used by domain experts to address the business problem and are supplemented by solution models.
- [B] Conceptual models aim to express functional and non-functional requirements from different points of view and they detail requirements models.
- [C] Requirements models aim to represent the business area and support creating solution models.
- [D] Solution models aim to express business and stakeholder requirements for the purpose of effort estimation and they are detailed by conceptual models.

4.4.6 Question 4.6

LO-4.1.9 Know the different views of requirements/solution modelling (K1)

Question

Which of the following models most likely would represent the process view in requirements/solution modelling?

Answer set

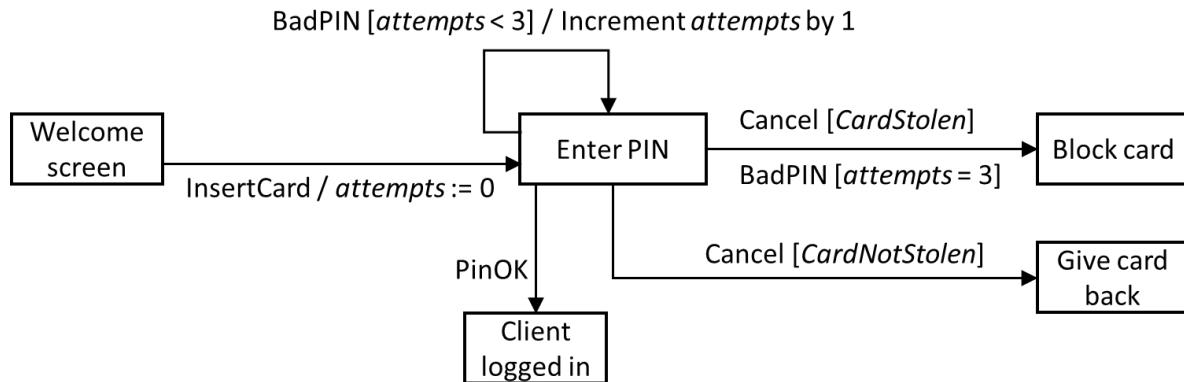
- [A] Communication model
- [B] Use case model
- [C] Architecture model
- [D] Functional requirements model

4.4.7 Question 4.7

LO-4.1.10 Use proper method to structure and express Business Analysis work products (UML activity diagram, UML use case diagram, UML state machine diagram, BPMN business process diagram) (K3)

Question

You are modeling requirements for an ATM. Your model should cover the process of entering the PIN by the customer. The following state machine diagram represents the results of your work.



Which of the following requirements are modeled within this diagram?

Answer set

- If a client enters the PIN incorrectly 4 times, the card is blocked.
- If a client enters the PIN incorrectly 3 times, the card is blocked.
- If a client enters the PIN incorrectly 3 times and the card is stolen, the card is blocked.
- If a client cancels from entering the PIN, the card is returned.

- [A] i) is modeled; ii), iii), iv) are not modeled.
 [B] ii) is modeled; i), iii), iv) are not modeled.
 [C] ii) and iv) are modeled; i) and iii) are not modeled.
 [D] ii), iii) and iv) are modeled; i) is not modeled.

4.4.8 Question 4.8

LO-4.1.11 Understand the concept of conflict, conflict management and conflict resolution in terms of requirements analysis and negotiation (K2)

Question

You are a business analyst working on creating a solution for a given business problem. During requirements analysis, you discover a conflict in the requirements. After some investigation you identify the potential cause of the conflict – imprecise statements in regulations impacting the business domain. You also identify the authors of the contradictory requirements and connect with them to get some additional information.

Which conflict management activity is taking place?

Answer set

- [A] Conflict resolution
 [B] Conflict identification
 [C] Conflict reduction
 [D] Conflict analysis

4.4.9 Question 4.9

LO-4.1.12 Know the purpose of information documentation and different methods and standard contents of a requirements documentation (K1)

Question

Which of the following items would be a part of a standard business requirements document?

Answer set

- [A] Solution requirements
- [B] Main scenarios for system use cases
- [C] Limitations and assumptions impacting the project
- [D] Structured business requirements

4.4.10 Question 4.10

LO-4.1.14 Know the concept of validation and verification in terms of Business Analysis work products (K1)

Question

Which of the following statements about validation and verification is true?

Answer set

- [A] Validation and verification have a common goal but use different approaches.
- [B] Validation and verification may focus on checking if requirements are documented and then tested against the quality criteria.
- [C] Validation and verification can be done only after completing requirements analysis and specification activities.
- [D] Validation and verification should involve all stakeholders in order to ensure quality criteria for the product are met.

4.4.11 Question 4.11

LO-4.2.3 Understand the concept, purpose and methods of establishing an information architecture (K2)

Question

Which of the following statements is **not** true?

Answer set

- [A] Information architecture defines deliverables for specific activities and appropriate levels of information.
- [B] Applying information architecture decomposes business problem into requirements that can be understood by project team.
- [C] Defining information architecture helps to understand and structure information in understandable and adjusted for a given audience and purpose way.
- [D] Information architecture defines required content and structure for analysis deliverables and work products.

4.4.12 Question 4.12

LO-4.2.6 Use traceability to manage relationships between different artefacts (K3)

Question

The following tables present the traceability between business needs, requirements and test cases. The mark "X" in the table means that a given need is covered by a given requirement and a given requirement is covered by a test case. Every change in any artifact A implies the analysis of all the artifacts that are traced back to A.

	Business need 1	Business need 2	Business need 3
Requirement 1	X		
Requirement 2		X	
Requirement 3		X	X
Requirement 4			X

	Req 1	Req 2	Req 3	Req 4
Test case 1	X			
Test case 2	X			
Test case 3		X		
Test case 4			X	
Test case 5			X	X
Test case 6			X	

The client decided to change the Business Need 3. How many test cases are needed to be analyzed in this situation?

Answer set

- [A] 3
- [B] 4
- [C] 5
- [D] It is impossible to answer, because the test cases are not traced back to the business needs.

4.4.13 Question 4.13

LO-4.2.7 Know elements of effective requirements configuration management: version, change management (K1)

Question

Which of the following statements correctly defines the objective of configuration management?

Answer set

- [A] Configuration management includes configuration identification, configuration change control, configuration status accounting, and configuration audit.
- [B] Configuration management aims to create and manage the association existing between artifacts on different abstraction levels
- [C] Configuration management aims to establish and maintain the integrity of the products and relevant artifacts, throughout the development and product life cycle.
- [D] Configuration management aims to manage versions of requirements artifacts that were already implemented and deployed into production.

4.4.14 Question 4.14

LO-4.2.9 Know methods for Quality Assurance in Business Analysis (K1)

Question

Which of the following options is **not** typically used for quality assurance of Business Analysis products?

Answer set

- [A] Domain standards and templates
- [B] Different types of reviews
- [C] Evaluation of requirements specification quality criteria
- [D] Feasibility study

4.4.15 Question 4.15

LO-4.2.10 Understand the meaning of QA in building the right approach to Business Analysis (K2)

Question

Which of the following statements best explains the meaning of QA in building the right approach to Business Analysis?

Answer set

- [A] QA covers all activities and task required to evaluate the solution against market demands.
- [B] QA provides a means for ensuring that the selected approach to Business Analysis will fulfill specified requirements for quality.
- [C] QA provides a means to control the quality of products in terms of meeting specified quality criteria.
- [D] QA provides a set of tools and techniques ensuring the solution meets the specified business requirements.

4.4.16 Question 4.16

LO-4.3.2 Know different types of techniques supporting Requirements Engineering activities and their application (K1)

Question

Which of the following techniques is used for information elicitation?

Answer set

- [A] UML
- [B] Interview
- [C] MoSCoW
- [D] Ishikawa diagram

4.4.17 Question 4.17

LO-4.3.4 Know the purpose and application of formal modelling notations (UML) (K1)

Question

Which of the following statements about UML is **not** true?

Answer set

- [A] UML contains structural diagrams to model dynamic aspects of system.
- [B] UML allows the user to model the solution from different perspectives.
- [C] UML is a unified notation for the analysis and design of systems.
- [D] UML contains behavior diagrams depicting behavioral features of a system or business process.

4.4.18 Question 4.18

LO-4.3.5 Understand the application of the following diagrams: UML activity, use case, state machine, class diagram (K2)

Question

Which of the following diagrams would be the best option to directly express functional requirements for a system?

Answer set

- [A] UML activity diagram
- [B] UML class diagram
- [C] UML state machine
- [D] UML use case diagram

4.5 Answers and Justifications

Question 4.1 – answer D

Justification

D – Correct. This activity belongs to requirements development, as explained in the IQBBA syllabus, section 4.1.1

A and B – Incorrect. All these activities belong to requirements management, IQBBA syllabus, section 4.2.1

C – Incorrect. There is no such a main activity in requirements engineering process.

Question 4.2 – answer C

Justification

C – Correct. This tasks is addressed by the scenario (“analyzing business documentation and interviewing stakeholders to collect specific needs and expectations regarding the planned solution”).

A – Incorrect. The scenario does not mention any analysis of collected information.

B – Incorrect. This answer refers to risk management, not mentioned in the scenario.

D – Incorrect. This answer refers to the strategy analysis knowledge area, not mentioned in the scenario.

Question 4.3 – answer B

Justification

B – Correct. Questionnaires help to collect information about the customers (information about the customers, problems they experience, key expectations); scenarios help present requirements in an understandable way, prototypes will help visualize the solution so that the customer representatives can validate it, workshops are a good way to confirm and validate requirements with key customer representatives.

A – Incorrect. Direct observation of customers’ behavior may be impossible and will not bring any value if used without a precise goal.

C – Incorrect. System use cases express functionality, while the main problem is related with usability. In addition, validation by the project team will not help to resolve problems the customers are facing. Questionnaires may not be a good solution to collect usability requirements as those requirements typically are difficult to express.

D – Incorrect. Workshops with randomly selected customers may result in incorrect problem analysis and decisions – random customers may not represent the general audience and may not face the real problem, in addition the goal of the workshop (“collect information about target business process”) is not consistent with the goal defined by the scenario; the lead of the development team may not have sufficient knowledge to define correct personas and user stories; the goal of interviews with all outstanding business stakeholders is not clear.

Question 4.4 – answer B

Justification

B – Correct. The scenario is about structuring requirements, creating a solution design and modeling. These are activities of analysis and modeling (IQBBA syllabus, section 4.1.3).

A – Incorrect. According to the scenario, elicitation was already completed (there are requirements being analyzed and modeled).

C – Incorrect. Solution design is not a main activity of requirements engineering process, in addition solution design could be done only after requirements analysis.

D – Incorrect. Risk management is not a main activity of requirements engineering process, in addition the scenario does not mention risk management.

Question 4.5 – answer C

Justification

C – Correct – as explained in the IQBBA syllabus, section 4.1.3

A – Incorrect. Requirements models “describe the problem area”.

B – Incorrect. Conceptual models “represent concepts (entities) and relationships between them” (IQBBA syllabus, section 4.1.3)

D – Incorrect. Solution models “describe the solution area from different points of views and determine the shape of implementation of the functional and non-functional requirements” (IQBBA syllabus, section 4.1.3)

Question 4.6 – answer A

Justification

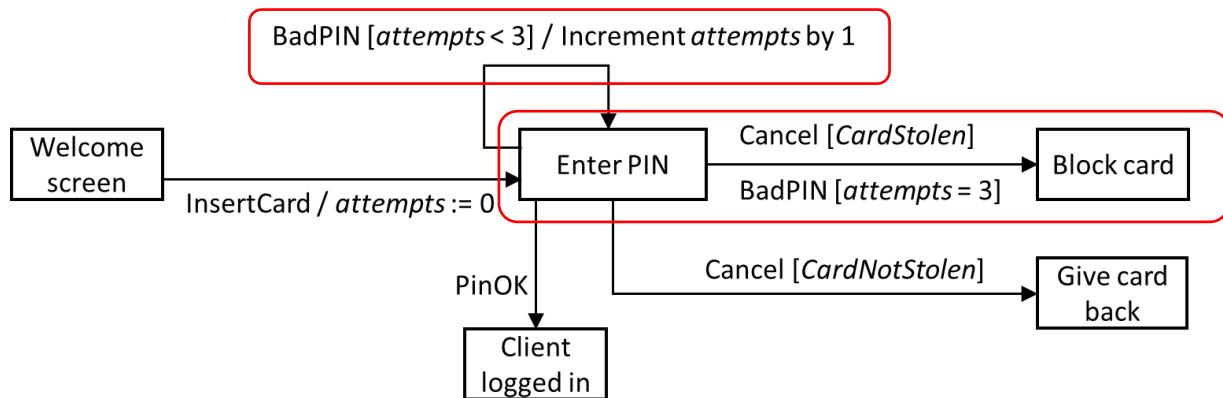
A – Correct – as explained in the IQBBA syllabus, section 4.1.2

B, C and D – Incorrect. Not compliant with the IQBBA syllabus, section 4.1.2

Question 4.7 – answer A

Justification

A – Correct. The case of entering PIN incorrectly 4 times is modeled. Only after entering wrong PIN 4 time the card is blocked.



Question 4.8 – answer D

Justification

D – Correct. Conflict was already identified and is now analyzed.

A – Incorrect. There is nothing about conflict resolution actions in this scenarios.

B – Incorrect. This activity was already completed.

C – Incorrect. There is no such activity in conflict management model.

Question 4.9 – answer D

Justification

D – Correct. This is a standard business requirements document, as explained in the IQBBA syllabus, section 4.4.1

A and B – Incorrect. These answers refer to a solution document rather than a standard business requirements document and are not mentioned in the IQBBA syllabus, section 4.4.1

C – Incorrect. This refers rather to project plan.

Question 4.10 – answer B

Justification

B – Correct – as explained in the IQBBA syllabus, section 4.1.5

A – Incorrect. Validation and verification have different goals. Approaches used for validation and verification may be similar.

C – Incorrect. V&V can be done before specification – on single requirements or business concepts too. Recommended practice is: “The best practice is to plan and perform validation and verification of requirements from the early phases of solution development – ideally from the requirements elicitation”, IQBBA syllabus, section 4.1.5

D – Incorrect. Validation and verification involves relevant stakeholders, not all of them.

Question 4.11 – answer B

Justification

B – Correct. This statement refers to decomposition or requirements analysis rather than IA.

A, C and D – Incorrect. All these statement refers to the purpose of IA, as explained in the IQBBA syllabus, section 4.2.2.

Question 4.12 – answer A

Justification

A – Correct. Business need is covered by Requirement 3 and 4. Requirement 3 is covered by three test cases (4, 5, and 6), Requirement 4 is covered by Test case 5. Therefore 3 test cases should be analyzed.

B, C and D – Incorrect. See A.

Question 4.13 – answer C

Justification

C – Correct, as explained in the IQBBA syllabus, section 4.2.5.

A – Incorrect. The statement itself it true, but it does not answer the question (objective of configuration management)

B – Incorrect. This statement refers to traceability.

D – Incorrect. CM does not focus only on version management. In addition, versions should be managed during the whole lifecycle.

Question 4.14 – answer D

Justification

D – Correct. Feasibility study is used to evaluate feasibility of a solution proposal, it is not a typical QA mean.

A, B and C – Incorrect. All the mentioned methods support QA for Business Analysis, as explained in the IQBBA syllabus, section 4.2.7.

Question 4.15 – answer B

Justification

B – Correct. This is a definition of QA, explaining the idea behind QA and goals of this discipline, as explained in the IQBBA syllabus, section 4.2.7.

A – Incorrect. This statement is more about solution evaluation.

C – Incorrect. This statement refers to quality control (IQBBA syllabus, section 4.2.7.)

D – Incorrect. This statement refers to quality control, or acceptance testing.

Question 4.16 – answer B

Justification

B – Correct. Interviews, surveys and workshops are elicitation techniques, as explained in the IQBBA syllabus, section 4.1.2.

A – Incorrect. UML is a modeling notation.

C – Incorrect. MoSCoW is a prioritization technique

D – Incorrect. Ishikawa diagram is used for causal analysis.

Question 4.17 – answer A

Justification

A – Correct – as explained in the IQBBA syllabus, section 4.3.3.

B, C and D – Incorrect. All these statements are true, as explained in the IQBBA syllabus, section 4.3.3.

Question 4.18 – answer D

Justification

D – Correct. Use case diagrams “capture requirements for a system” (OMG UML specification).

A, B and C – Incorrect. Activity diagram and state machines do not express functional requirements in a direct way. Class diagrams focus on the information structure, not functions.

5. Solution Evaluation and Optimization

Terms

Evaluation, Optimization

5.1 Evaluation

Solution Evaluation covers a set of activities that are performed in order to ensure that the capabilities provided by the solution proposal fulfill the stated Business Need(s), and satisfy business, stakeholder and solution requirements.

Evaluation – systematic assessment of an organization, process, or solution to determine its status and/or performance in meeting objectives over time, and to identify ways to improve it to better meet objectives.

Solution Evaluation is typically based on agreed requirements. During evaluation, the solution proposal is examined against compliance with the requirements and the Business Case. It is necessary to consider both business and technical assumptions and constraints as well, as they may determine the choice of solution. Solution Evaluation may result in discovering additional capabilities provided by the solution that had not been previously considered.

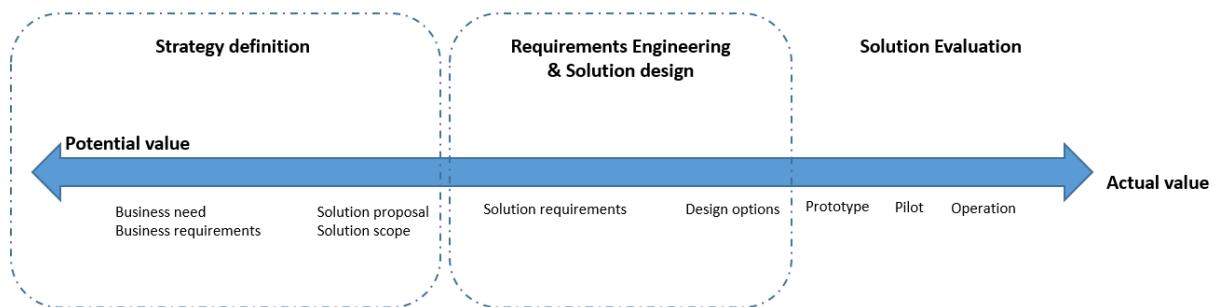


Figure 113 Solution Evaluation

Common methods for Solution Evaluation:

- Reviews and inspection (often based on a Requirements Traceability Matrix (RTM) and/or requirements specification documents)
- Demonstrating the solution proposal (prototype) to the stakeholders with the aim of explaining and confirming the appropriateness of the implemented requirements
- Collecting stakeholder's feedback regarding the solution proposal(s)

Weighting	Evaluation - 9 = Excellent, 6 = Good 4 = Satisfactory, 1 = Poor							
	Solution 1		Weighted		Solution 2		Weighted	
	Solution 1	Weighted	Solution 2	Weighted	Solution 3	Weighted		
Functionality	40%							
Fulfilling the functional requirements	67%	6	4,02	4	2,68	6	4,02	
Quality of the fulfillment (non-functional requirements)	33%	9	2,97	6	1,98	4	1,32	
	100%		6,99		4,66		5,34	
Integrability	20%							
Open intersections and APIs	50%	6	3	9	4,5	4	2	
Effort required to integrate existing system landscape.	50%	9	4,5	4	2	4	2	
	100%		7,5		6,5		4	
Providers	20%							
Experience, know-how, flexibility, reputation	75%	6	4,5	9	6,75	4	3	
Leading providers	25%	9	2,25	9	2,25	6	1,5	
	100%		6,75		9		4,5	
Price and Value	20%							
Amorisation of investment	50%	6	3	4	2	6	3	
TCO incl. extension	40%	6	3	4	2	6	3	
Absolute costs	10%	6	0,6	4	0,4	9	0,9	
	100%		6,6		4,4		6,9	
Weighted results	100%		69,66		58,44		52,16	
Recommendation								

Figure 114 Sample evaluation matrix (<https://www.microtool.de/en/requirementsengineering/the-solution-evaluation-in-business-analysis/>)

Solution Evaluation often includes an organizational readiness assessment.

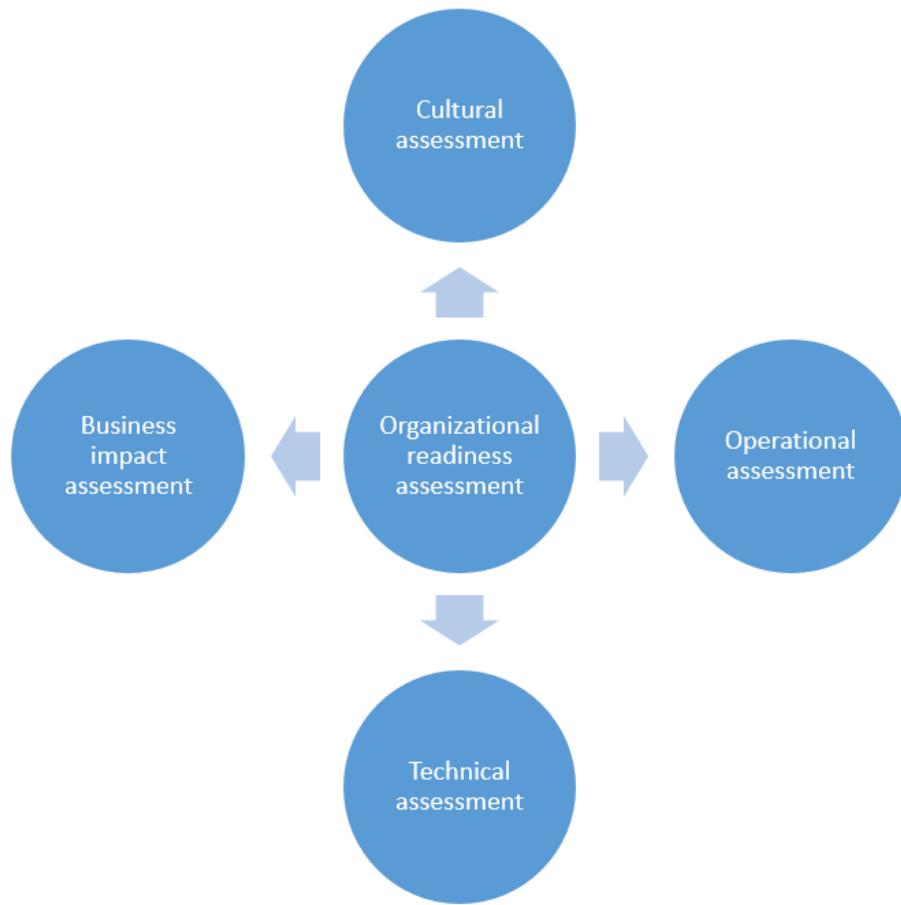


Figure 115 Elements of organizational readiness assessment

In the case of evaluating a released (operating) solution, the main focus is on checking if the solution successfully satisfies the Business Needs and Goals described in the Business Case (as defined during Strategy Analysis). In case of defects, weaknesses or an identified need for new capabilities, the Business Analyst should determine the most appropriate response to the identified problems and opportunities for solution or process improvement.

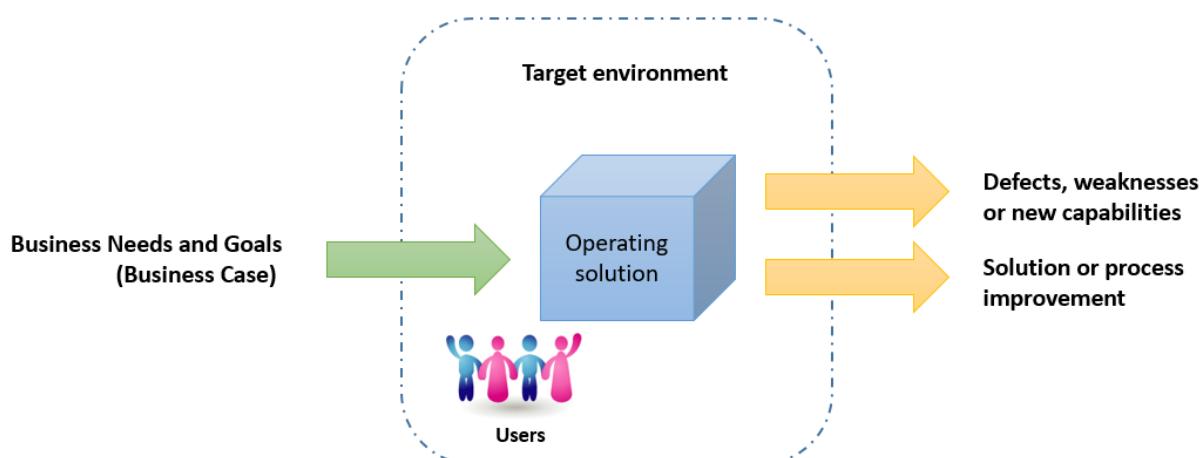


Figure 116 Evaluation of operating solution

Common methods for evaluating a released solution include:

- Reviews against defined KPIs, or acceptance and evaluation criteria
- Reviews against requirements stated in the Business Case
- Root cause analysis (for problem analysis)
- Usability evaluation

Questions

Recall the definition of solution evaluation

Explain the purpose, activities, methods and results of solution evaluation

Explain the process of evaluating the solution based on the solution proposal

Explain the concept, meaning and methods for evaluating solution performance once it is in place

Provide examples of solution evaluation criteria

5.2 Optimization

Optimization aims to introduce controlled change into the current solution or process in order to add value. Optimization may reduce the cost of operation, improve quality, allow alignment with other solutions, etc.

Optimization – the process of identification of an alternative with the most cost effective or highest achievable performance, under the given constraints, by maximizing desired factors and minimizing undesired ones.

Supporting optimization efforts is one of the tasks of a Business Analyst. The Business Analyst analyzes solutions and business processes used within an organization in order to discover ineffective elements and areas for improvement. With this knowledge, the Business Analyst is able to refine the solution and improve it by adding more value.

Common approaches to optimization include:

- Manual re-design of the solution or processes on the basis of experience and domain knowledge
- Re-design of the solution or processes based on Solution Evaluation activities
- Introducing means for optimizing performance of solutions or business processes in the organization (e.g., SAP, ERP, CRM software)
- BPR (Business Process Reengineering)

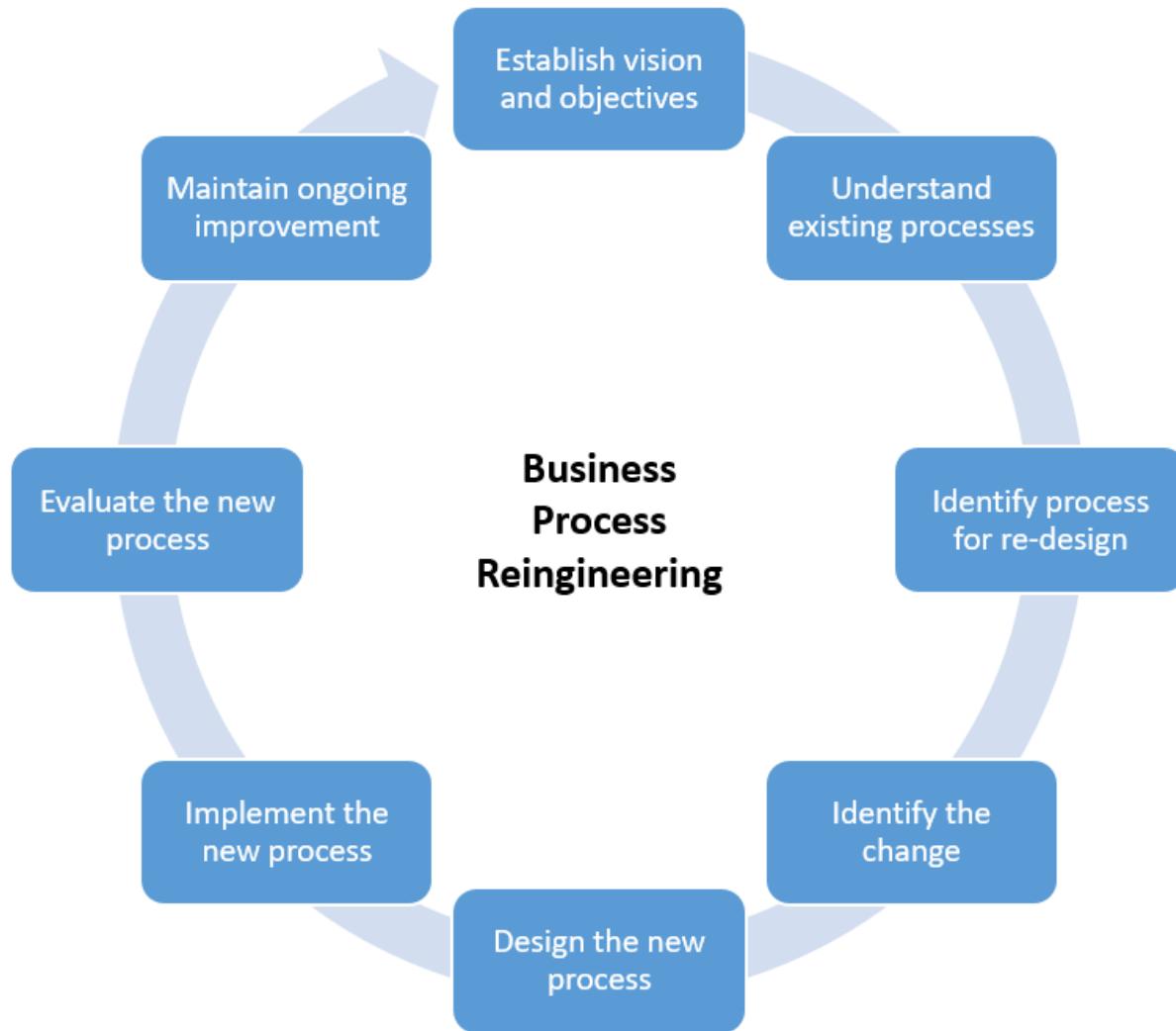


Figure 117 The concept of Business Process Reengineering

Process Improvement is a set of actions taken by a Process Owner to identify, analyze and improve existing processes within an organization to meet new goals and objectives. Optimization of business processes can be supported by methods such as Business Process Improvement (BPI). BPI is a systematic approach used to optimize an organization's processes to achieve more efficient results and significantly change the performance of an organization [Harrington].

BPI is conducted in three steps [Harrington]:

1. Define the organization's strategic goals and purposes together with the existing structure and processes (define the "AS-IS")
2. Determine the organization's customers or stakeholders, identify what outcomes would add value to the organization's objectives, and determine what would be the best way to align its processes to achieve those outcomes (define the "TO-BE")
3. Re-organize the business processes to realize the goals and meet the new objectives, using the tools available within the BPI methodology

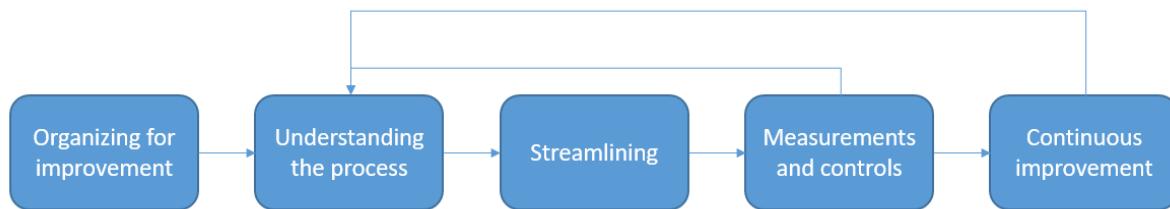


Figure 118 Formal phases of BPI [Harrington]

BPI Phases	
Phase 1. Organizing for improvement	
Objective	To ensure success by building leadership, understanding and commitment
Activities	<ul style="list-style-type: none"> • Establishing Efficiency Improvement Tool • Appointing a BPI champion • Providing executive training • Developing an improvement model • Communicating goals to employees • Reviewing business strategy and customer requirements • Selecting the critical processes • Appointing process owners • Selecting team members
Phase 2. Understanding the process	
Objective	To understand all the dimensions of the current business process
Activities	<ul style="list-style-type: none"> • Defining the process scope and mission • Defining process boundaries • Providing team training • Developing a process overview • Defining customer and business requirements and expectations for the process • Creating a flow diagram of the process • Collecting cost, time and value data • Performing process walkthroughs • Resolving differences • Updating process documentation
Phase 3. Streamlining	
Objective	To improve the efficiency, effectiveness and adaptability of the business process
Activities	<ul style="list-style-type: none"> • Providing team training • Identifying improvement opportunities (errors and rework, poor quality, high cost, delays) • Eliminating bureaucracy • Eliminating no-value-added activities • Simplifying the process • Reducing process time

- Error proofing of the process
- Standardization
- Automating
- Documenting the process
- Electing the employees
- Training the employees

Phase 4. Measurement and controls

Objective	To implement a system to control the process for ongoing improvement
Activities	<ul style="list-style-type: none"> • Developing in-process measurements and targets • Establishing a feedback system • Auditing the process periodically • Establishing a poor-quality cost system

Phase 5. Continuous improvement

Objective	To implement a continuous improvement process
Activities	<ul style="list-style-type: none"> • Qualifying the process • Performing periodic qualification reviews • Defining and eliminating process problems • Evaluating the change impact on the business and on the customer • Benchmarking the process • Providing advanced team training

Table 7 BPI Phases [Harrington]

Optimization efforts can be also supported by following specific methodologies or strategies, including:

- ISO 9000 or other standards aiming to improve performance of an organization
- Capability Maturity Model Integration/Capability Maturity Model (CMMI/CMM)
- Benchmarking
- Total Quality Management (TQM)
- Six Sigma

Level		Capability	Result
5	Optimizing	Continuous Process Improvement	Organizational Innovation & Deployment Causal Analysis & Resolution
4	Quantitatively Managed	Quantitative Management	Quantitative Process Management Software Quality Management
3	Defined	Process Standardization	Requirements Development Technical Solution Product Integration Verification Validation Organizational Process Focus Organizational Process Definition Organizational Training Integrated Product Management Risk Management Integrated Teaming Integrated Supplier Management Decision Analysis & Resolution Organizational Environment for Integration
2	Managed	Basic Project Management	Requirements Management Project Planning Project Monitoring & Control Supplier Agreement Management Measurement & Analysis Product & Process Quality Assurance Configuration Management
1	Initial	Heroic Efforts	Design Develop Integrate Test
		Risk & Waste	

Figure 119 CMMI model

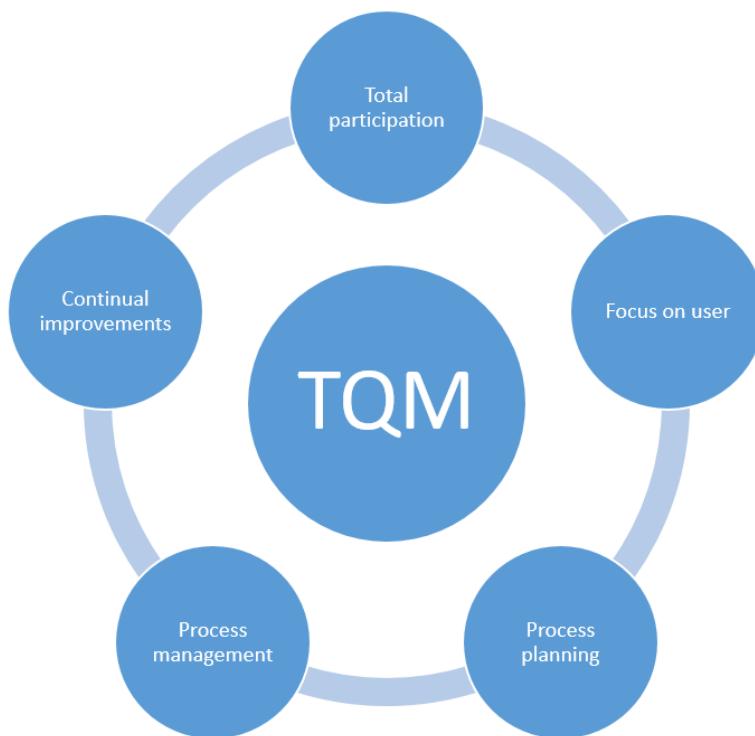


Figure 120 Basic principles of TQM

Typical results of optimization work are suggestions for improvements, new requirements and/or modifications to existing requirements or solutions.

Questions

Recall the definition of solution optimization

Explain the purpose, activities, methods and results of solution optimization

Provide examples of common approaches to optimization

Provide examples of methodologies or strategies supporting optimization

5.3 Sample Exam Questions

5.3.1 Question 5.1

LO-5.1.3 Understand the concept, meaning and methods for evaluating solution performance once it is in place (K2)

Question

You are examining a solution deployed into the working environment against requirements defined in a Business Case. According to the Business Case, end users should be able to use the solution without a need for any additional training or instruction.

What solution evaluation activity will be needed to conduct the evaluation?

Answer set

- [A] Usability evaluation
- [B] Reviews against performance metrics
- [C] Reviews against technical requirements
- [D] Feasibility analysis

5.3.2 Question 5.2

LO-5.1.4 Perform solution evaluation using specified evaluation criteria (K3)

Question

You would like to demonstrate the solution proposal to the stakeholders with the aim of explaining and confirming the appropriateness of the implementation of the requirements. The Business Case contains the following constraint:

“To demonstrate the proper implementation of each requirement, the statement coverage (achieved by the test cases) for each of the features related to this requirement must be 80% or higher”

You obtained the following report on features and coverage:

Requirement	Feature	Statement coverage
Login	Correct login process when all data correct	100%
Login	Ability to re-enter the password if wrong	85%
Login	“Forgot password” reminding mechanism	80%
Registering	Correct registration if all data correct	90%
Registering	Report on mistakes if some data wrong	75%

Based on the information covered by the above scenario, what should be the next step to be done?

Answer set

- [A] One of the features should be tested more thoroughly.
- [B] The solution meets the Business Case constraints and it can be presented to the client.
- [C] “Login” requirement needs more testing.
- [D] One feature for the “Registering” requirement is missing.

5.3.3 Question 5.3

LO-5.2.1 Know the purpose, activities, methods and results of solution optimization (K1)

Question

Which of the following is not a typical purpose of optimization?

Answer set

- [A] Reducing operational cost
- [B] Improving quality
- [C] Facilitating communication with other solutions
- [D] Reducing the number of system functions

5.4 Answers and Justifications

Question 5.1 – answer A

Justification

A – Correct, the information “end users should be able to use the solution without a need for any additional training or instruction” suggests that the solution should be intuitive enough to enable users to use it without additional training or instruction. This is a part of usability evaluation.

B – Incorrect. There is nothing about performance metrics in this scenario.

C – Incorrect. There is nothing about technical requirements in this scenario.

C – Incorrect. Feasibility analysis is not a mean for solution evaluation.

Question 5.2 – answer A

Justification

A – Correct. Coverage of feature: “Report on mistakes if some data wrong” is not sufficient (Business Case requires 80%), so the feature should be tested more thoroughly.

B and C – Incorrect. See A.

D – Incorrect. There is nothing in the scenario to indicate that a feature is missing.

Question 5.3 – answer D

Justification

D – Correct. Optimization “aims to introduce controlled change into the current solution or process in order to add value.” – reducing the number of system functions is not a solution ensuring the value is added.

A, B and C – Incorrect. All the answers express typical purposes for optimization effort, as mentioned in the IQBBA syllabus, section 5.2.

6. References

5.5 Books and Other Publications

[Bens] Bens, Ingrid, *Facilitation at a Glance! 4th Edition*, Goal/QPC; 4th edition, 2016, ISBN-10: 1576811832

[BMM] Business Motivation Model™ (BMM™), Version 1.3, <http://www.omg.org/spec/BMM/1.3>, retrieved 01.08.2017

[BPMN] Business Process Model And Notation™ (BPMN™), Version 2.2, <http://www.omg.org/spec/BPMN/2.0/>, retrieved 01.08.2017

[BABOK] International Institute of Business Analysis, *A Guide to the Business Analysis Body of Knowledge*, Version 2.0 and 3.0

[Brown] Brown Tim, *Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation*, HarperCollins, 2009, ISBN 978-0061766084

[Carlson, Wilmot] Carlson C.C., Wilmot, W.W., *Innovation: The five disciplines for creating what customers want*, New York: Crown Business, 2006, ISBN: 0307336697

[Cohn] Cohn Mike, *User Stories*, <https://www.mountaingoatsoftware.com/agile/user-stories>, retrieved 01.01.2018

[DD Manifesto] Digital Design Manifesto <https://www.digitaldesign.org/content/1-home/digital-design-manifesto.pdf>, retrieved 01.10.2019

[EPM] Expert Program Management, <https://expertprogrammanagement.com/2017/09/gap-analysis/>, retrieved 10.09.2019

[Hass] Hass Kathleen and Associates, Project Management and Business Analysis Maturity Assessments, <http://www.kathleenhass.com/Whitepapers-docs/BA%20and%20PM%20Assessments.pdf>, retrieved 01.08.

[Harrington] Harrington H. James, *Business Process Improvement: The Breakthrough Strategy for Total Quality, Productivity, and Competitiveness*, 1991

[IA Institute] Information Architecture Institute <http://www.iainstitute.org/>, retrieved 01.08.2017

[ICC/ESOMAR] ICC/ESOMAR (2008), *International Code on Market and Social Research*.

ICC/ESOMAR Amsterdam, the Netherlands, 4th ed. See:

http://www.esomar.org/uploads/pdf/professional-standards/ICCESOMAR_Code_English.pdf,
retrieved 01.08.2016

[IIBA Competency] IIBA® Business Analysis Competency Model Version 3.0, 2011, http://iiba.ru/wp-content/uploads/2013/04/IIBA_Competency_Model_v3_Final.pdf, retrieved 01.08.2017

[IQBBA Glossary] Standard glossary of terms used in Software Engineering Version 2.0

[Pichler] Pichler R., <https://www.romanpichler.com/blog/working-with-the-agile-product-vision-board/>,
retrieved 11.09.2019

[Pinheiro F.A.C. and Goguen J.A] F.A.C. Pinheiro and J.A. Goguen, *An object-oriented tool for tracing requirements*, in: *IEEE Software* 1996, 13(2), pp. 52-64

[PRINCE2] Axelos, *Managing Successful Projects with PRINCE2® 2017 Edition*, Axelos, 2017 ISBN: 9780113315338

[Rosenfeld, Morville] Morville, Peter and Rosenfeld, Louis, *Information Architecture for the World Wide Web: Designing Large-Scale Web Sites*, O'Reilly Media; 3rd edition, 2006, ISBN: 0596527349

[Rubin] Rubin K., *Essential Scrum: A Practical Guide to the Most Popular Agile Process*, Addison-Wesley Professional; 1 edition (August 5, 2012)

[Sparx] *The Business Process Model*, see:
http://www.sparxsystems.com.au/downloads/whitepapers/The_Business_Process_Model.pdf,
retrieved 01.08.2017

[SparxEA]
https://sparxsystems.com/enterprise_architect_user_guide/14.0/guidebooks/tech_stakeholder_list_map_or_personas.html, retireved 10.09.2019

[TGilb] Gilb Tom, *Glossary*, <http://concepts.gilb.com/Glossary>, retrieved 01.08.2017

[Web Style Guide] LynchPatrick J., Horton Sarah, *Web Style Guide 3rd Edition*,
<http://webstyleguide.com/wsg3/3-information-architecture/index.html>, retrieved 01.08.2017

[Wiegers, Beatty] Wiegers, Karl E., Beatty, Joy, *Software Requirements (3rd Edition)*, Microsoft Press; 3 edition, 2013, ISBN-10: 0735679665

5.6 Standards

[CMMI] Capability Maturity Model Integration

<https://cmmiinstitute.com/resources?searchtext=ResourceType:%22model%22>

[IEEE 610] IEEE 610.12-1990 IEEE Standard Glossary of Software Engineering Terminology

[IEEE 1042] IEEE 1042-1987 - IEEE Guide to Software Configuration Management

[ISO/IEC/IEEE 29148] ISO/IEC/IEEE 29148:2011 Systems and software engineering -- Life cycle processes -- Requirements engineering

[ISO 9241-210] ISO 9241-210:2010 Ergonomics of human-system interaction — Part 210: Human-centred design for interactive systems

[ISO 9000] ISO 9000 Quality management:

- ISO 9000:2015 Quality management systems. Fundamentals and vocabulary
- ISO 9001:2015 Quality management systems. Requirements
- ISO/IEC 90003 – Software engineering

[ISO 31000] ISO 31000 Risk Management - Principles and Guidelines on Implementation

[UML] Unified Modeling Language™ (UML®), Version 2.5, <http://www.omg.org/spec/UML/2.5>, retrieved 01.08.2017

7. Figures

Figure 1 Overview on Business Analysis areas	8
Figure 2 Business Analysis and Requirements Engineering	9
Figure 3 Levels of requirements	10
Figure 4 Alternative roles for a Business Analyst.....	12
Figure 5 The role of a Business Analyst.....	13
Figure 6 Business Analysis areas	15
Figure 7 Sample stakeholders map with communication direction {SparxEA].....	16
Figure 8 Sample Business Analysis skills	17
Figure 9 Business Analysis roles (IIBA Competency Model V3)	19
Figure 10 Vision, Mission and Business Goal	23
Figure 11 Eriksson-Penker notation	24
Figure 12 SIPOC method for business process description	25
Figure 13 Basic elements of BPMN notation	25
Figure 14 Sample BPMN model [Mleczko].....	26
Figure 15 Top down analysis of Business Goal	27
Figure 16 Bottom up analysis of the current („AS-IS“) state	27
Figure 17 The concept of a capability gap	28
Figure 18 Sample Gap Analysis [EPM]	29
Figure 19 Sample innovation process	30
Figure 20 Market Research and Analysis	31
Figure 21 User Needs Identification (source: https://insightpd.com/condensed_poster-2/)	32
Figure 22 Examples of Generic Stakeholders [BABOK]	33
Figure 23 Stakeholders Power-Interest Matrix.....	34
Figure 24 Sample Power-Interest Matrix.....	34
Figure 25 Product Vision [Pichler]	36
Figure 26 Sample Product Vision [Pichler].....	36
Figure 27 Elements of a Business Case	37
Figure 28 Sample structure of a Business Case	38
Figure 29 Sample Business Case (https://expertprogrammanagement.com/2017/06/project-business-case/)	39
Figure 30 Elements of PID	40
Figure 31 Sample maturity model [Haas].....	45
Figure 32 Waterfall model	46
Figure 33 V model	46
Figure 34 Scrum framework [Rubin].....	47

Figure 35 Product Owner in Scrum [Rubin].....	48
Figure 36 The concept of Product Backlog [Rubin].....	49
Figure 37 User story mapping (https://www.visual-paradigm.com/guide/agile-software-development/what-is-user-story-mapping/)	49
Figure 38 UX design process	50
Figure 39 Service design.....	51
Figure 40 Design Thinking process (https://www.nngroup.com/articles/design-thinking/).....	52
Figure 41 Lean Startup process (http://value-first.be/category/lean/lean-startup/)	53
Figure 42 Sample stakeholders involved in Business Analysis works.....	54
Figure 43 Common methods of communication	54
Figure 44 Content of a communication plan	56
Figure 45 Sample communication plan (https://www.teamgantt.com/blog/project-management-communication-plan)	56
Figure 46 Sample RACI matrix.....	57
Figure 47 Sample Business Analysis approach	59
Figure 48 Meaning of business requirements	60
Figure 49 SWOT.....	61
Figure 50 5 Why's (http://worksmaertogether.ucd.ie/the-power-of-asking-why/).....	61
Figure 51 Ishikawa diagram with sample categories	62
Figure 52 Elements of Requirements Development	70
Figure 53 Business Requirements Elicitation purposes	71
Figure 54 Requirements sources	72
Figure 55 Questionnaire process	73
Figure 56 Using personas with user story and scenarios	74
Figure 57 Use case scenario template.....	74
Figure 58 Sample scenario (http://www.uxforthemasses.com/scenarios-part-one/#)	75
Figure 59 Procedure of Elicitation based on existing documents	76
Figure 60 Brainstorming procedure [BABOK]	77
Figure 61 6-3-5 method	78
Figure 62 Field observation procedure.....	79
Figure 63 MoSCoW method	80
Figure 64 Sample organization of requirements and other artifacts	81
Figure 65 The concept of decomposition	81
Figure 66 Requirements decomposition using requirements diagram (https://docs.nomagic.com/display/SYMLP190/Requirements+decomposition)	82
Figure 67 Sample Story mapping (https://www.visual-paradigm.com/guide/agile-software-development/what-is-user-story-mapping/)	82
Figure 68 Thomas-Kilmann Conflict Mode Instrument.....	84
Figure 69 Conflict Management process.....	84

Figure 70 Levels of modeling	85
Figure 71 Different perspectives of modeling.....	86
Figure 72 Sample SysML requirements diagram.....	86
Figure 73 Sample UML use case diagram - user view	87
Figure 74 Sample UML class diagram	87
Figure 75 Sample UML component diagram	88
Figure 76 Sample prototype created using Excel	89
Figure 77 Sample wireframe (https://www.visual-paradigm.com/learning/handbooks/agile-handbook/wireframe.jsp)	90
Figure 78 Different approaches to specification (IREB Certified Professional for Requirements Engineering- RE@Agile Primer -Syllabus and Study Guide, Version 1.0, March 15, 2017)	91
Figure 79 Sample requirement specification	92
Figure 80 The concept of CCC.....	93
Figure 81 Persona {Pichler].....	93
Figure 82 Sample persona [Pichler]	94
Figure 83 IEEE 1362 Concept of Operations outline	95
Figure 84 IEEE 830 SRS outline	96
Figure 85 IEEE 830 SRS – sample elaboration of chapter 3.....	97
Figure 86 Relative cost of defects	98
Figure 87 Validation and verification { https://www.plutora.com/blog/validation-vs-validation }.....	98
Figure 88 V&V techniques.....	99
Figure 89 Quality criteria for requirements	100
Figure 90 Sample requirements checklist	100
Figure 91 Elements of Requirements Management.....	101
Figure 92 Elements of Information Architecture	102
Figure 93 Sample Information Architecture for Business Analysis works	103
Figure 94 Sample design of Business Analysis artifacts.....	103
Figure 95 Sample Information Architecture for a website(https://docstore.mik.ua/oreilly/web2/infoarch/ch08_04.htm)	104
Figure 96 Requirements communication.....	105
Figure 97 Sample requirements acceptance process.....	106
Figure 98 Sample structure for traceability.....	107
Figure 99 Sample traceability between artifacts (https://sparxsystems.com/enterprise_architect_user_guide/14.0/model_navigation/create_traceability_diagrams.html)	108
Figure 100 Traceability and scope management – UC Modify product may be out of scope	109
Figure 101 Traceability and coverage analysis – FR Order products is covered by two use cases ..	109
Figure 102 Traceability and impact analysis - impact of change in FR Order products	109
Figure 103 Traceability and usage analysis - UC Search product is used twice in the system model	110

Figure 104 Sample RTM	110
Figure 105 Configuration Management.....	112
Figure 106 Basic Change Management process	113
Figure 107 UML diagrams	117
Figure 108 SysML diagrams	117
Figure 109 SysML requirements diagram (https://docs.nomagic.com/display/SYSMLP183/Requirement+Diagram).....	118
Figure 110 SysML parametric diagram (https://docs.nomagic.com/display/SYSMLP183/SysML+Parametric+Diagram).....	119
Figure 111 Solution Evaluation	130
Figure 112 Sample evaluatio matrix (https://www.microtool.de/en/requirementsengineering/the-solution-evaluation-in-business-analysis/).....	131
Figure 113 Elements of organizational readiness assessment.....	132
Figure 114 Evaluation of operating solution	132
Figure 115 The concept of Business Process Reengineering	134
Figure 116 Formal phases of BPI [Harrington].....	135
Figure 117 CMMI model.....	137
Figure 118 Basic principles of TQM	137

8. Tables

Table 1 Examples of requirements	11
Table 2 Consequences of neglecting Business Analysis	14
Table 3 Sample Business Analysis products	16
Table 4 Examples of Vision, Mission and Goals	22
Table 5 Sample configuration of a requirement	111
Table 6 Sample Change Request	114
Table 7 BPI Phases [Harrington]	136