
**Health Informatics - Methodology for
analysis of business and information
needs of health enterprises to support
standards based architectures**

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 215, *Health informatics*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Healthcare organizations need to have coordinated and systematic methodologies for business management, quality management and information management. These methodologies also support creating of a coherent business and information architectures as one of the prerequisites for achieving semantic interoperability in both the healthcare enterprises and their information and communications technology (ICT).

Healthcare is a business sector where high quality information is crucial for the quality of the services delivered. In healthcare it is critical to be able to share information between different healthcare providers regionally, nationally and sometimes also internationally. Therefore, business and information architectures should be coherent and based on standards. To achieve this, an appropriate methodology should be used for creation of such architectures.

This document describes the methodology for analysis of business and information needs of health enterprises to support standards based architectures, BIA methodology. The purpose of the methodology is to provide an efficient business and information needs analysis for an optimal healthcare enterprise description in order to create a standards based business and information architectures.

The BIA methodology starts with describing of the organization's mission and vision.

The organization's mission defines the type of business to be conducted and its extent. A defined business always has a purpose to state why it exists.

The business vision drives the business forward, stating the direction for streamlining and thereby development of the business.

There should be a comprehensive holistic overview that describes the current state and the target state of the business and its information management, as well as how to move from the current state to the target state, thereby allowing the vision to be more easily achieved.

The BIA methodology is used for the analysis and descriptions of a defined business. The resultant descriptions comprise the basis for decisions made for different purposes, ranging from the production of a holistic overview as a basis for the business development, information supply, ICT strategies as well as ICT requirements-setting.

The methodology consists of several steps that analyse and describe different aspects of a business. It also defines how these aspects relate to each other in order to achieve an effective and lean analysis of the business and its information needs. The analysis results in descriptions of:

- Goals - long-term, strategic, wider goal, not precisely quantifiable
- Objectives - more short-term, on operational level, specific measurable
- Stakeholders - roles/actors/target groups that directly interact in the business or have an interest that business is operative
- Concepts - the concepts that are fundamental and anchored in the business
- Process from value processing perspective - patterns for action that shall ensure that the objectives are achieved
- Process from a collaboration perspective - crystallizing of the processing perspective that shows the business roles in collaboration
- Information needs – what type of information that business roles are needed in their collaboration
- Information structure - a comprehensive and structured description of the type of information managed by the different roles in the process

- Codes, classifications and terminologies - agreed and predefined values which describe a certain type of information related to a specific attribute in the information structure

Using an established and specific for healthcare system methodology ensures that the result is fit for its purpose, maintaining quality at a high level. It also increases opportunities for comparing and re-using different analytical results as well as producing an optimal business description which can be used for different purposes.

The BIA methodology also points out a number of International Standards to use as reference models in development of the standards based coherent business and information architectures.

This document is targeted at experts working with strategic issues such as devising a business goals, objectives and strategies as well as those working with the production of industry frameworks, creating of standards based business and information architectures, business and information analyses, information structuring and requirements setting for ICT or their information supply.

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Health Informatics - Methodology for analysis of business and information needs of health enterprises to support standards based architectures

1 Scope

This document presents a methodology which supports and enables the development of standards based business and information architectures that contribute to good quality of healthcare and patient safety. The methodology is used to develop descriptions of healthcare enterprises from different aspects. Those aspects are covering what, how, where, who, when, why^[1] and are based on standards.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 9000, *Quality management systems — Fundamentals and vocabulary*

ISO 13940, *Health informatics — System of concepts to support continuity of care*

EN 15224, *Quality management systems*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 9000, ISO 13940, and EN 15224 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

business mission

purpose and scope of a business

3.2

business vision

future or ideal goals that a business strives to achieve

3.3

holistic view of the business

description of the business current state, the target state and how to move from the current to the target state

3.4

time dimension

view of the business in the current state or the target state

3.5

strategy for transition to the target state

overall description for displacement of business from current state to target state

3.6

action plan

concrete activities intended to achieve the target state

3.7

current state

description of way in which the business and its support operate, for example information management and information and communications technology

3.8

target state

description of desired way in which the business and its support should operate, for example information management and information and communications technology

3.9

business aspect

type of business analysis from a certain point of view in order to create a deeper understanding of the business and its information management

3.10

set of information

the information managed by the activities in the process

3.11

stakeholder

role, actor or target group who directly interact with the business or who have an interest in the outcomes of that business

3.12

process from a value processing perspective

patterns for action that ensure that the objectives are achieved

3.13

process from a collaborative perspective

crystallizing of the processing perspective that shows the business roles in collaboration

3.14

concept

unit of knowledge created by a unique combination of characteristics

[SOURCE: ISO 1087:2019, 3.2.7, modified — Notes removed.]

4 Why the BIA methodology is useful in healthcare

The structure and standardization of information handled in electronic systems in the healthcare has been attempted over several decades in many different countries. It became clear that there was a need to first define the concepts which are the basis for this information before structuring could commence.

Concepts and information structures by themselves are insufficient to create the preconditions for the information to be unambiguously defined. Users should therefore understand the context in which this information is created and handled.

Healthcare is an information-intensive industry, that is both knowledge- and evidence-based. [Figure 1](#) illustrates that many different professions and roles work together in the patient care. For clarification and the maintenance of patient safety, those roles shall understand the clinical context in which the information was created. In addition, it is important that information is retained in such a way that it can be reused in order to meet the needs of different stakeholders.

As healthcare information shall be handled over many years, it is necessary that structures are backwards compatible. Information structures and related regulations should be stable over time and based on a predefined conceptual structure.

Business and information analysis methodology takes those aspects characteristic of healthcare into account:

- many professions
- many specialties with their own development needs
- interaction with others
 - to understand each other in the same way
 - to protect patient safety
- information-intensive
- traceability and an audit trail of information management
- based on knowledge and evidence
- the need for follow-up



Figure 1 — Managing of a large amount of information

Healthcare professionals should focus their time and resources on patients. At the same time, it is necessary to streamline healthcare enterprises, their information management and ICT. Healthcare usually has a need to pass through this with quite limited resources and under the short periods of time without disturbing the core enterprise. Therefore, enterprises should use methodologies in change work that meets these requirements.

The BIA is such a methodology that characterizes:

- well-demarcated methodology and with limited scope
- easy to understand, relatively quick to learn and get started to use
- can be used in its entirety or in less delimited parts
- enable to involve healthcare professionals in analysis
- healthcare professionals are the driving factor in analysis
- analysts play the role as help and support in analysis work

Historically, healthcare professionals were very poorly involved in business and information analysis. ICT professionals conducted analysis with very minimalist involvement of healthcare professionals. Such analysis was ICT-driven.

A fundamental advantage of the BIA methodology is that it is the healthcare professionals who "owns" analysis and are at the focus in the analysis work. Analysts are seen as the help and support in this work and stands for the structural perspective. Through agreement and consensus in analysis work, healthcare professionals create different models. Analysts, on the other hand, help keep the focus in the discussion in order to come to a common understanding of areas of analysis.

To be able to involve healthcare professionals in analysis, the methodology should to be easily understood. Healthcare professionals also need to see how each step in analysis work contributes to a qualitative end result.

Because the BIA methodology is clearly defined and made easy to understand, opportunities are created for healthcare professionals to be the driving force in analysis work. The purpose of the BIA methodology is to conduct business-driven analysis.

5 Efforts to achieve the business vision

5.1 The business mission, vision, holistic view and strategies

A mission defines the type of business that is to be conducted and the extent of this business. A defined business always has a specific purpose which justifies its existence.

The vision drives the business forward, stating a direction for streamlining and thereby its development as it shows in [Figure 2](#). A business should have a common, agreed and established vision why it exists. A vision doesn't have to be measurable or even completely realistic; it serves to point out the direction of the business' future.

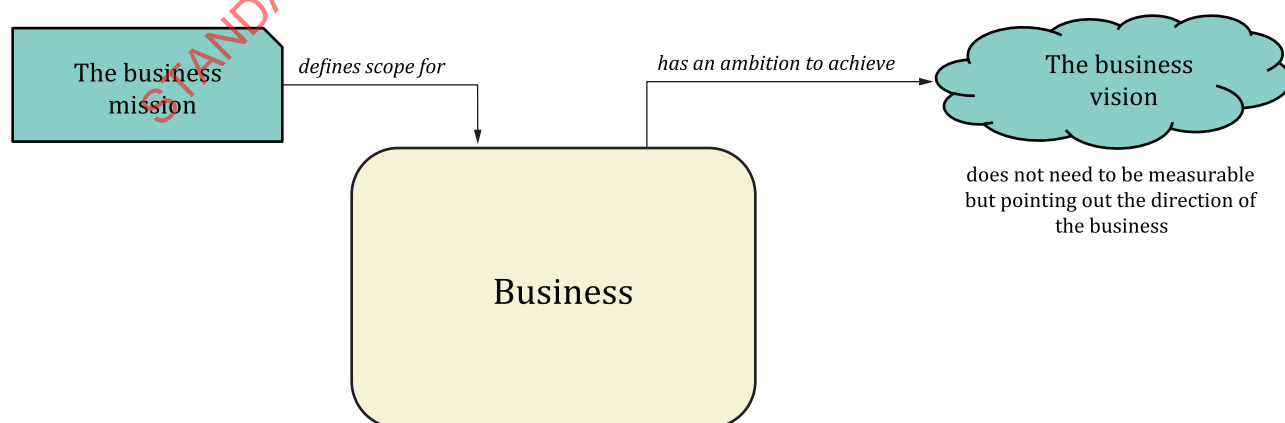


Figure 2 — Business vision

Sometimes a business is not sufficiently effective enough to achieve its vision at the present time; there should be a holistic view of the business that describes its current state, how it is viewed and perceived the way it works today. The target state of the business, that is another part of the holistic view, describes the desired state of how it will function in the future. [Figure 3](#) illustrate the relationship between business vision, current state, target state and strategy for transition. A gap analysis handles the difference between the current state and the target state.

In reality, it can be difficult to directly change the business if major operational changes are involved. However, rather than compromising the vision, the strategic plan allows it to be reached in steps with the added benefit of continuously evaluating the relevance of the target state to ensure it retains its viability.

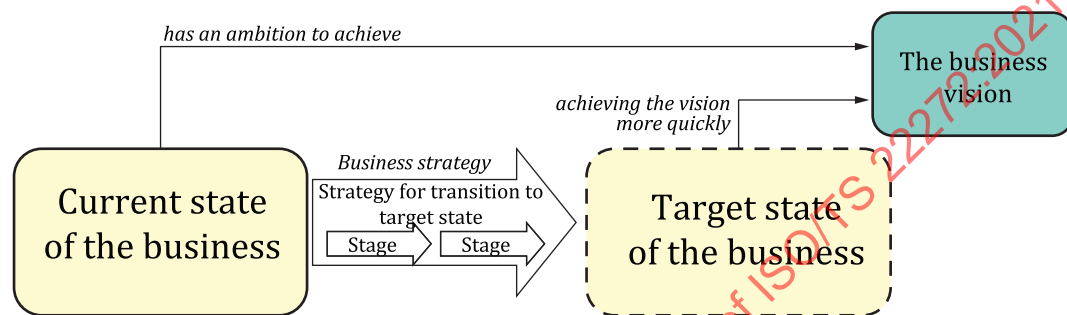


Figure 3 — Business vision and strategy for transition

The business' target state should be clear before the tools which support it, such as information and communications technology, are devised.

Just as the business can perceive its current state as insufficient to achieve the vision, ICT tools can also have shortcomings.

However, the business and its ICT still have to operate as usual on a daily basis. Therefore, short-term measures which describe how to make minor and limited changes should be identified in order to allow the business to continue to function. [Figure 4](#) shows the movement of the business from the current state to the target state should be synchronized with an ICT strategy.

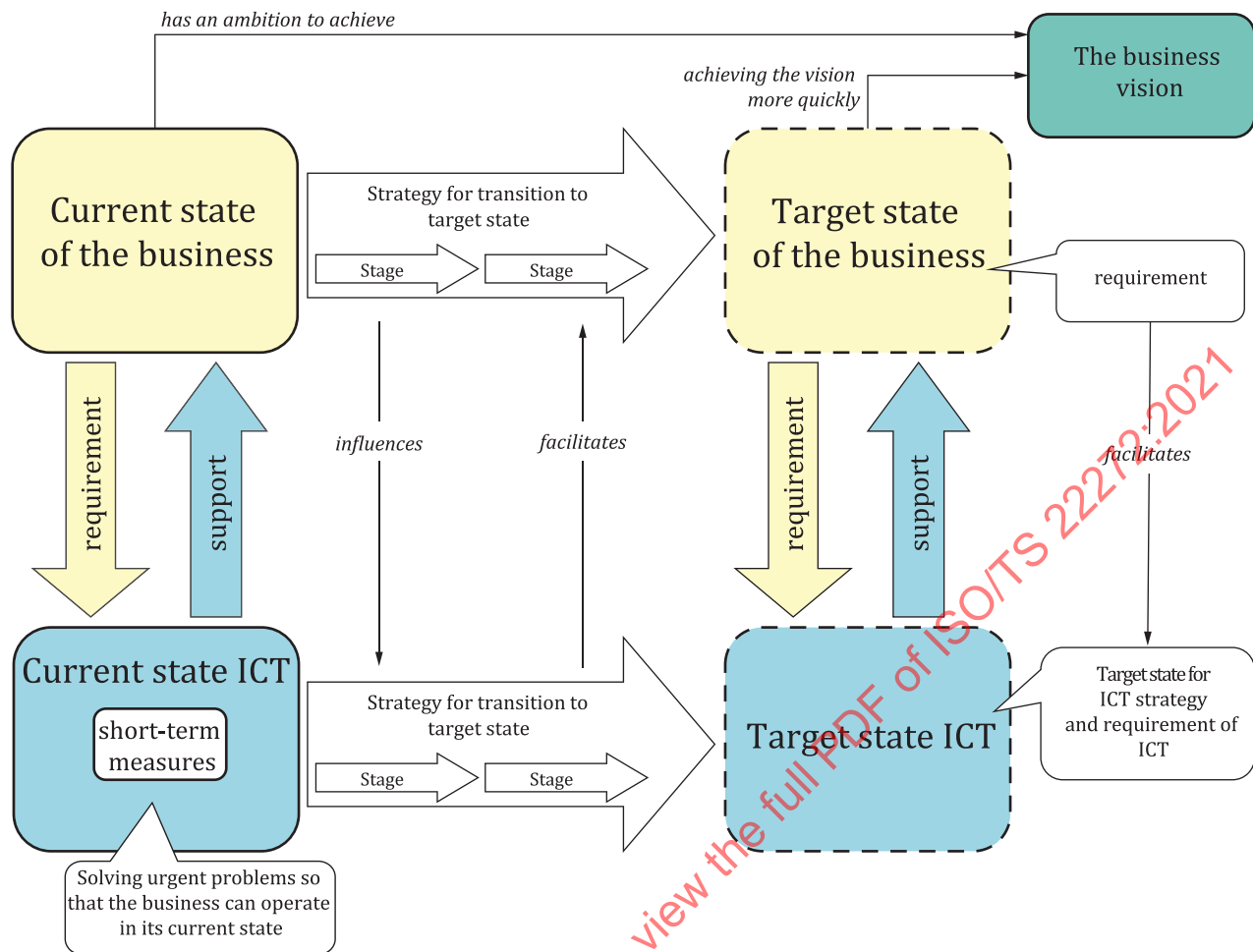


Figure 4 — Synchronization between different perspectives

Streamlining the business and developing an effective ICT alone are insufficient to effectively achieve the vision. Nowadays, the supply of business information plays a decisive role in the enterprise. Effective information management is central to creating the optimum conditions to achieve the business' target state and thereby its vision. Therefore, the current state, target state and strategy for transition to the target state within information management is central to achieving the business vision.

In summary, the holistic view of the business includes the descriptions of the current state of the business, information management as well as the ICT. The strategies for transition to the target state facilitate achievement of the vision as it is shown at [Figure 5](#).

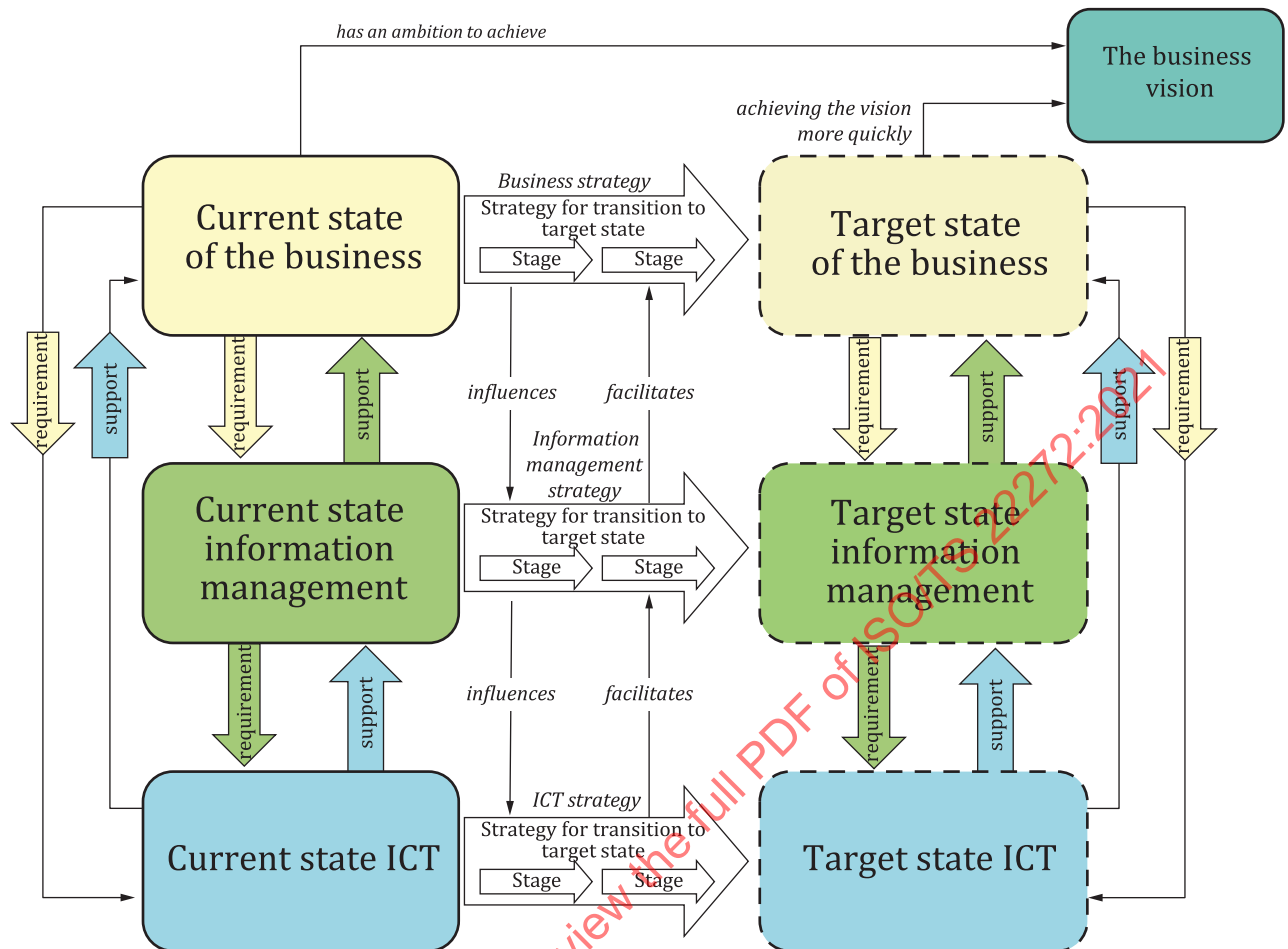


Figure 5 — Holistic view of the business

5.2 Different steps in analysis work and change management

Figure 6 illustrates several important steps in the analysis work and change management. The gap analysis identifies which business areas should be streamlined and improved. Using this as base for decision, a business strategy is then devised, which describes the route to achieve the target state. Stipulating which business areas should be prioritized for commencing the change work allows the definition of action plans for the change.

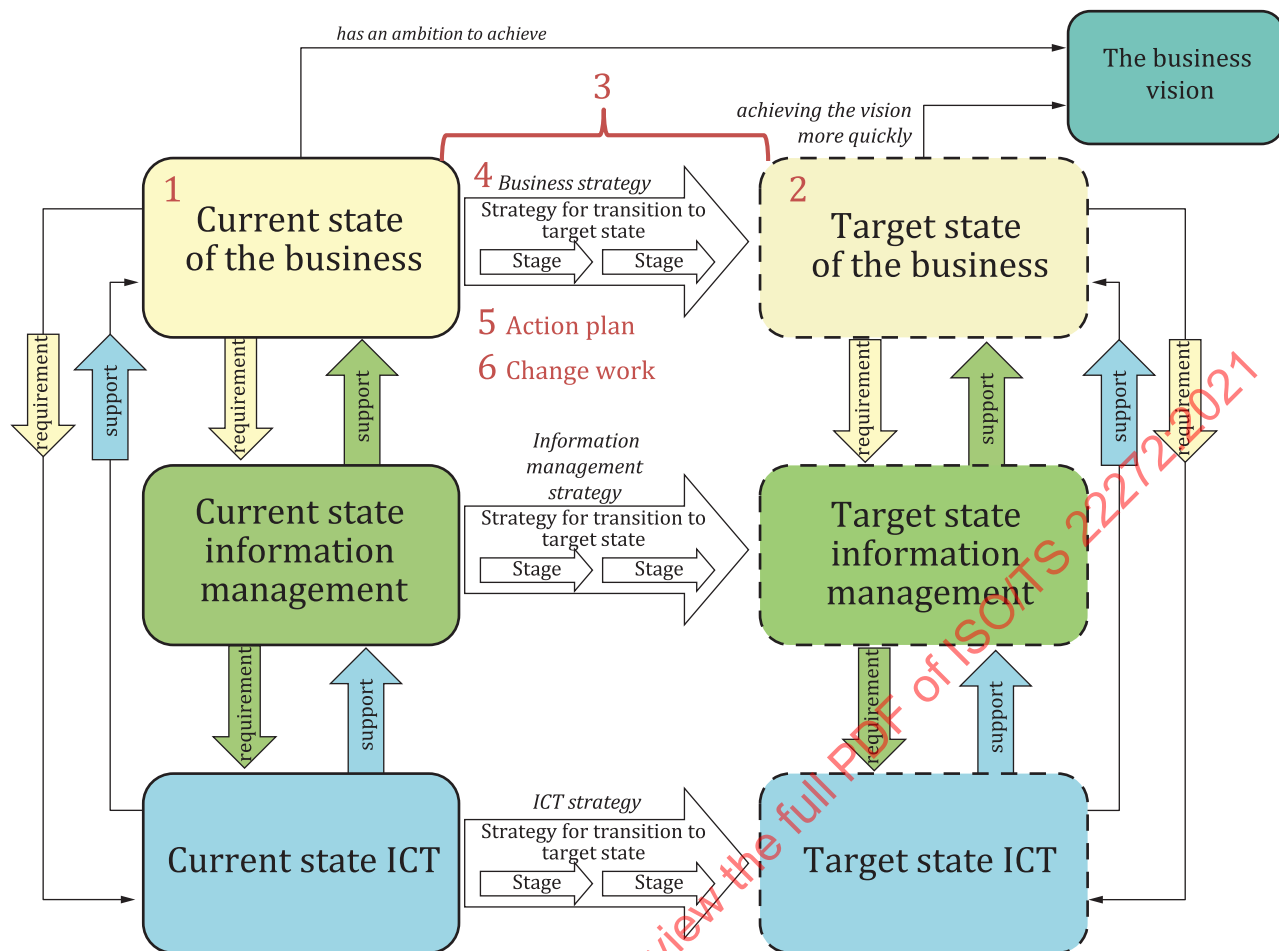


Figure 6 — Different steps in analysis work and change management

The planning of all change work should start from the holistic view of the business and its vision. The same principles apply at an overall level within all three perspectives, i.e. business, information management and ICT. It is very important that the changes within these three perspectives are coordinated and take place on a collaborative basis, see [Figure 7](#).

Discrepancies between the descriptions of the current and target states forms the basis for devising the strategies for business development and its information supply, thereby creating the base for decision for devising the ICT strategy.

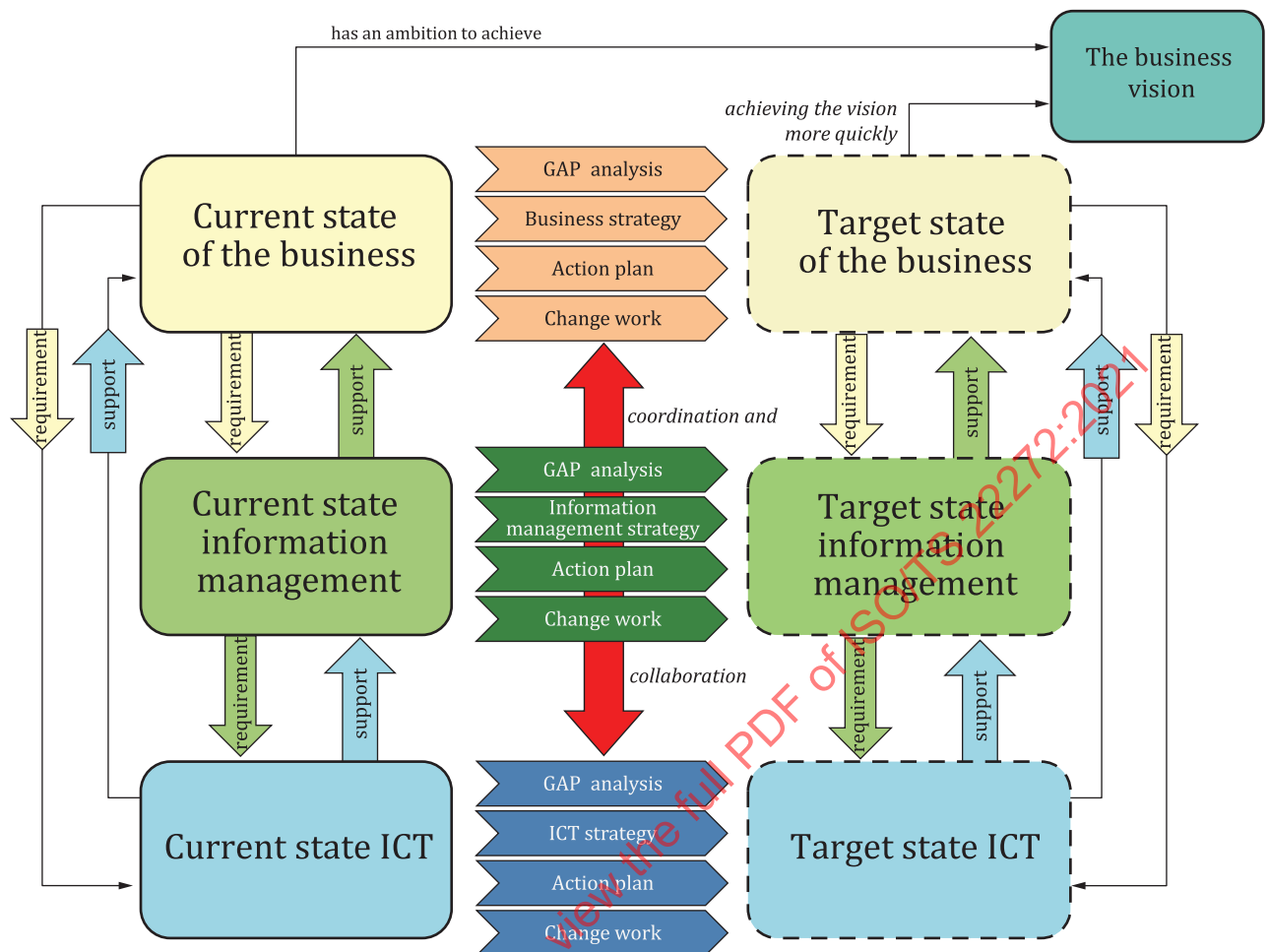


Figure 7 — Coordination and collaboration between different perspectives in change work

Within each perspective, strategies for transition to the target state (business strategy, information management strategy and ICT strategy) shall be outlined and coordinated. Change management should be planned and implemented in collaboration between these perspectives.

Without an overall picture, it is difficult to describe effective processes within the business that will deliver the results, which in turn contribute to the achievement of objectives. For example, if there is no description of the target state and strategy for transition within information management then there is a risk that the information is not traceable and that siloed sets of information which are not compatible are created. By the same token, it is difficult to devise a business-based and realistic ICT strategy without a description of the target state and strategy for transition for the business and its information supply.

5.3 Fundamental areas within healthcare as a system

Management of healthcare is divided into strategic and operational levels. The strategic level sets goals for the core business and is responsible for the implementation of governance within healthcare. The operational level is responsible for ensuring that the core business delivers the patient care. In addition, healthcare is dependent upon regulations, laws, constitutions, knowledge bases and ethical values as it shows in [Figure 8](#).

When starting a business and information needs analysis, it is important to identify which fundamental area(s) will be covered. These areas are grouped into:

- core business

- leading and governing the core business
- support and resource allocation for the core business

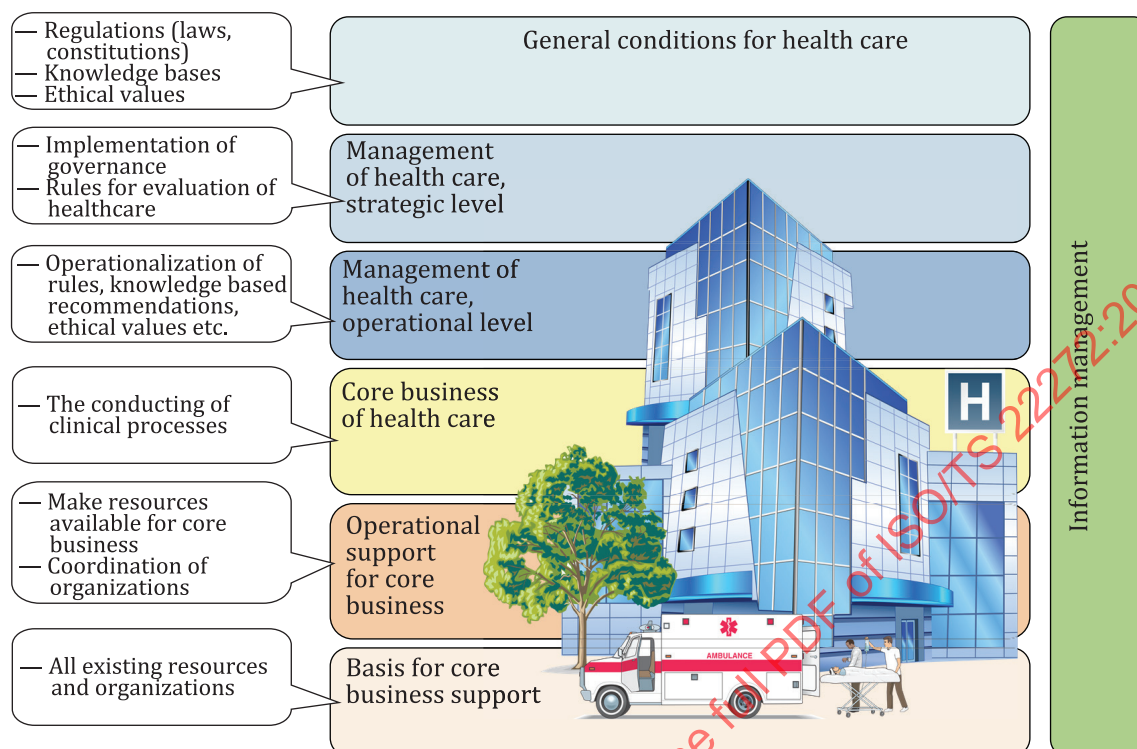


Figure 8 — The fundamental areas within healthcare as a system

5.4 Time dimensions in the BIA methodology

The first step in the analysis work, according BIA methodology, is to describe the business from a high-level perspective including how different parts of the business are related to each other and the mutual dependences which exist between them. It is important to identify which level within fundamental areas that business belongs to and how it relates to other levels.

The next step is to provide descriptions of the holistic view of the business that consists of the current and the target states of the business. These descriptions cover different business aspects.

Often the current state will highlight inefficient processes or a waste of time and resources.

Sometimes it can be difficult to achieve a sustainable common description of the current state of the business due to the lack of a common view or perception. However, the description of the current state should be done even if only at high level. Otherwise it would be impossible to define a strategy for reaching a target state and an action plan for transition if the starting point is unknown.

[Figure 9](#) illustrates the connection between the fundamental areas and the description of the holistic view of the business.

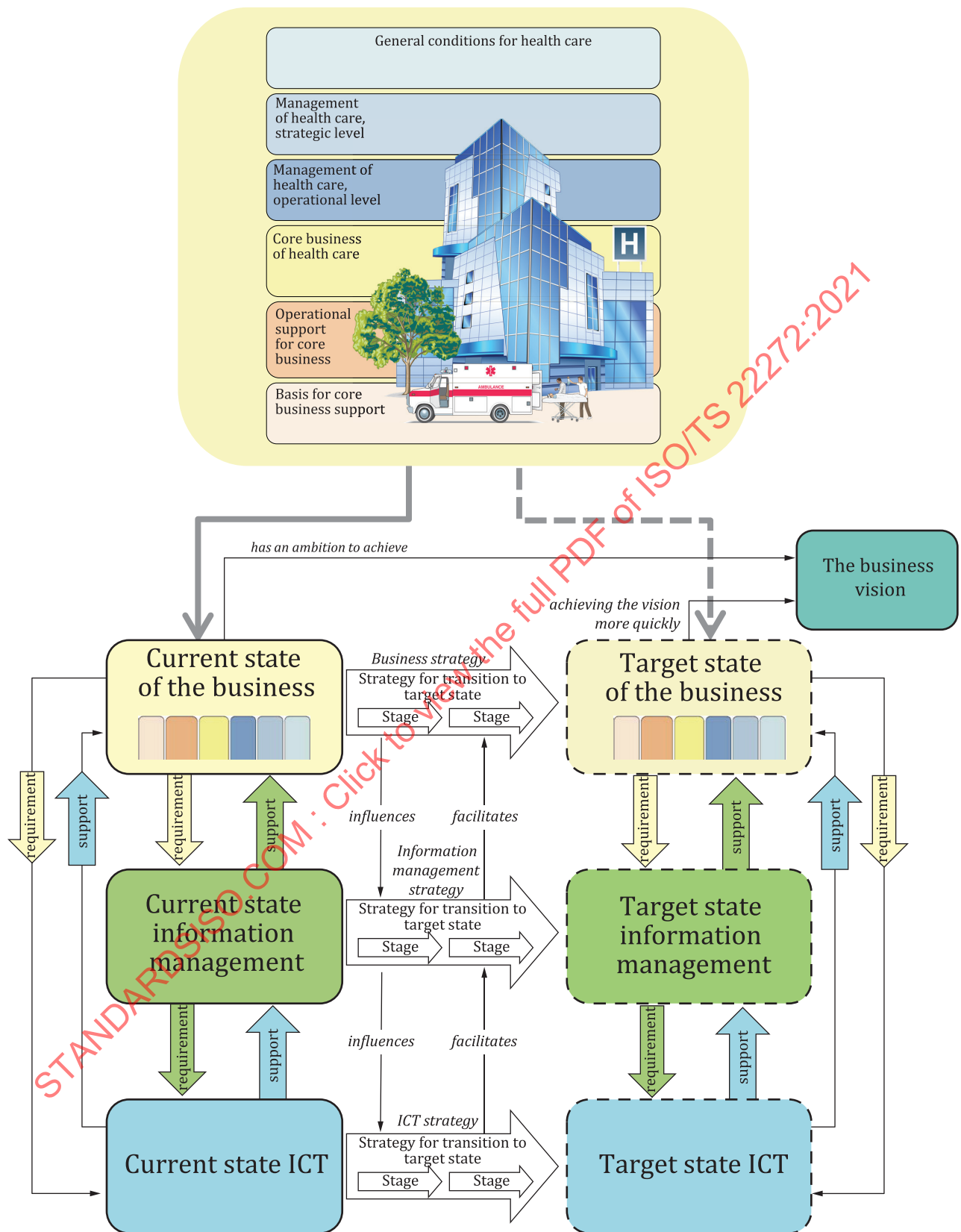


Figure 9 — The fundamental areas of healthcare and the holistic view of the business

5.5 Focus of the BIA methodology and business aspects

Figure 10 illustrates the focus of BIA methodology that supports analysis for creating of the business and information architectures.

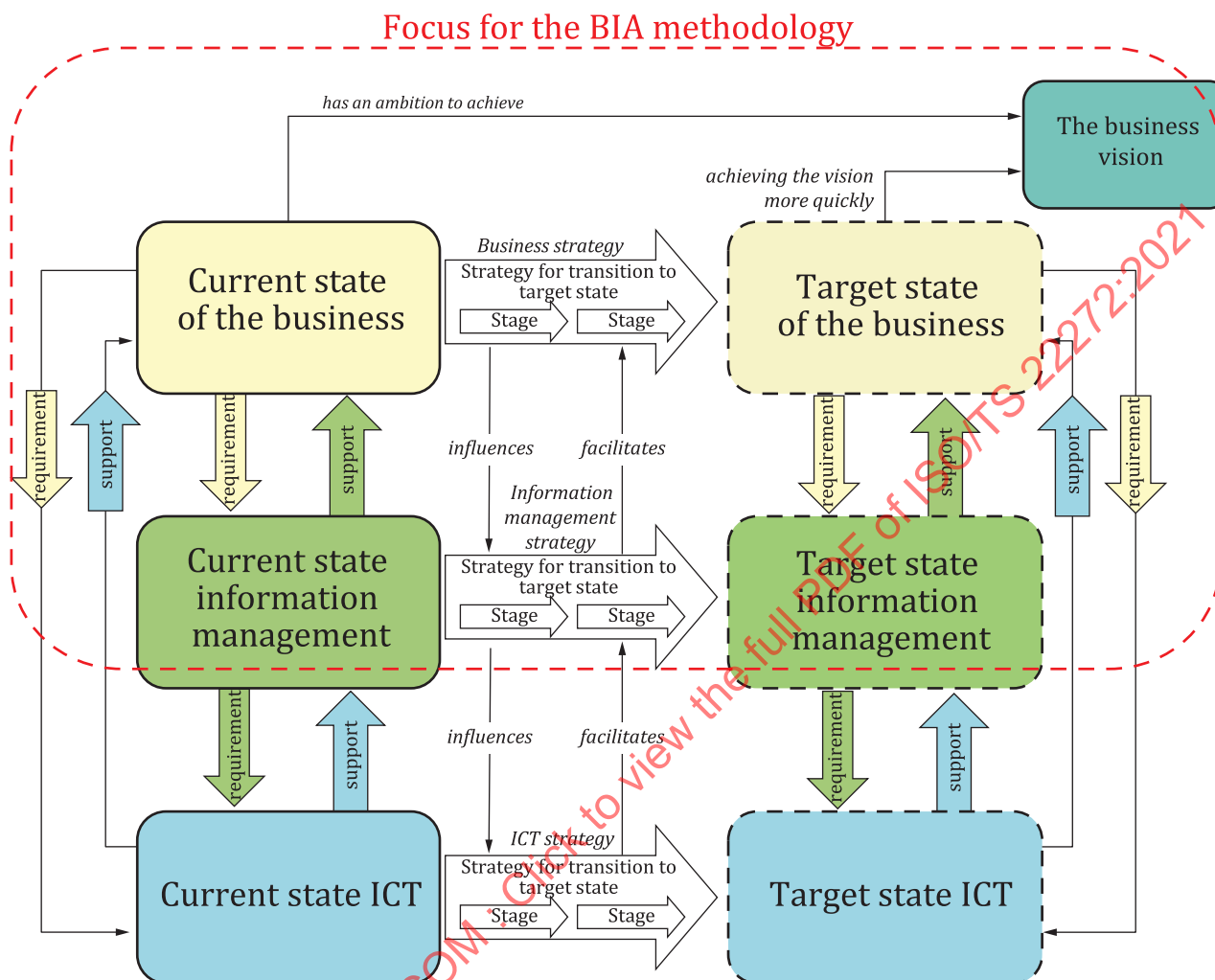


Figure 10 — The BIA methodology focus

The results of these analysis provide a deep and an aggregate understanding of the business and its information management. Figure 11 shows how a business and its information management are described from various business aspects.

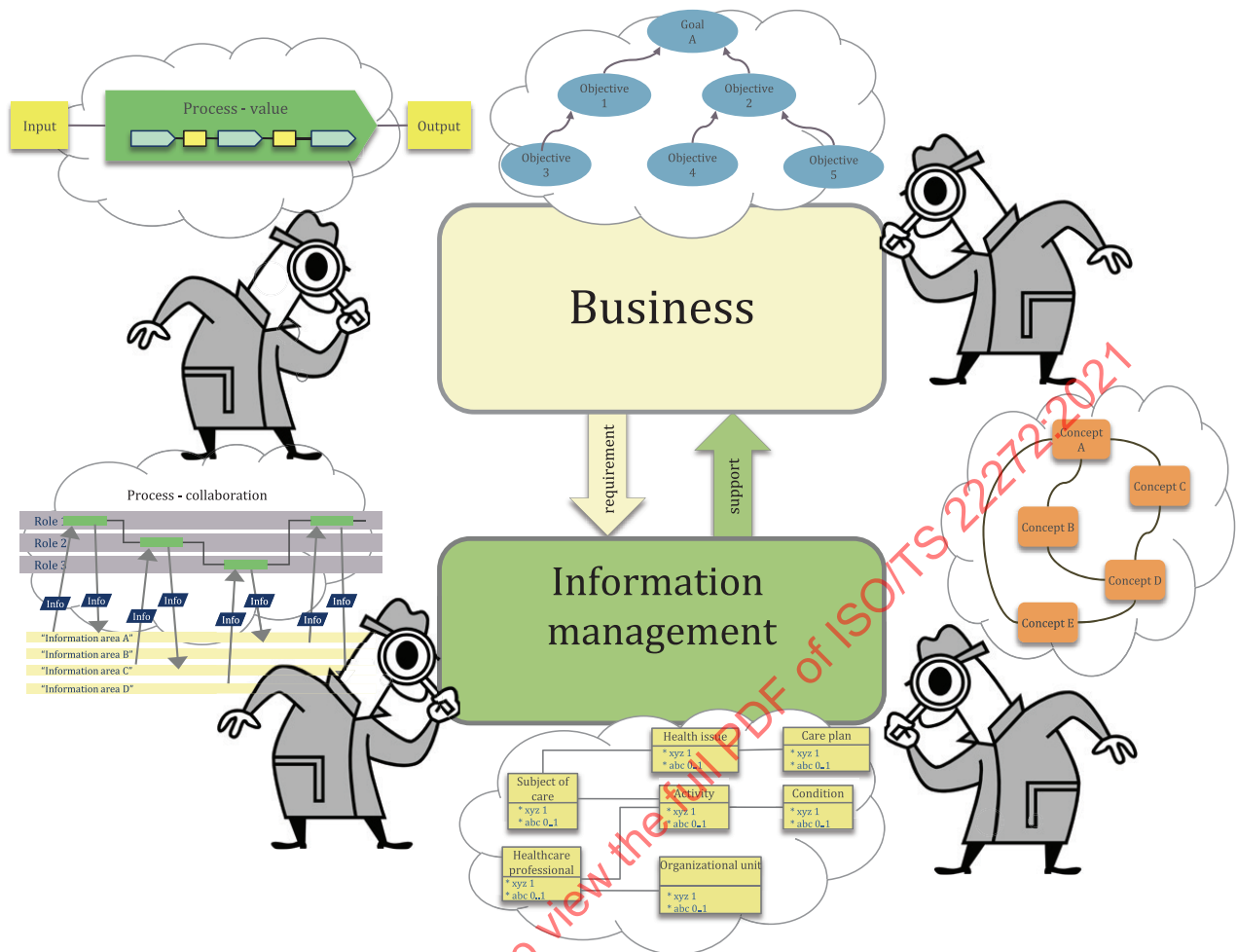


Figure 11 — Business aspects in BIA methodology

For both current and target states, the following business aspects should be identified as it shows in [Figure 12](#):

- Analysis of the purpose of the business, its goals and objectives. The intended purpose of the business and what should be achieved. Goals – long-term, strategic, wider goal, not precisely quantifiable. Objectives – more short-term, on operational level, specific measurable. Normally structured in an **objectives** model.
- Analysis of stakeholders – those who have an interest in the outcomes and the objectives which can be linked to them. It can be roles/actors/target groups that directly interact in the business or have an interest that the business is operative. Normally described using a **stakeholder** model.
- Concepts – the concepts that are fundamental and anchored in the business so that the roles can collaborate in an effective way. Normally described using **concept** model.
- The processes which have been implemented in the business and those which should be analysed and described. Processes from a value processing perspective – patterns for action that shall ensure that the objectives are achieved. Normally described using a **process** model.
- Processes from a collaborative perspective – crystallizing of the processing perspective that shows the business roles in collaboration. Normally described using a **process** model.
- The kind of information managed in these processes and how the information is structured. Information needs – what type of information that business roles are needed in their collaboration. Normally described as a **set of information** in the form of templates, forms, checklists, etc.

- Information structure – a comprehensive and structured description of the type of information managed by the different roles in the process formulated in a “logical and solution-neutral” **information** model. Among other things, this means that the model does not describe how, for example, a database should be structured in practice but how information is perceived to “link together” in a logical way.
- Coding systems, classifications and terminologies – agreed and predefined values which describe a certain type of information related to specific attribute in the information structure.

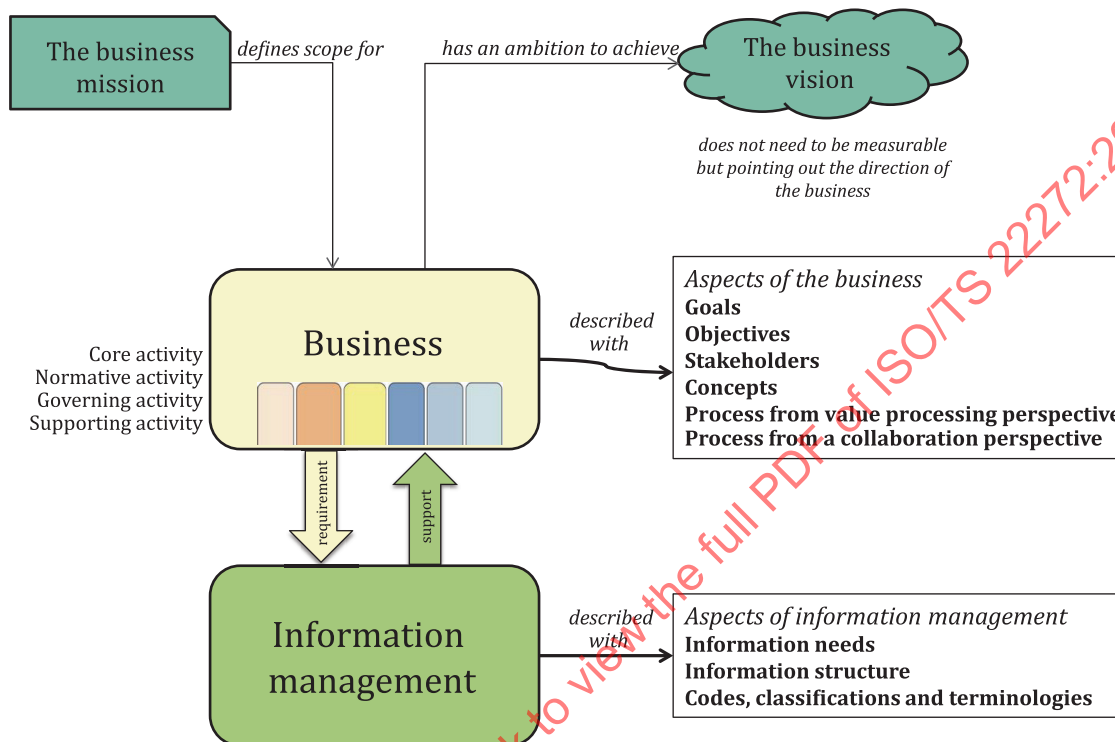


Figure 12 — Different aspects of the business and its information management

5.6 The basic concepts in the BIA methodology

Figure 13 illustrates the connections between the basic concepts in the BIA methodology.

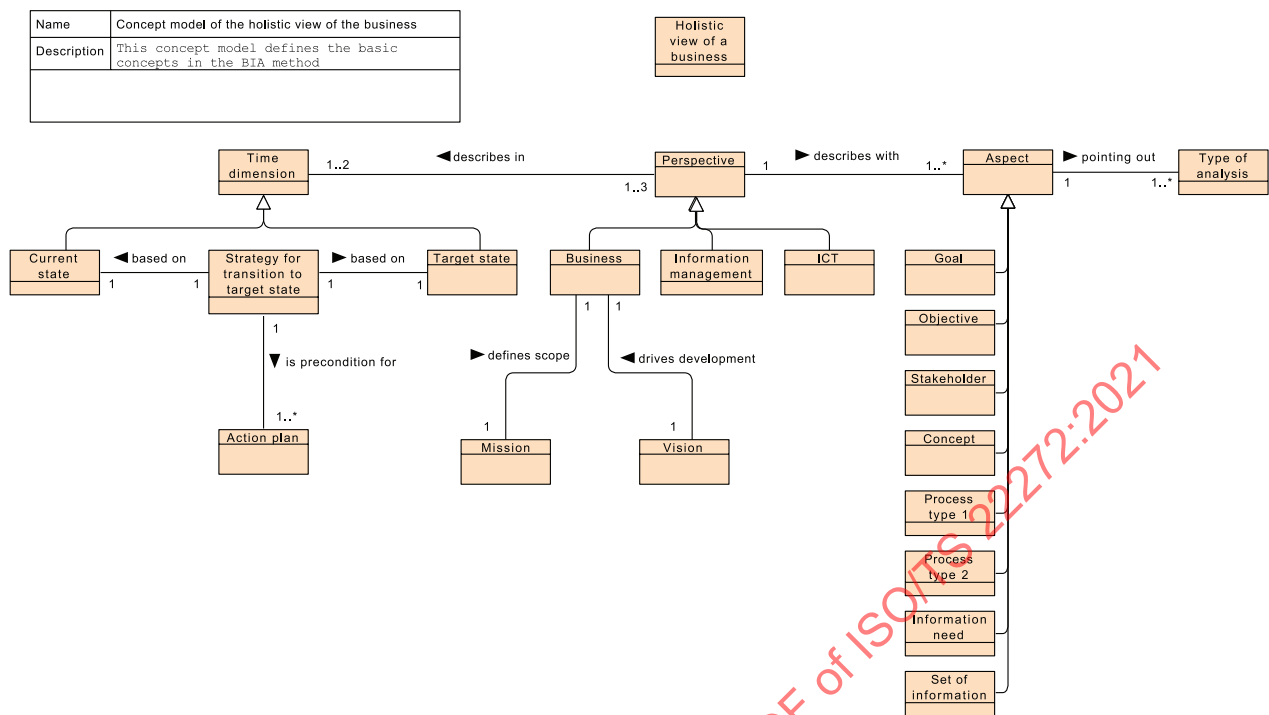


Figure 13 — Concept model of the BIA methodology

6 The route to semantic interoperability

6.1 A mutual understanding of the business

A common and agreed understanding of the business is the basis for semantic interoperability.

Semantic interoperability means that both the sender and receiver of information used in a given context within a given period of time have a common understanding of the content. This applies regardless of whether information is communicated orally or through technology.

The route to creating an effective collaboration between individuals is to ensure they have a common view and understanding. Whilst this can sound self-evident, often different perspectives exist. The reasons can include their work duties, education and experience, however this “non-common business view” can become apparent following reorganization, mergers of companies/organizations, acquiring new partners or undergoing process reengineering. All these factors have an effect on how the concepts are connected and what words or terms are used.

Consensus on these views can be achieved through the results of business analysis. However, these results should be documented as a record of decisions made or actions taken. This is where the technique of modelling comes in: all participants are given the opportunity to “see” what is being discussed and thus make the discussion easier to follow.

In addition, using models to focus on a description of the business results in a more objective outcome whereby different options for change can be tested prior to implementation.

The models shall be supplemented with textual descriptions written in a clear and precise manner in order to form an unambiguous and common perception and description of the business. The fundamental prerequisites for the ICT to work are:

- those who are setting requirements, i.e. the business representatives, are united in their view/perception of their business

- those who are setting requirements can describe and explain their business to the designers in an unambiguous way
- those who are setting requirements can explain what kind of information they need and in which format
- the designers understand the business and its information needs descriptions then design the ICT accordingly

In order to be able to interact in an efficient and effective way, it shall be well-functioning technology which suits the business described. However, the fundamental prerequisite is that there is a common and agreed business and its information needs description. The business is responsible for describing the business and its information needs. Selecting a suitable technical solution for this is the responsibility of the ICT designers.

6.2 Prerequisites for a semantic interoperability

Each person perceives and interprets situations differently, based on knowledge and past experiences. The situation can be of a concrete nature, for example measurement results, or have a more abstract dimension such as feelings like joy, sorrow, melancholy. Should this be a new situation for an individual, (s)he will try to interpret it through association to concepts which are familiar to him / her.

Concepts can be communicated in symbols in addition to words. In this context, symbols can mean signs, gestures, images, icons, but also those items in a coding system. Whichever is used, there shall be agreement about what is meant.

In [Figure 14](#), xyz is an example of a symbol. Someone perceives something in his/her “reality” and interprets this as xyz. This is registered and stored in a database. Sometime later, someone else, or the same person, sees this information and interprets xyz. How xyz is interpreted depends on the knowledge this person has about the “reality” from which the information originated. If we have the same frames of reference and knowledge about the “reality” then there is less risk of misinterpretation than if we have a completely different view and experience of this “reality”.

The basic condition has nothing to do with the technology chosen for the transfer of information. Parties will understand each other better if they talk directly to each other as any misunderstanding can be handled immediately. More indirect communication in the form of electronic or paper documents increases the risk of misunderstanding. The basic premise is that all parties shall have a common view on and knowledge of “reality” and thus business.

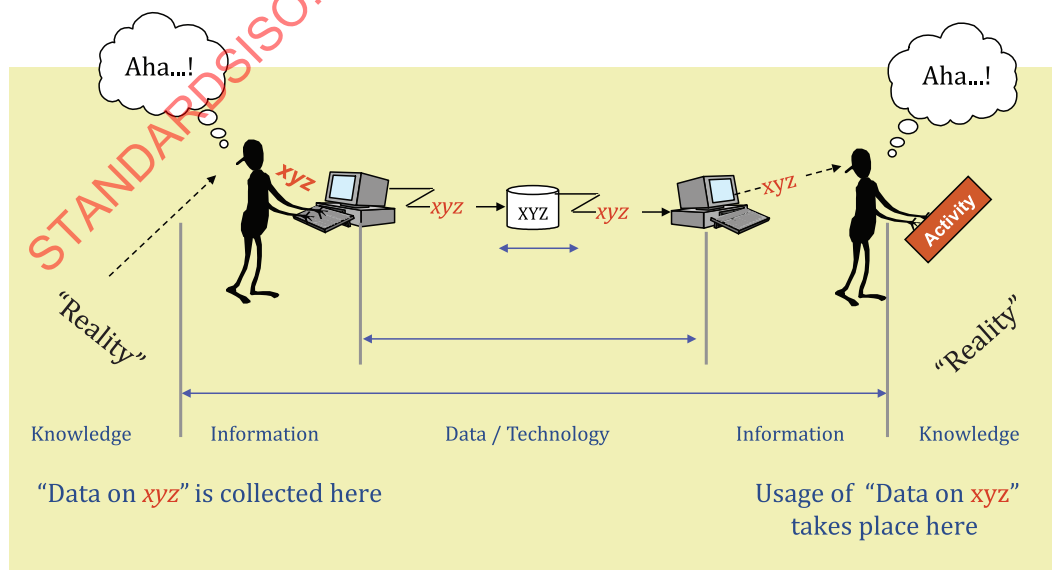


Figure 14 — A mutual understanding of information

6.3 Why is a common methodology for analysis needed?

Business and information needs analysis should begin from the same starting points. It is usually more difficult to compare and reuse analytic results because the models can have different degrees of detail and be described with different notations. This complicates the ability to compare models with each other. If a common methodology is employed, the different parts of the business which have been analysed separately can be compiled in an overall model.

Each analysis situation is unique. Therefore, there should be a methodology that consists of different steps that can be used independently of each other to provide a business description that is sufficient to achieve the purpose of the analysis.

7 Business and information needs analysis

7.1 General

[Clause 7](#) describes how to apply and document the business and information needs analysis based on different aspects. Each method step includes one or more model types which describe the business and its information needs in a coherent way to be able to achieve traceability between these models.

The BIA methodology is used to create base for decision. If there is no common methodology for analysis, then...

Within the business:

- Different projects work in different ways, applying different methodologies. The business descriptions produced can have different levels of detail, focusing on different perspectives which means they cannot be compared and re-used in a correct way.
- There is an increased risk that the content of the models produced is incongruent with the industry framework or standards.
- The results of the analysis are described in different ways. A common notation is not used, and models are drawn in different tools that are incompatible. This means that the models are difficult to manage and compile.
- The analysis work results will not provide traceability between the different business descriptions.

Within information management:

- Different models and their descriptions of information are not compatible.

Within ICT development:

- Each ICT development project produces its own business descriptions in order to set requirements. Business requirements are a time consuming and resource intensive part of ICT development work. The lack of a common methodology often means that analytical results cannot be re-used. Not being able to re-use these results means that ICT development projects will perhaps not be economically feasible.
- ICT requirements will perhaps not meet the business requirements. There is also increased risk that they are not compatible with each other.

7.2 Steps in the BIA methodology

[Table 1](#) provides a description of the steps in the BIA methodology. Sometimes it can be necessary to carry out these steps in a different order and in several iterations.

A completed business description should be stable over time but not static. It can be updated for several reasons:

- business objectives have changed
- new insights and knowledge necessitate that processes are designed in another way
- new roles within the area necessitate a review of process collaboration

A change in some aspect of the business description triggers a review of other descriptions. Any change in the definition of the business objectives shall initiate a review of all the other aspects. A change of the process description from a value processing perspective should lead to updates of the descriptions of the process from a collaborative perspective. Analysis should begin with the steps that are most relevant, based on the current needs of the business.

Table 1 — Method steps in BIA methodology

Method step	Results	Purpose
1. Goals, objectives and stakeholder analysis	Objectives model Stakeholder model	Why and for whom does the business exist?
2. Process analysis	Process models	Who does what , i.e. which value processing object(s) for whom and with whom ?
2a. Process analysis from a value processing perspective		
2b. Process analysis from a collaborative perspective		
3. Concept analysis	Concept model	What is meant by words and concepts in a business context? “Mean the same thing”
4. Information analysis		
4a. Information needs analysis	Set of information	What kind of information do the roles shall managed and create in the process?
4b. Information structure analysis	Information model	How is the information linked together in a structured way?
5. Code systems, classifications and terminologies	Decision to develop or use existing code systems, etc. as well as which parts of them should be used	Agreed and predefined values which describe a certain type of information related to specific attribute in the information structure “Measure the same thing”

The method steps are also outlined in [Figure 15](#).

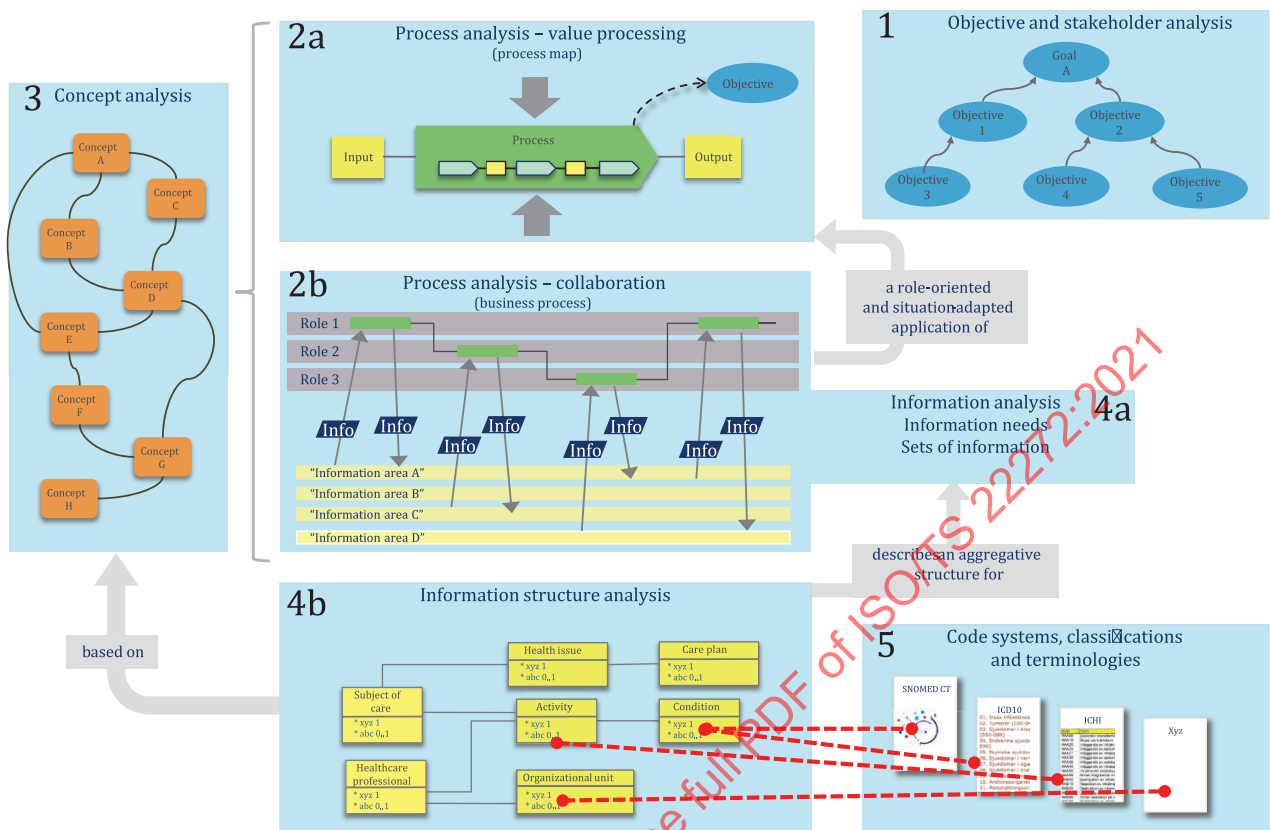


Figure 15 — Method steps in BIA methodology

Method steps highlight different business aspects, adding a new level of detail to the complete description.

However, it is important to point out that a business and information needs analysis is not normally conducted sequentially but performed in iterations based on new knowledge that is acquired in the analysis, see [Figure 16](#).

1. Objectives and stakeholder analysis
2. Process analysis
 - a. Process analysis from a value processing perspective
 - b. Process analysis from a collaborative perspective
3. Concept analysis
4. Information analysis
 - a. Information needs analysis
 - b. Information structure analysis
5. Analysis of code systems, classifications and terminologies

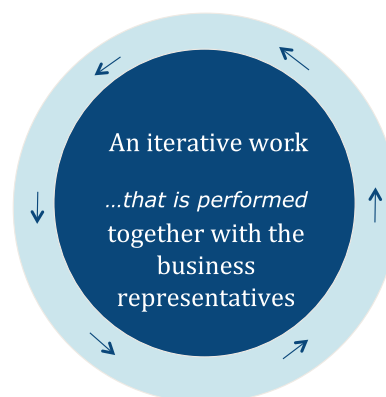


Figure 16 — Iterative approach in BIA methodology

Models facilitate understanding and analysis by capturing the patterns present in a complex and versatile business. By focusing on the relevant properties, the perception of a business is illustrated in a simplified format. A visualization provides the basis for determining whether there is a common view and what could be improved and optimized. [Figure 17](#) describes the content of each method step.

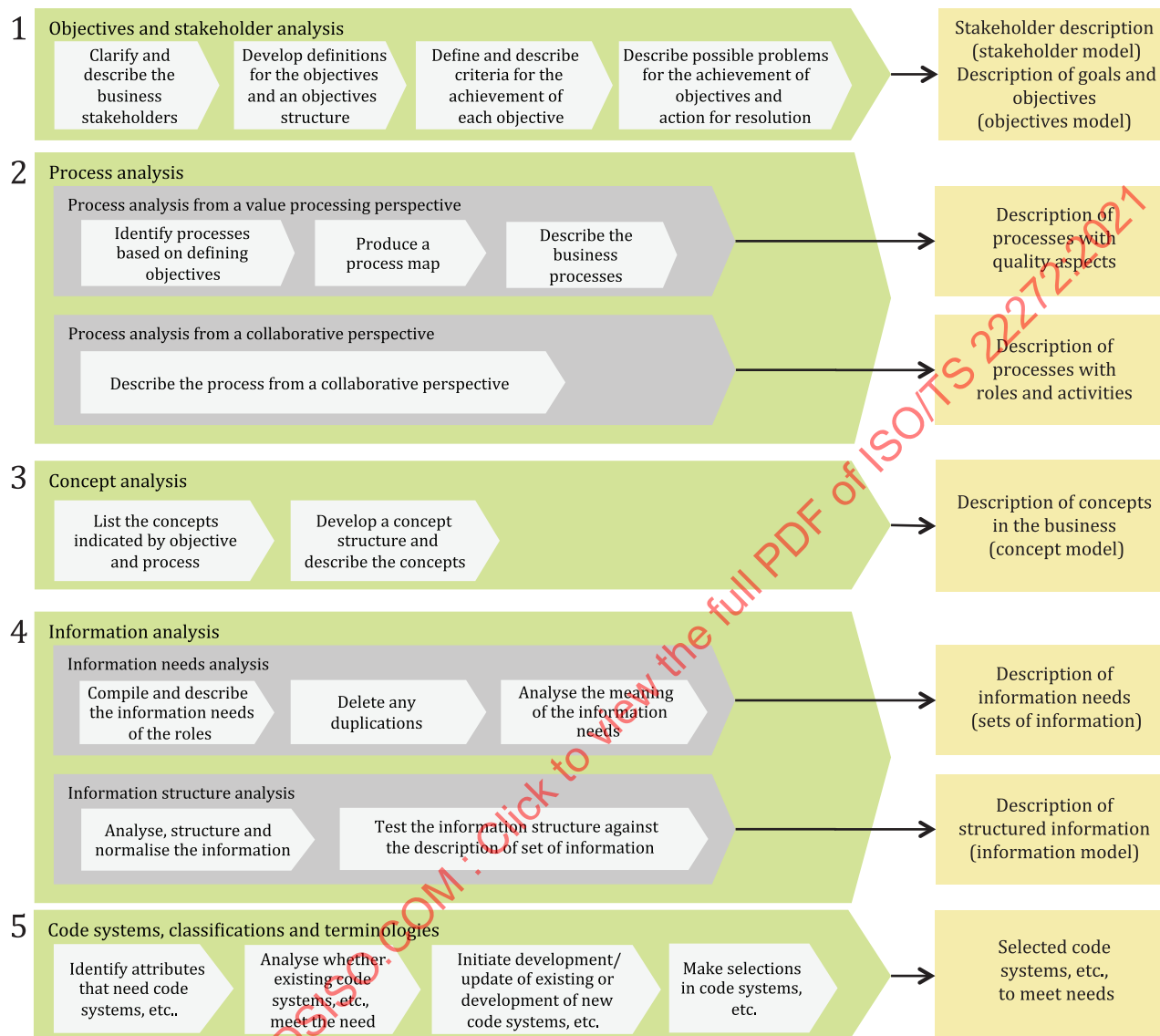


Figure 17 — Content of method steps in the BIA methodology

7.3 Goals, objectives and stakeholder analysis

7.3.1 Purpose of stakeholders and objectives analysis

The purpose of the step is to reach agreement about and describe goals and objectives in the defined business, i.e. why does the business exist and what is to be achieved? The goals and objectives structure, sometimes called a hierarchy of objectives, shows overall purposes and subordinate goals and objectives. [Figure 18](#) illustrates dependencies between goals and objectives so that subordinated objectives should be attained before overall goals can be achieved.

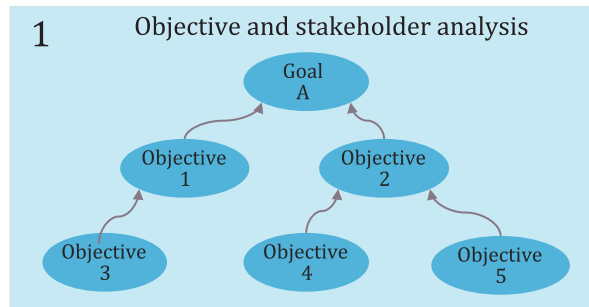


Figure 18 — Goals and objectives analysis from the perspective of each stakeholder

Performing an objectives analysis is desirable as a first step since it highlights those parts of the business deemed important. Without clarified business goals and objectives, it is difficult to determine which processes should be developed and in what order. This discussion also includes highlighting any impediments to achievement as well as how these problems can be solved. The result is a model which describes the business goals and objectives in a structured way, sometimes called the motivation, purpose or intention of the business. This demonstrates that the work provides the desired effect for the business and its stakeholders.

Why and for whom does the business exist?

Among other things, the purpose of an objectives analysis is to:

- highlight the business goals and objectives, problems and actions to eliminate these problems as well as actions to achieve the business objectives;
- identify the business processes as well as those that should be analysed;
- create consensus within the business.

An objectives analysis describes the business goals and objectives and how they relate to each other so that the overall goals can be reached. The purpose is to clarify any conflicts between objectives, highlighting any obstacles to achievement as well as how these obstacles should be handled. The objectives model provides important basis for decision for being able to devise strategies, both in terms of optimal function of the business in the short term as well as for devising more long-term strategies. Subordinate objectives constitute the basis for input to an action plan.

Criteria for the achievement of each objective should be described and defined. It can be difficult to quantify high level goals however the subordinated objectives should always be measurable.

This method step also clarifies and describes the business stakeholders. Stakeholders can be roles, competencies, organizations, departments or individuals with an interest in the deliverables of the process. They are subdivided into direct or those who benefit from the business such as customers, owners, management, employees and indirect such as partners, society and citizens in general.

Stakeholder analysis contributes to prioritising business goals and objectives and is performed to:

- create clear customer focus by describing who should benefit from what the business achieves;
- clearly describe stakeholder types;
- prioritise stakeholder goals and objectives.

The model starts from the perspective of a specific stakeholder; different stakeholders should not be mixed together in the same single objectives model. Once each different perspective is completed, analysis determines whether there are any conflicts between these goals and objectives.

7.3.2 How do you do this?

Analysis is divided into four steps, see [Figure 19](#):

- Clarify and describe the business stakeholders;
- Develop definitions for the goals and objectives and create an objectives structure which shows dependencies between them;
- Define and describe criteria for the achievement of each objective;
- Describe possible problems for the achievement of objectives and actions for resolution.

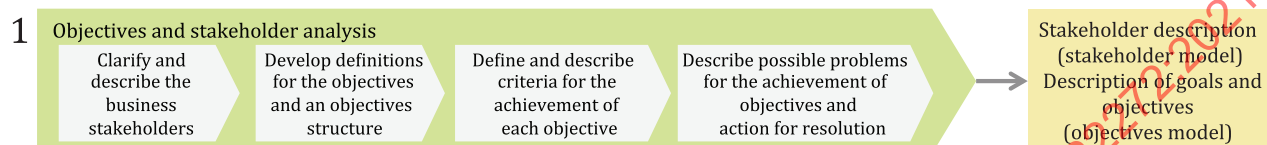


Figure 19 — Steps in a stakeholders and objectives analysis

7.3.3 Model notation

[Figure A.1](#) in shows an example of notation for an objectives model.

7.4 Process analysis

7.4.1 Analysis of processes from a value processing perspective

Process analysis is based on two perspectives – value processing and collaborative as it shows in [Figure 20](#). The former describes a pattern for action that shall ensure that the objectives are achieved in order to deliver the end product or service whilst the latter is crystallizing of the processing perspective that shows the business roles in collaboration in order to add value in the process to achieve objectives.

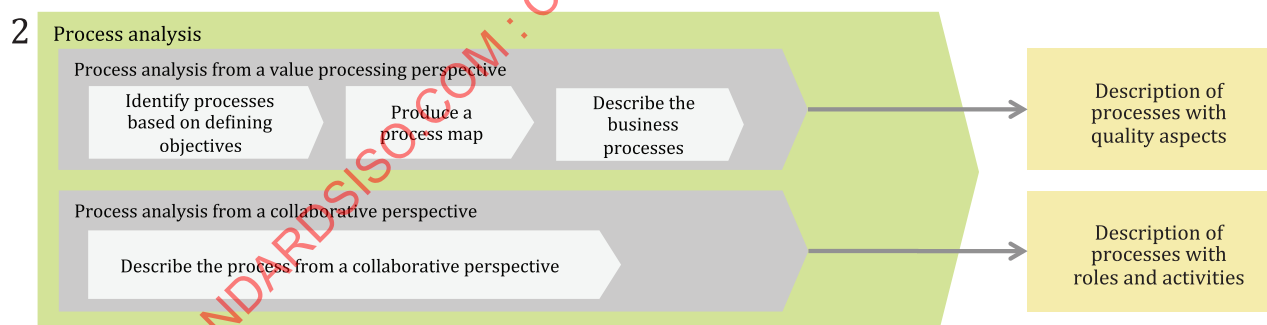


Figure 20 — Steps in a process analysis

All organizations can be described from a process perspective as [Figure 21](#) illustrates. This step clarifies how the objectives can be achieved in the most effective way, including which processes should be described and implemented in the business.

All processes should fulfil a specific objective. For example, indicating an objective of having satisfied and returning customers, a business should define a process that is used to continuously monitor and measure customer satisfaction.

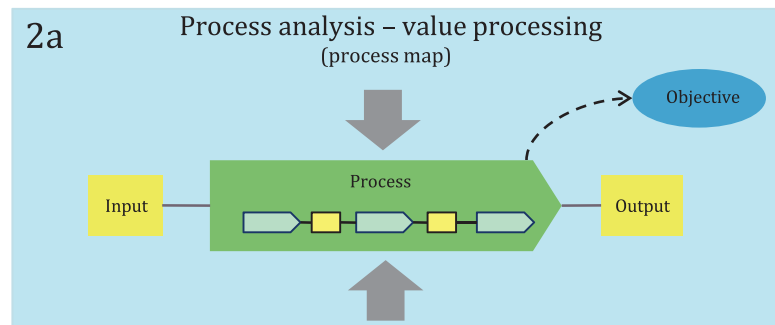


Figure 21 — Value processing perspective

The types of the processes that the business should identify, describe, monitor and improve should be based on the business objectives. If the process cannot be linked to a business objective, then either the objectives are incorrect or incomplete or the business is not properly focused.

7.4.2 Types of processes

Organizations are characterised by the existence of one or more core activities, the specific and vital part that forms its basis and where its essential competencies are located. These core activities will differ from organization to organization; payroll can be supportive in one company whilst in another it can be the main business itself.

Figure 22 illustrates basic elements of a process model.

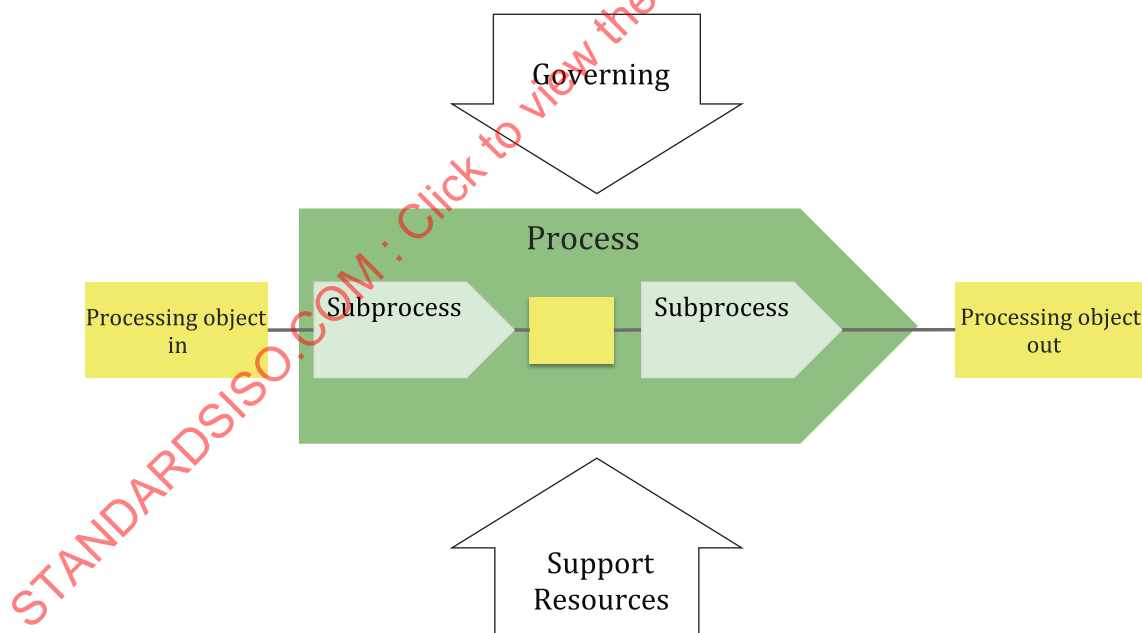


Figure 22 — Elements of a process model

The core activity is described with one or more principle processes accompanied by governing and supportive processes. One example of a core process within healthcare is the treatment of chronic heart failure. A governing process would be the licencing of the clinician as competent to treat the condition by the regulating body. Examples of supportive processes are the procurement and allocation of medical technical equipment.

The dependencies between core, governing and supportive processes are shown in Figure 23.

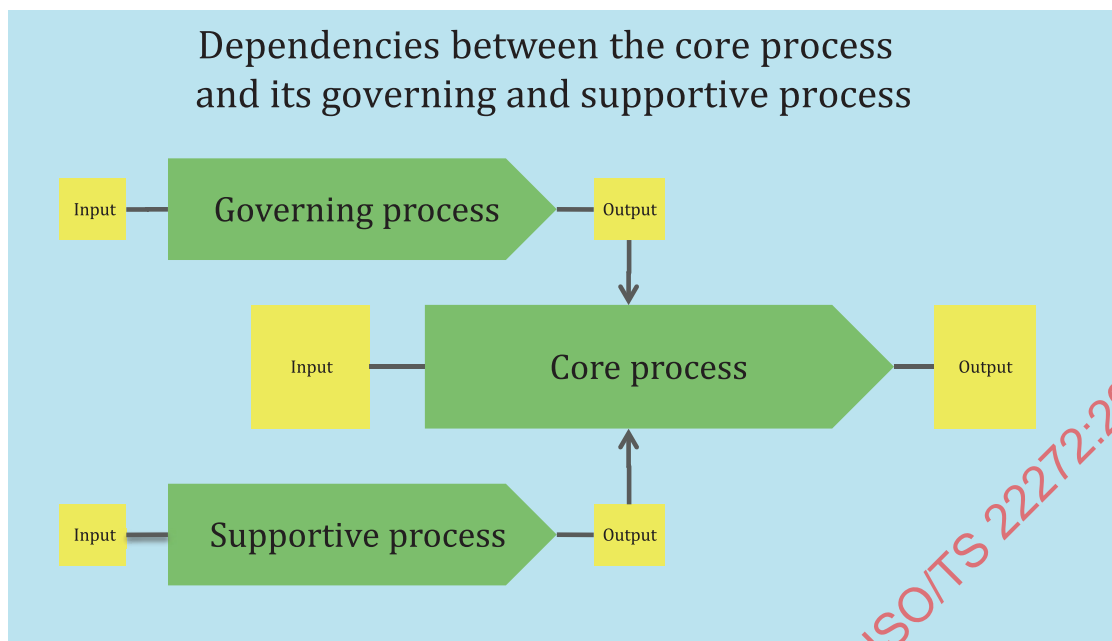


Figure 23 — Process dependencies

This translates into at least three different types of processes, as it shows in [Figure 24](#), with the output of one being the starting point for another.

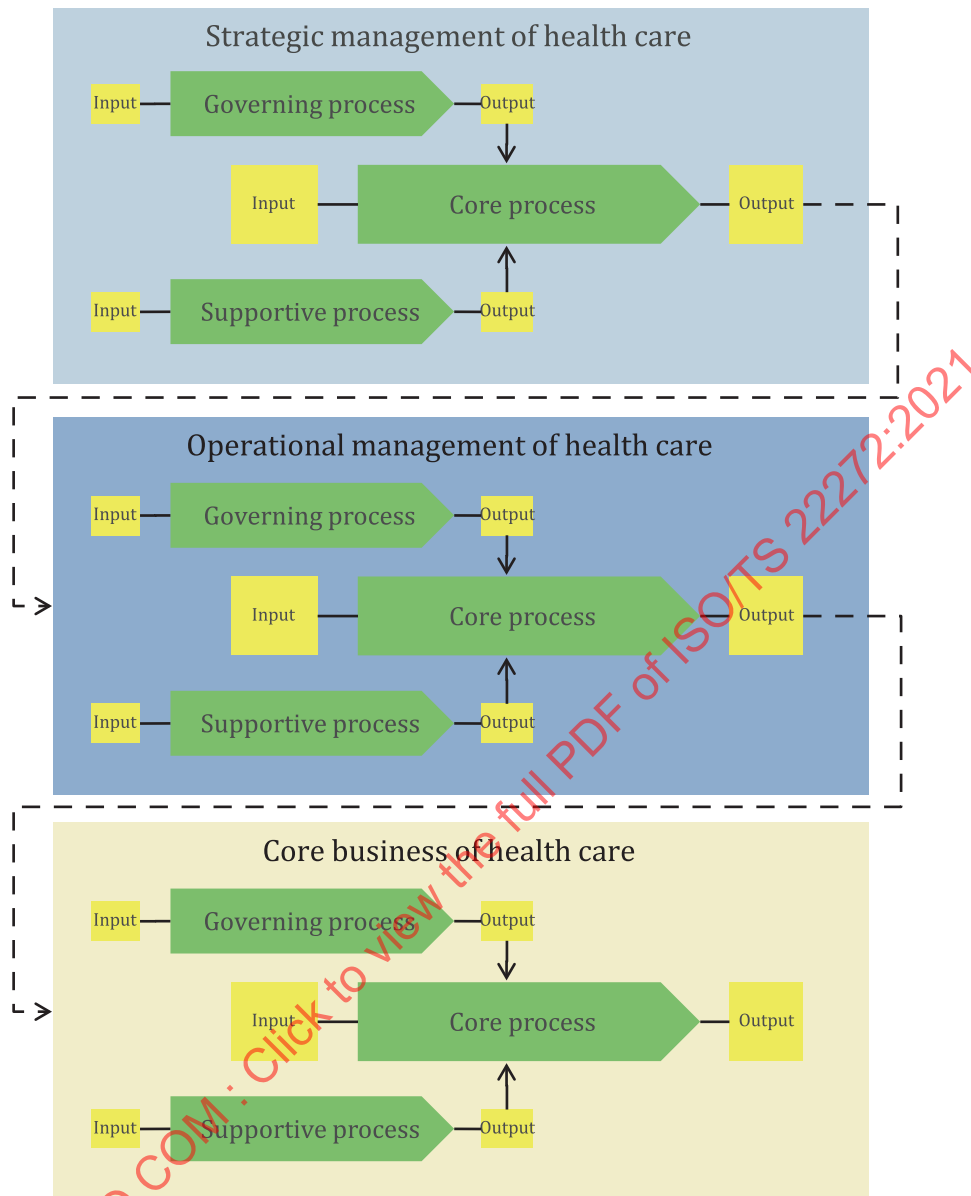


Figure 24 — Types of processes

7.4.3 Dependencies

Often the tendency is to start design processes before identifying which objectives should be achieved. Core activity, and thereby its essential processes, stems from the objectives. If the business has several core processes, it is important to understand any dependencies between them as well as the order in which they should be addressed. All core, governing and supporting processes along with their interdependencies constitute the business process map that [Figure 25](#) illustrates.

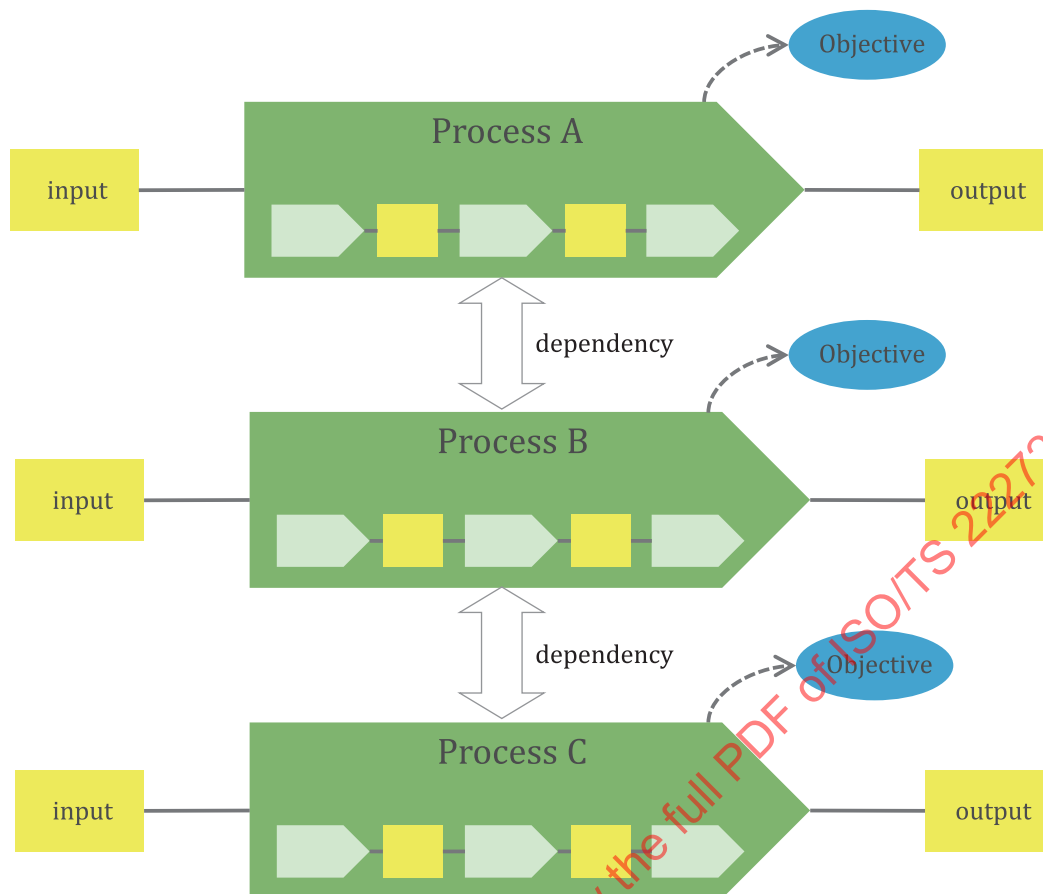


Figure 25 — Dependencies between business processes

7.4.4 Value process components

A process is an agreed plan of action which creates a pre-defined added value for “someone”. The process includes descriptions about what should be achieved, and which sub-processes should be implemented. Aggregately, the sub-processes should result in the creation of added value for a consumer. The start and end points for each step within the process are identified so that there is a mutual understanding of when the step can begin and when it has completed.

During its implementation, the process could involve several different organizations which are each responsible for different activities. The value process does not show which roles or organizations are involved and it is therefore organization neutral. This also means that this perspective does not specify how the line organizations should be designed in order to be able to implement a process. However, the process is managed by a named owner.

7.4.5 Value process criteria

A value process should fulfil certain criteria:

- It **should** achieve one or more business objectives.
- It is a **pattern for action**.
- Is **value enhancing**, has a processing object.
- The process has a **named owner** who is responsible for its management.
- It always has a **consumer** (customer).

- It can consist of **sub-processes**.
- It should define **start and end criteria** that the process objective defines.
- It is **organizationally independent**.

7.4.6 Quality aspects

The process describes an optimal way to achieve its objective, but it is only upon implementation that results which provide benefits to the consumer are created, see Figure 26. In the process implementation, the result is compared with the intended outcome to determine whether the objective has been achieved.

How much the actual outcome deviates from the process objective is attributable to two factors:

- How much of the process is implemented in the business, both in terms of level of detail and scope of activities (process implementation quality)
- How well the actual implementation follows the pattern of the process, both in terms of the objective and activities (process compliance quality)

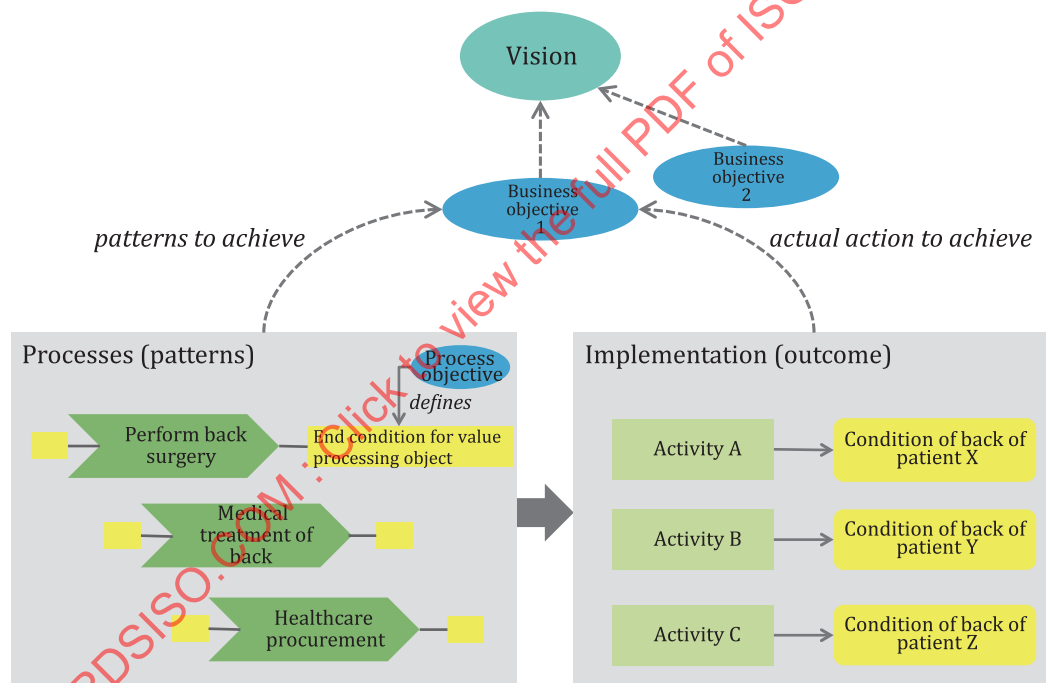


Figure 26 — Relationship between the process and its implementation

Following the pattern of the process of which sub-processes should be implemented and in what order - sequentially, in parallel or repetitive - will provide the optimum chance of achieving the objective and desired effect/result.

However, the agreed process description still might not be successfully followed due to:

- poor process knowledge because of deficient employee training in the current process;
- poor acceptance by employees due to low motivation, for example, the threat of redundancies due to automation;
- poor acceptance by management which can result in not securing the necessary resources or providing employee training so that the process can be implemented;
- lack of essential and critical resources, such as the necessary information;

- change of collaboration between different roles who have not worked together in the past.

Different quality aspects during process development, process implementation and realization of the process are shown in [Figure 27](#).

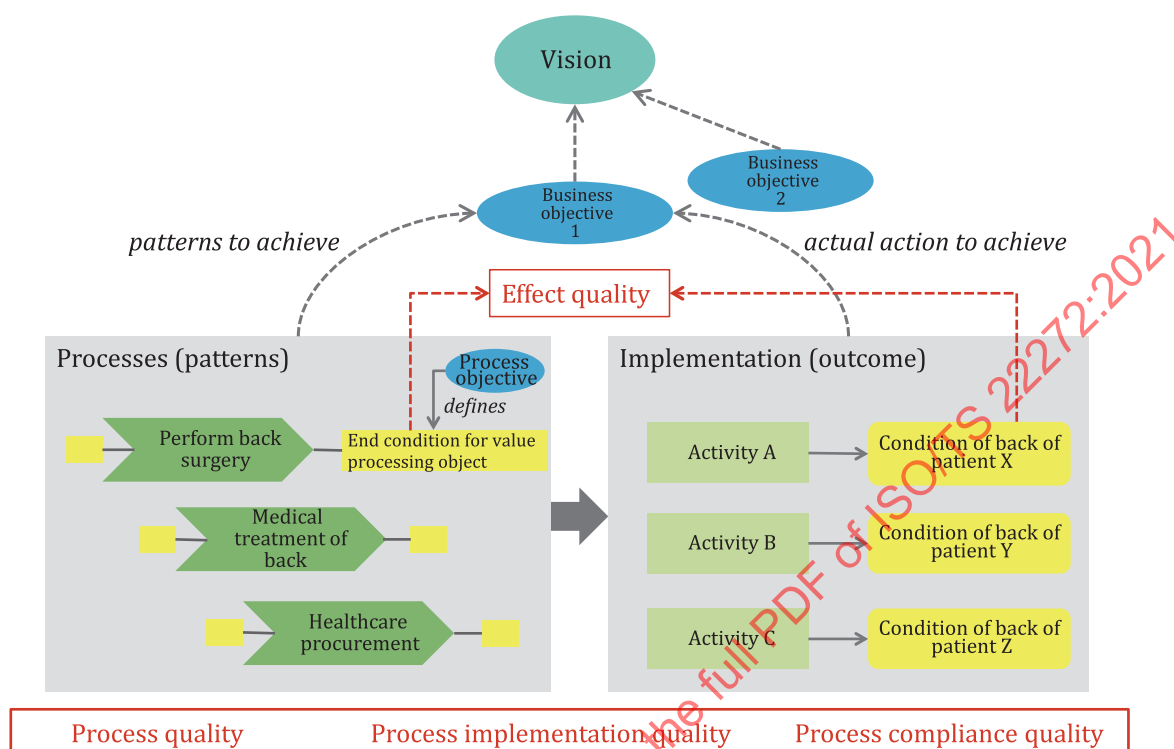


Figure 27 — Process quality aspects

7.4.7 Purpose of the process analysis

What is handled in the business, **how** and **for whom** do you work? How should we work more effectively to create value for our “value recipients” (consumers) and thereby achieve objectives? Describe a pattern for action that aims to achieve objectives in a reliable and effective way.

7.4.8 How do you do this?

Analysis from a value processing perspective has three main activities, shown in [Figure 28](#).

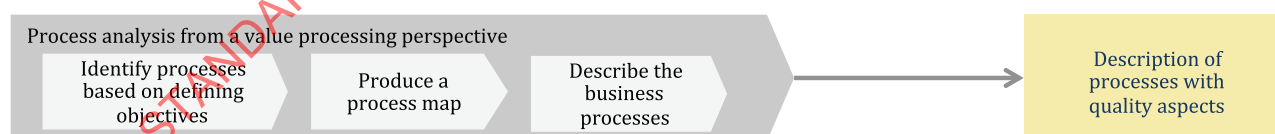


Figure 28 — Analysis steps from a value processing perspective

Those activities include:

- Identifying processes based on defined objectives.
- Mapping the core processes. Which supporting and governing processes exist? In what order should the processes be designed? Produce a process map.
- Describing the business processes.

7.4.9 Process model symbols

The process model is mainly based on IDEF0,^[2] see symbols in a process model in [Figure 29](#). The processing object is the product or service which is being given added value. It is transformed through a chain of various sub-processes, each of which should provide added value from the consumer's perspective as it is the customer who uses or benefits from the results.

Symbol	Model concept
	Process/sub-process
	Processing object
	Processing route

Figure 29 — Symbols in a process model

Sub-processes can be broken down into more detailed descriptions. Regardless of the level of detail, ensure that all aspects of a given sub-process are addressed in order before moving to another sub-process where its results will be an input.

[Figure 30](#) illustrates that added value activities within the process refines processing object condition 1 through three changes to become processing object condition 4. Once processing object condition 1 undergoes sub-process 1.1, it transforms into processing object condition 2. After undergoing sub-process 1.2, it is upgraded into processing object condition 3. This then becomes the input to sub-process 2 which results in the change to processing object condition 4.

Renumbering the process object condition also allows the immediate identification of a unique refinement of the original process object.

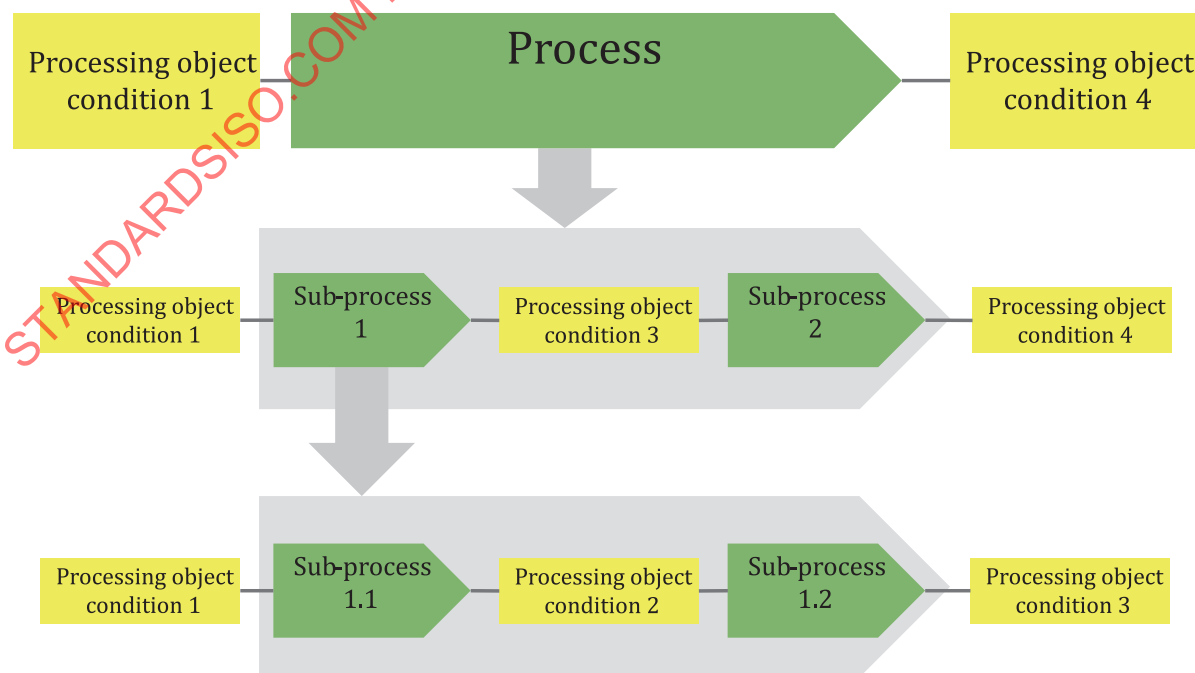


Figure 30 — Flow of sub-processes

Where the changes are relatively simple, it is possible to view the content instead directly in the same chart which is read from left to right. In [Figure 31](#), “Notify reservation” is a sub-process.

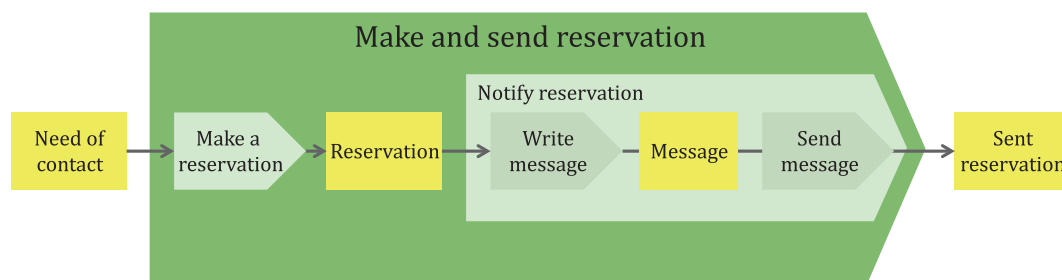


Figure 31 — Simple decomposition of a process

7.4.10 Analysis of processes from a collaborative perspective

The value processing perspective is insufficient on its own as it allows a situation whereby it is possible to miss a step because there is no assigned responsibility for a given action.

For this reason, it should be supplemented with a process description from a collaborative perspective, see [Figure 32](#); this defines the roles which have responsibility for the specific activities within the process in order to achieve set objectives.

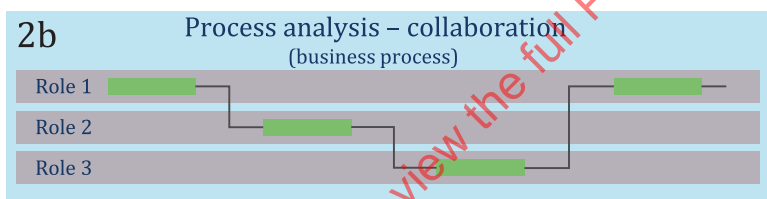


Figure 32 — Process from a collaborative perspective

Each role shall have information to be able to carry out activities from the point of receipt to the handover to another role. Information needs are described as inputs and outputs to each activity which can also function as handover checklists as well as decision data.

As well as allowing each role to understand their own work routines without any misinterpretation, it also provides a holistic overview of who is responsible at each stage of the process. This also offers an opportunity to measure process compliance and the quality of the results quality.

7.4.11 Purpose of the method step

The collaborative perspective allows all stakeholders, including the customer / end user to identify **how** and **by whom** work is accomplished. It is an important prerequisite for being able to analyse the information needs of the different roles in order to be able to perform their activities in an effective and reliable way.

7.4.12 How do you do this?

Analyse and describe the process on the basis of **who** does **what** and **when**. This description then forms decision data for the analysis of sets of information needs. [Figure 33](#) shows the analysis steps in the process from a collaborative perspective.



Figure 33 — Analysis steps in the process from a collaborative perspective

7.4.13 Notation of a process model from a collaborative perspective

[Figure A.2](#) shows an example of notation in the process model from a collaborative perspective.

7.5 Concept analysis

7.5.1 Purpose of the method step

Concept analysis is primarily intended to clarify the ideas within a business and describe how they relate to each other so that everyone has the same understanding as well as how and in which context they are used. It is therefore important to carefully consider the choice of a term for the concept. The analysis follows on from the objectives and process analyses. Results are described in a concept model by means of illustrating the concepts and their relation to each other, as it is shown in [Figure 34](#).

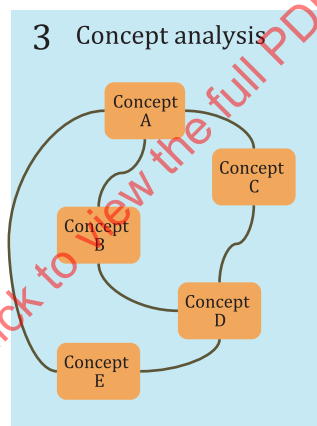


Figure 34 — Concept analysis

The concept analysis is based on the approach described in [Annex B](#).

What do the terms and concepts mean? Which fundamental concepts and terms in the business shall we agree on?

The purpose is to gain a common understanding about the fundamental concepts and terms in the organization by describing and illustrating a concept structure, i.e. how the concepts relate to each other. It is important to agree on this concept structure prior to an analysis of the business information needs.

Examples of fundamental concept areas are:

- roles;
- action/activities;
- what we act on/what we handle (what we investigate, create, process, actions, etc.) ;
- results/outcome of activities;
- resources used in the activities.

7.5.2 How do you do this?

Concept analysis can be divided into two main activities, see [Figure 35](#):

- list the concepts indicated by objective and process;
- develop a concept structure by describing the concepts and their relationships in a concept model.



Figure 35 — Steps in a concept analysis

7.5.3 Concept model notation

[Figure A.3](#) shows an example of the concept model notation.

7.5.4 Concept analysis and terminology work

In order to achieve a good result in the concept analysis, concepts analysts, terminologists, business and information experts shall collaborate at an early stage.

Terminologists defines concepts at type level, setting them in context of technical language. A well-defined technical language facilitates clear communication between the business representatives within a given specialist subject area.

Concepts analysts structure concepts both at type and instance level, resulting in a structure consisting of its smaller elements, called atomic. This structure creates the conditions for effective communication, not just between the business representatives but also within ICT. One purpose of atomic elements is to be able to re-use information for different purposes, such as combining atomic elements into statements about the business in order to be used for follow-up, analysis and statistics, etc.

Once the concept structure is stable, terminologists should review the structure to develop concept definitions, suggest recommended terms and produce a list of synonyms.

7.6 Information analysis

7.6.1 Two parts of an information analysis

This step is comprised of two parts, information needs analysis and information structure analysis, see [Figure 36](#).

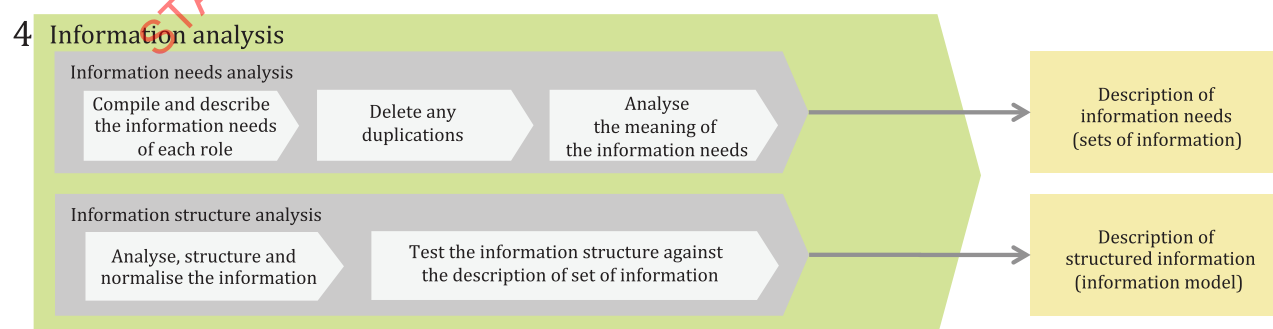


Figure 36 — Parts in information analysis

7.6.2 Information needs analysis

The result of the process analysis from a collaborative perspective facilitates the identification of information needs, i.e. what information should be managed and created in different activities in order for the different roles to be able to carry them out in an effective and reliable way. An information needs analysis is also performed to determine what elements will validate the different quality aspects of a given process as well as which role should contribute with additional, more detailed information, see [Figure 37](#).

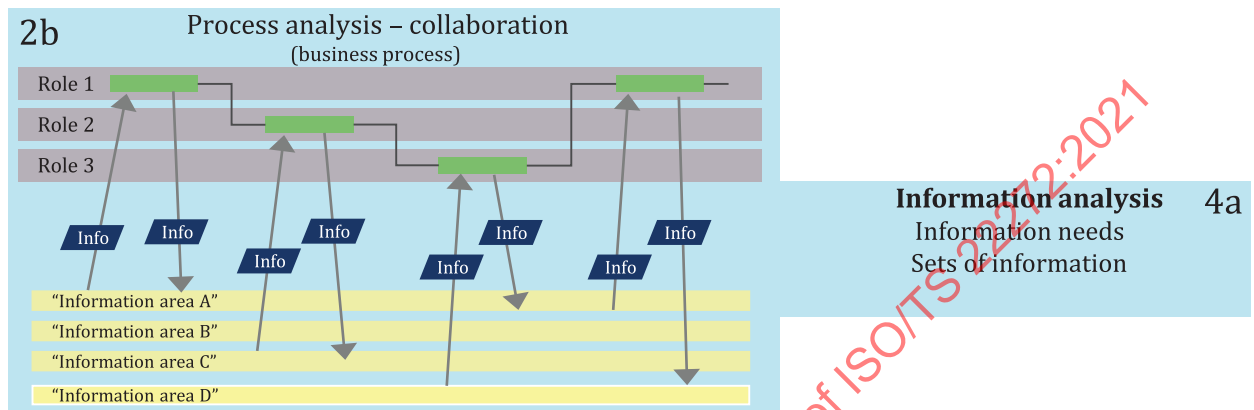


Figure 37 — Information needs analysis

7.6.3 Purpose of the method step

What information do the roles manage in their activities? A list of information that is input or output in a given activity. How do you do this?

The work is based on the process analysis from a collaborative perspective, supplementing with the information needs of the different roles, see steps in an information needs analysis in [Figure 38](#):

- Compile and describe the information needs of each role.
- Delete any duplications.
- Analyse the meaning of the information needs described such as occurrences of homonyms and synonyms.

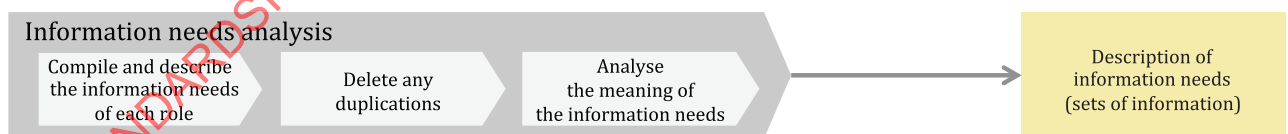


Figure 38 — Steps in an information needs analysis

7.6.4 Notation in the model for information needs

[Figure A.4](#) shows an example of notation in a model for information needs.

7.6.5 Information structure analysis

Once the information needs are listed, they have to be analysed and structured, with decision data provided by the results of earlier method steps. This work often results in an information model, see [Figure 39](#). These models describe how the information managed within an organisation is linked together in a structured way, identifying classes, describing attributes and defining multiplicity rules. The information is normalized in accordance with normalization rules^[3].

Information models are “solution neutral”, i.e. the technology used for implementation is not taken into account.

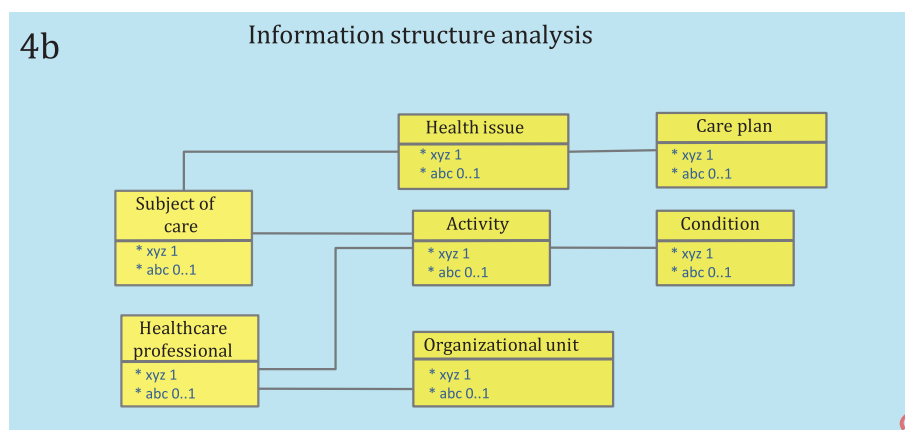


Figure 39 — Information structure analysis

7.6.6 Purpose of the method step

How does the information **link together** in a structured way?

7.6.7 How do you do this?

[Figure 40](#) illustrates the steps in analysis of information structure:

- Analyse, structure and normalise the information
- Test the information structure against the description of set of information.

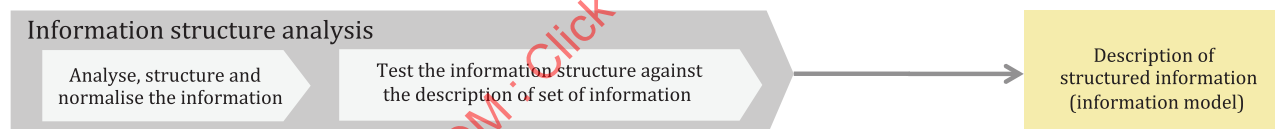


Figure 40 — Steps in analysis of information structure

One example of a successful project in Sweden that has done all method steps is Healthcare guide 1177 by phone, see [Annex C](#).

7.6.8 Information model notation

[Figure A.5](#) shows an example of a notation in an information model.

7.7 Analysis of code systems, classifications and terminologies

7.7.1 Purpose of the method step

Information is structured on two levels: class and attribute. For certain attributes, a more precise definition should be used in terms of code systems, classifications and terminologies, see [Figure 41](#). They facilitate structuring of the information on a third, more detailed level to minimise errors occurring during the re-use of information, thereby enabling compilation of the information correctly.

As code systems, classifications and terminologies are linked to attributes that should be detailed in an information structure, their context shall also be identified.

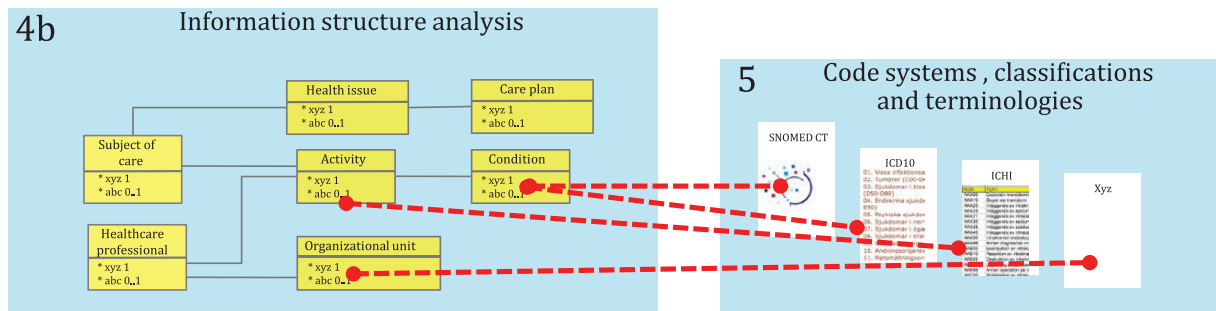


Figure 41 — Code systems, classifications and terminologies in information structure

Code systems, classifications or terminology that are relevant for use in a specific business context are identified and compiled into a set of code values.

Deepens the level of detail of attributes in an information structure, providing a further dimension.

Results in a decision to develop or use available/existing code systems, classifications, terminologies as well as which parts of them are to be used.

7.7.2 How do you do this?

Figure 42 shows different steps in analysis of code systems, classifications and terminologies:



Figure 42 — Steps in analysis of code systems, classifications and terminologies

- Identify which attributes should have code systems, classifications or terminology.
- Analyse whether existing code systems, classifications or terminologies are corresponding to business context purpose.
- Initiate further development/update of existing or development of new code systems.
- Make selections and apply code systems, classifications or terminologies.

8 BIA methodology supports standards based business and information architectures

8.1 BIA methodology supports creating branch frameworks

Business and information needs analysis aims at achieving a mutual understanding of an organization's:

- purpose;
- methodologies;
- language of communication;
- support requirements.

There are established norms and rules for how to conduct business. Internationally, these are expressed by standards. Branch frameworks exist at a lower organizational level (for example, the norms of a

different geographical location than a head office) but are not formalized in the same way as standards. Standards and branch frameworks are usually highly abstract, and it can therefore be difficult to directly apply them within the organization. Standards and frameworks can be both national and international, but both constitute a reference level which should be defined so their content can be utilized.

The BIA methodology can be used as a toolbox with different analytical instruments for creating of reference level, see [Figure 43](#).

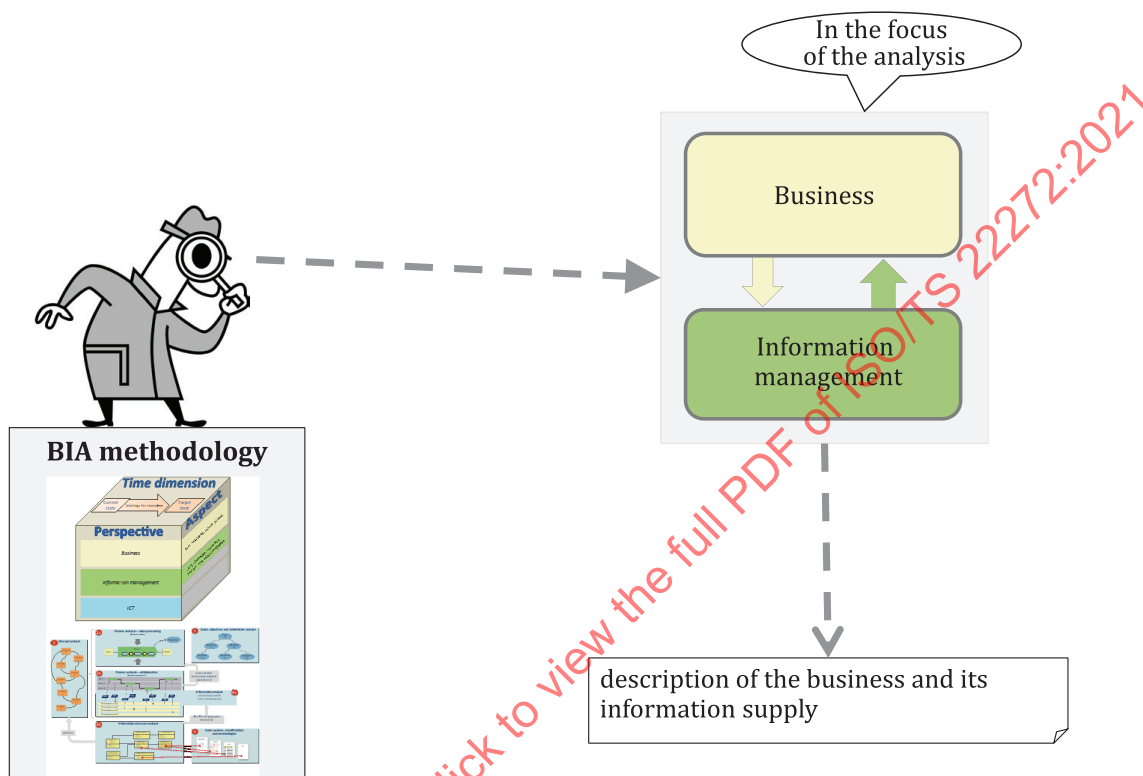


Figure 43 — The BIA methodology as toolbox

As long as there is no agreed branch framework, business within the same branch will be analysed and described without assuming an existing reference. Eventually, descriptions of different business aspects will in time form an agreed branch framework, see [Figure 44](#).

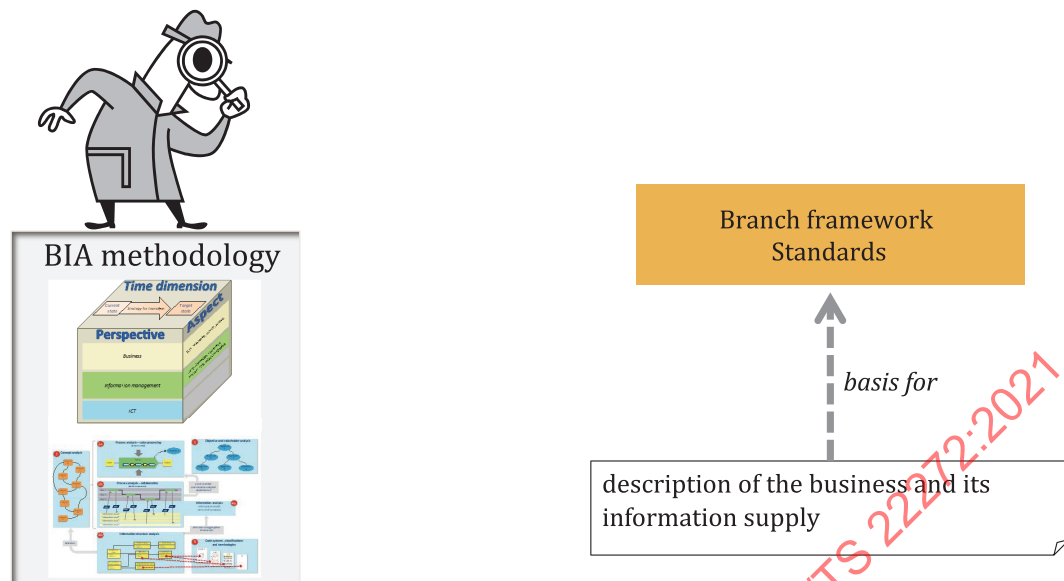


Figure 44 — Branch framework developing

The branch framework and previous analysis results are used as the basis of the next business analysis as it illustrates in [Figure 45](#). The ultimate goal is high quality information so in order to comply with agreed rules, the business descriptions should be harmonized with branch frameworks. This allows traceability between different organizations and a comparison of business descriptions.

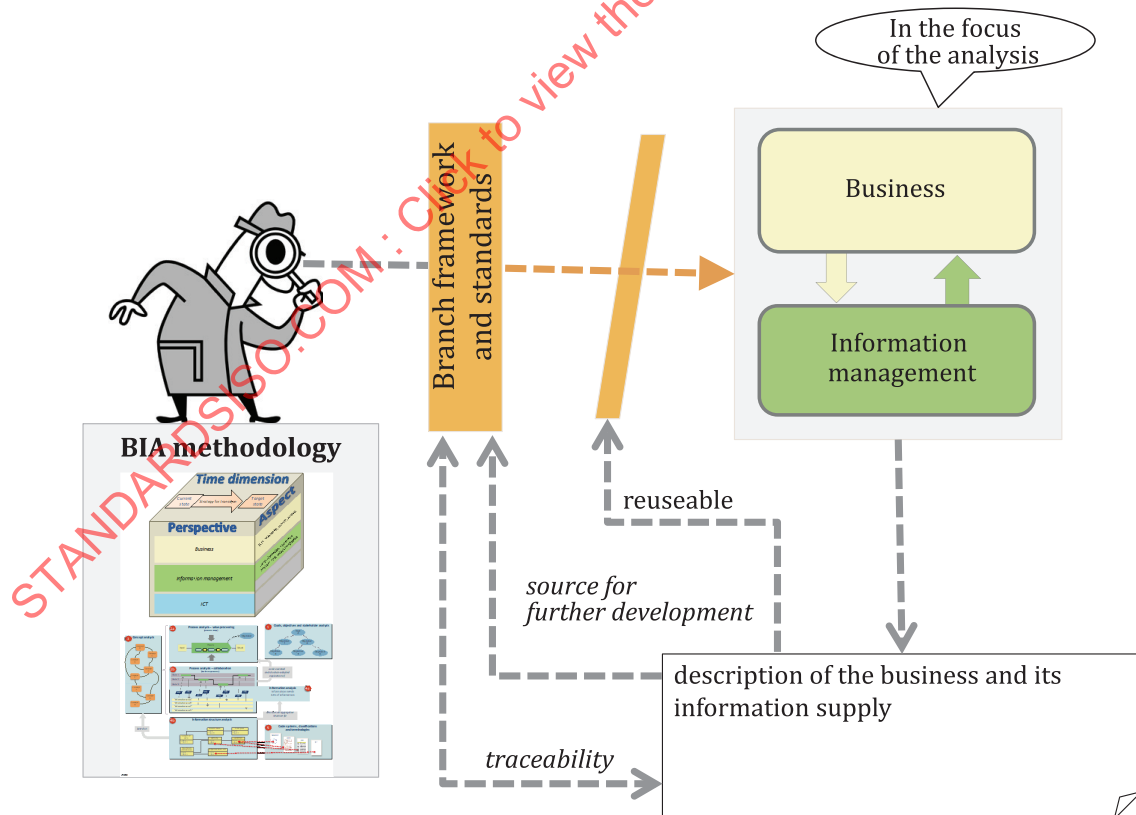


Figure 45 — Standards and branch frameworks as basis of business analysis

There are two central concepts describing different levels of architecture: reference and concrete, see [Figure 46](#). Reference architecture, also called abstract architecture, contains different types of

reference models, principles and guidelines in order to design the more detailed components of concrete architecture which result in implementation descriptions.

The BIA methodology also explains how developed models in concrete architecture contribute to the further development of models in the reference architecture and is therefore useful for developing models at both the reference and concrete levels.

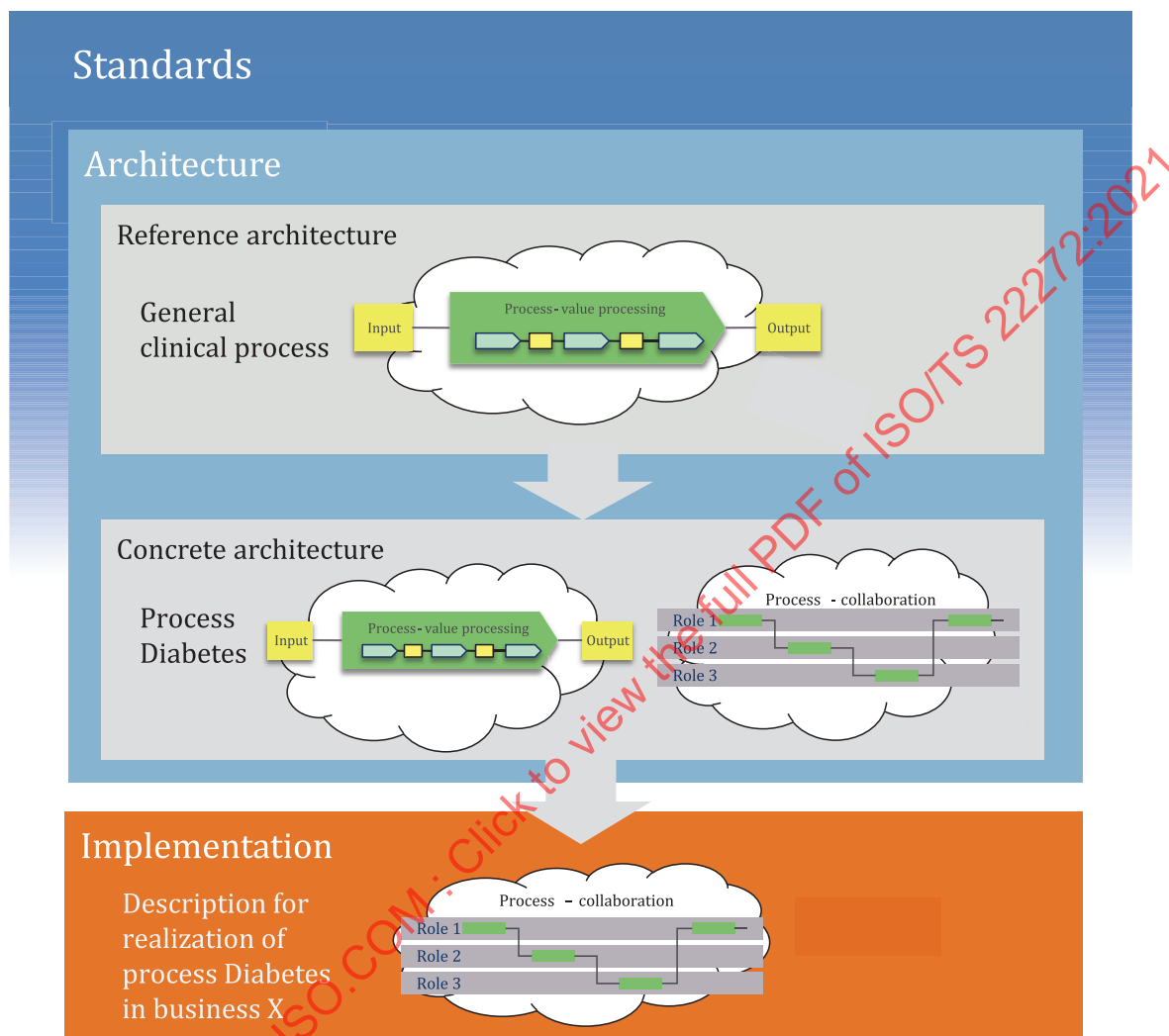


Figure 46 — Dependencies between reference and concrete architectures and implementation

The BIA methodology supports the business and information analyses on both architectural levels, from abstract to concrete, as it is shown in [Figure 47](#).

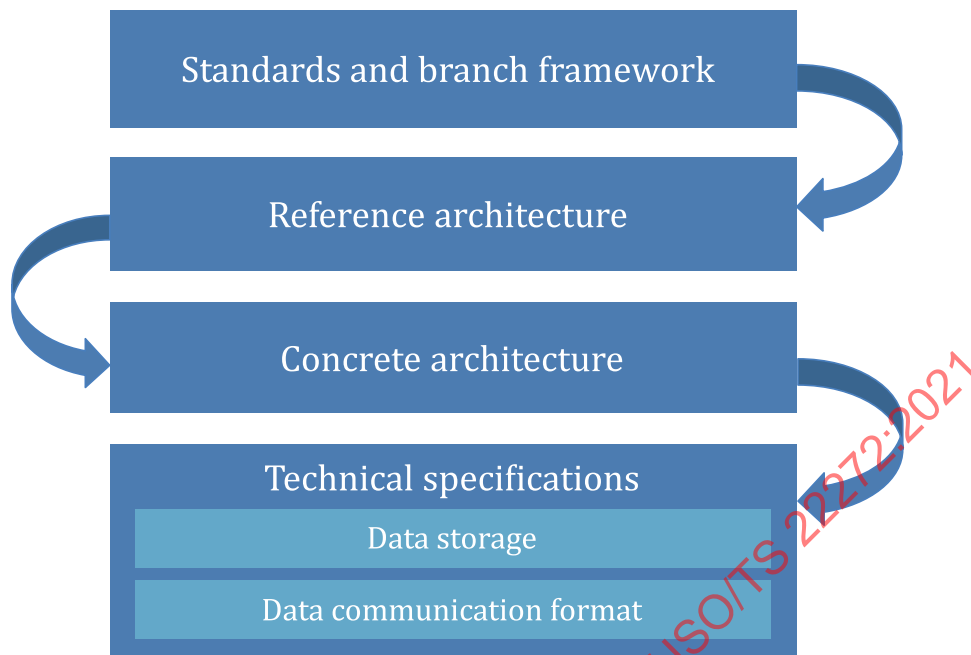


Figure 47 — From abstract to concrete

Standards and branch frameworks are often difficult to understand and therefore should to be described, for example, in implementation guide how to use them. Usually it is just expertise in the area that has deep knowledge of and work with these.

The standards and branch frameworks support the reference structures, reference information models, clinical reference models, reference templates, etc. The experts on this level analyse, understand and describe general patterns and rules for the business and its information management as reference architecture, managing the relationship between standards, branch framework by creating business and information architecture. The experts develop strategies, providing an effective and accessible way for information structures to be implemented in ICT.

Reference information structures are converted to descriptions which are easy to understand by relevant stakeholders such as ICT vendors, end users and patients. Examples of components in the concrete architecture are templates and web formats.

The most detailed and focused level is how to deliver the business requirements using technology. Technical specifications include at least two areas:

- How to design the data structure for storage and data interchange depending of the chosen technical solution.
- Data interchange format that shall create the basis to achieve interoperability.

8.2 ISO 13940 as a conceptual basis for the business architecture in healthcare

The purpose of 8.2 is to illustrate how to create a business architecture based on relevant standards. Models developed according BIA methodology constitute the components of a business architecture.

ISO 13940 is a comprehensive system of concepts for healthcare. Its purpose is to identify and define the generic concepts that should be used for both effective business development and information management in healthcare organizations. By defining, analyzing and describing all relevant concepts in a healthcare business, ISO 13940 provides a model for the basis of a business architecture. ISO 13940 should be used in concept and process from a value processing perspective analysis according BIA methodology, as it is shown in [Figure 48](#).

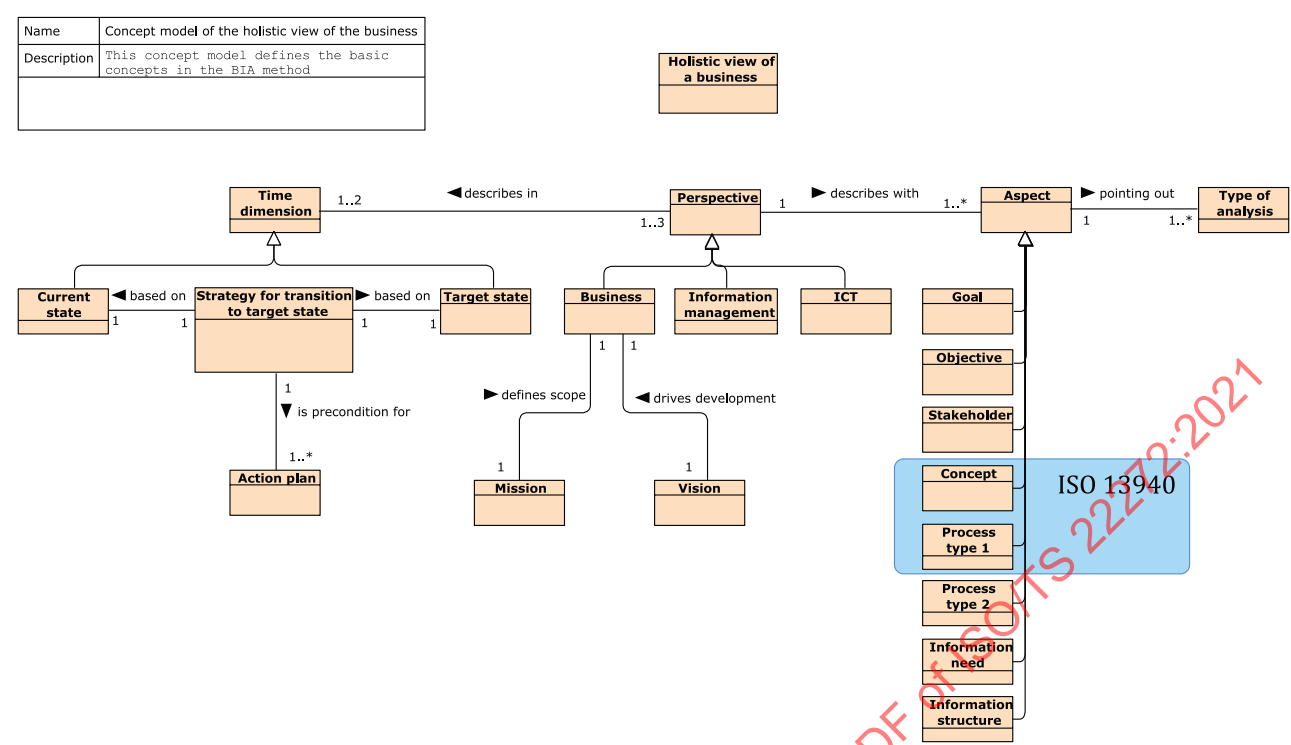


Figure 48 — ISO 13940 as the conceptual basis for the business architecture

Reference models conformant to ISO 13940 should be specified when developing process and concept models in the concrete architecture. Identification and descriptions of clinical processes which address a specific health problem should be congruent with the ISO 13940 general process model. The concepts used in these processes should refer to the corresponding concepts in ISO 13940, see [Figure 49](#). Concepts which occur in different concept models developed for the specific health-related processes should be based on relevant concepts in ISO 13940 concept model and share the same association pattern and accordingly, have the same meaning.

ISO 13940:2015 – System of concepts to support continuity of care

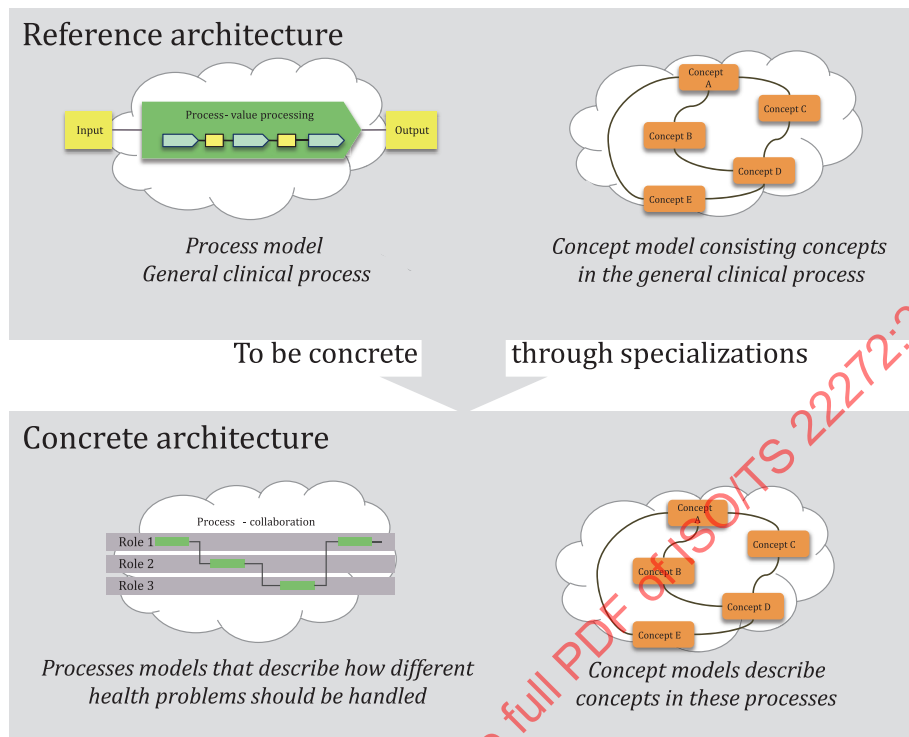


Figure 49 — Preconditions for semantic interoperability in the business architecture

8.3 EN 15224 as a basis for a clinical process oriented business architecture

Quality management principles and quality approaches are basic for any business; information management is an integrated part of general quality management. One general principle for quality management applied in ISO 9000 is a process approach.

Core business processes are main components of any business architecture and therefore clinical processes are fundamental in defining the business architecture in healthcare. EN 15224 should be used as a reference in objectives and stakeholders analysis as well as in a process analysis both from a value processing and collaborative perspectives, see [Figure 50](#).

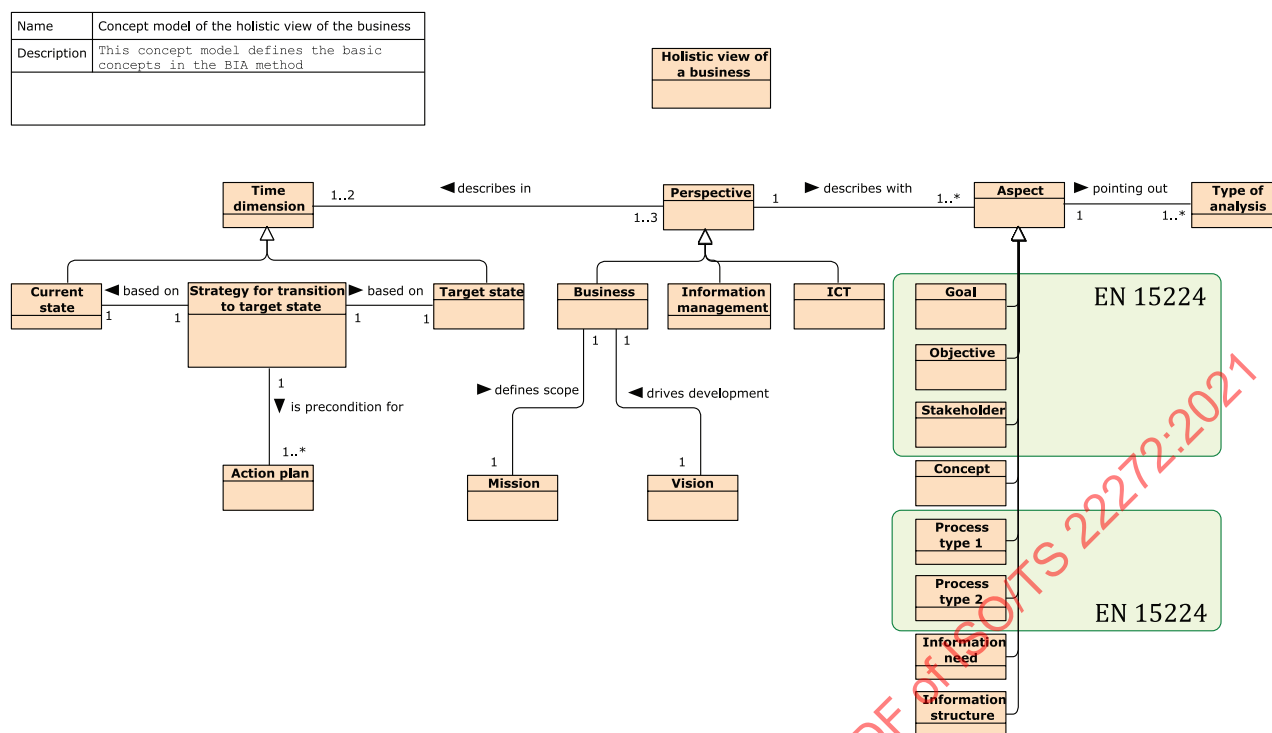


Figure 50 — EN 15224 as a basis for business architecture

8.4 Combining ISO 13940 and EN 15224 as a common basis for creation of a business architecture in healthcare

Requirements for identification, design, development, performance, follow up and improvement of clinical processes are defined in EN 15224. EN 15224 is based on the system of concepts defined in ISO 13940.

These two standards are compatible: both include identical models of the clinical process as reference for design of the core business processes in healthcare. ISO 13940 is the conceptual basis for the business architecture in healthcare and the quality management aspects of the business in healthcare are further specified and defined in EN 15224. These standards should be used in objectives, stakeholders, concept and process analysis both from a value processing and collaborative perspectives, as [Figure 51](#) illustrates.

Because information models are based on the reference models in the standards the fundamental prerequisites for semantic interoperability will be created. Therefore, information can be transferred between different ICT and roles in the organization, achieving the same understanding of the information content that is a ground for a high level of interoperability.

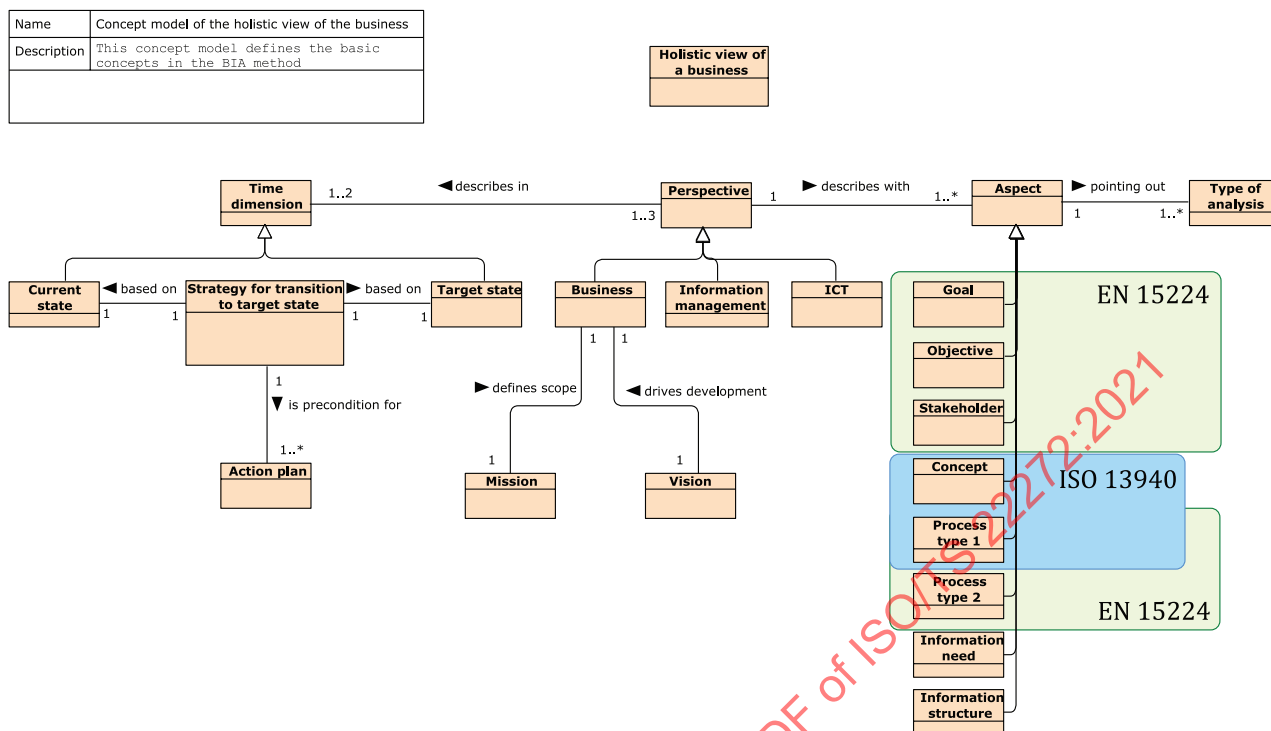


Figure 51 — ISO 13940 and EN 15224 as a common basis for business architecture in healthcare

8.5 Standards based information architecture

At first, information needs should be identified in the business processes in order to be managed in future developed ICT. The next step is the analysis and structuring of these identified information needs and creating of the models in the information architecture. Just like business architecture, information architecture is divided into two levels: reference and concrete.

A reference architecture manages different types of information at a general level based on concepts described in the concept model. Information classes in the reference information model describe information in an abstract manner using attributes.

An information model in the concrete architecture specifies the details in the reference information model at the attribute level. An information model in the concrete architecture is produced where information classes represent identified information needs within different activities in the processes and based on relevant classes in the reference information model.

It is important to point out that the information model is solution neutral and does not consider the technical aspects of the future ICT implementation.

8.6 ISO 13606-3 as a basis of content of the information architecture

ISO 13606-3 supports the creation of the information architecture for communication of all Electronic Health Records (EHR) for a single subject of care, whether a patient or group of patients. This block of information is called an extract. ISO 13606-3 includes reference archetypes and generic clinical models. Reference archetypes, which are comparable to generic clinical models, are a set of design patterns used as a basis for various aspects of clinical information in an electronic health record. They represent fundamental areas of demographic, clinical and drug information and cover common information needs in healthcare. They define both structural and semantic relationships between different information structures and rules for these relationships. These reference archetypes and generic clinical models should be used in creating of the concrete information architecture, as it shows in [Figure 52](#).

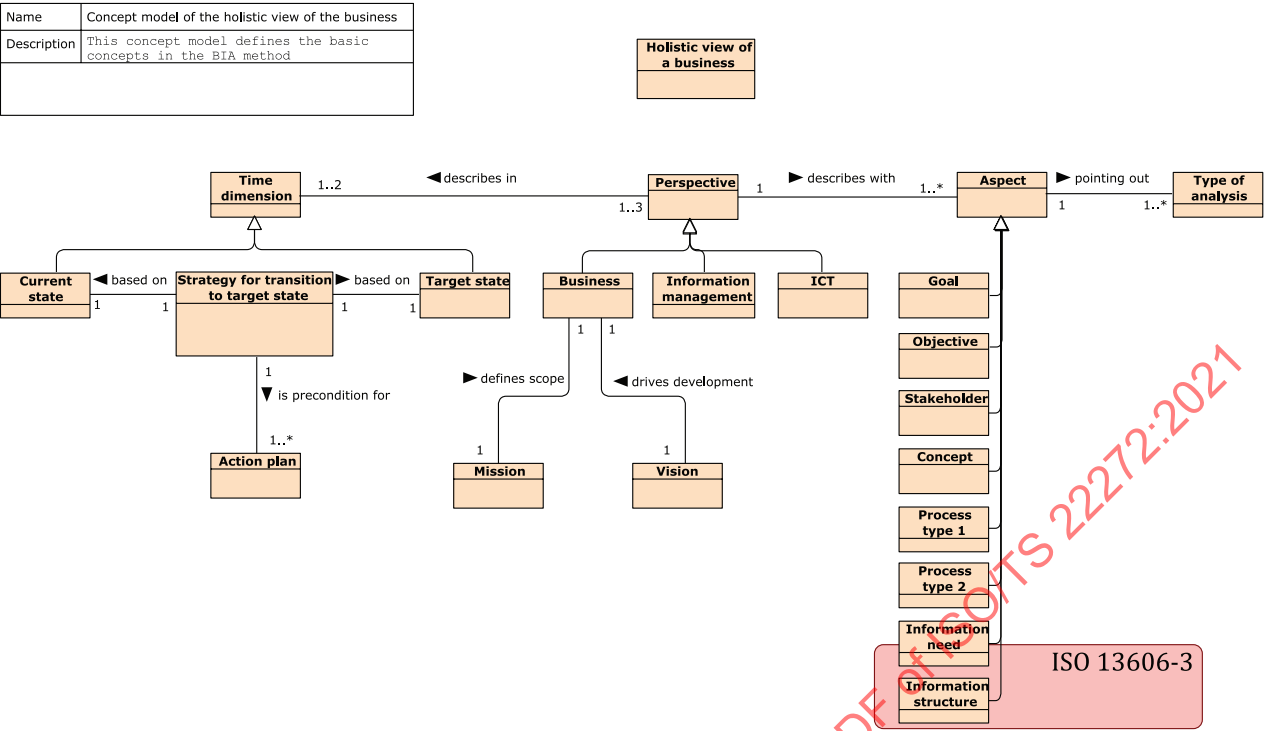


Figure 52 — ISO 13606-3 as a base for information architecture

When such models are created in different organizations, projects or countries, without using mutual reference models as a basis there is a risk that structures representing the same type of information needs are constructed differently and do more to prevent semantic interoperability than facilitate it.

However, the reference archetypes and generic clinical models in ISO 13606-3 can be used as a starting point; content and structure can be reused even if the models will be created in another format. Reference archetypes and generic clinical models are already harmonized and traceable to ISO 13940 concept model, see [Figure 53](#).

ISO 13606-3

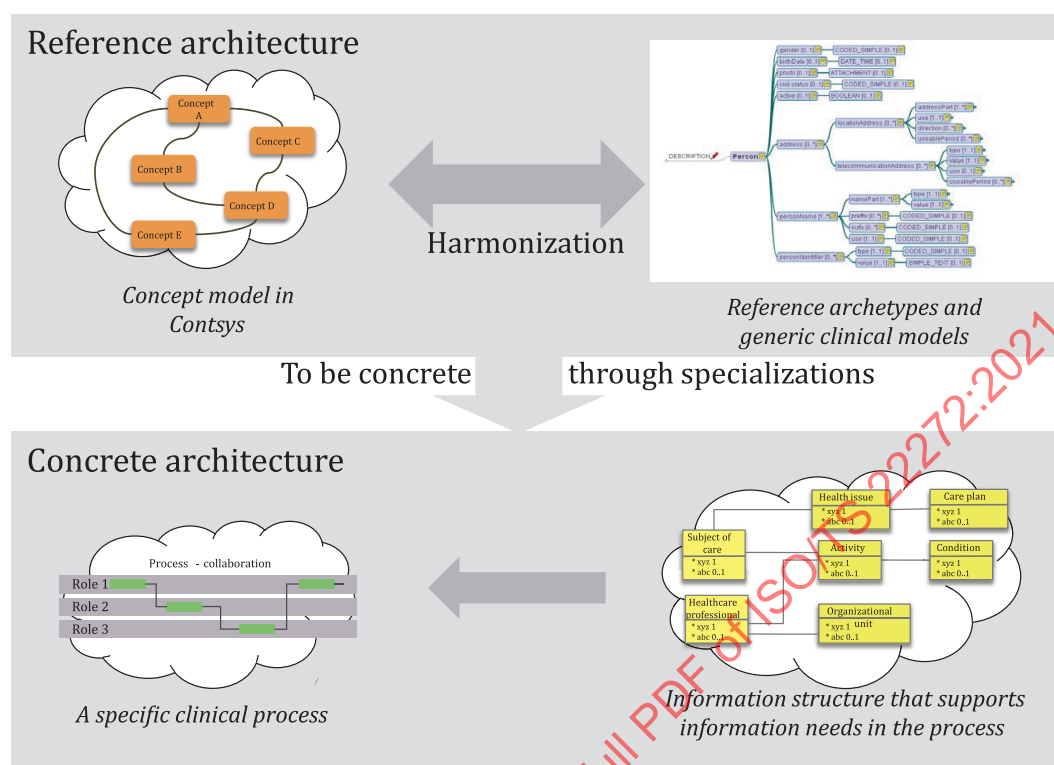


Figure 53 — Preconditions for a concept traceability

The reference archetypes and generic clinical models can be used for various purposes such as information supply in business development and requirement-settings for ICT development.

By structuring information in a technical format, they can be transferred between different ICT as well as providing the basis to optimize the automation of information management.

9 BIA methodology as a driver for an effective requirements-settings work

9.1 Methodology and development process

A method is a specific way of doing something and a methodology is a set of methods covering different areas of knowledge used in a particular activity. A number of methods can be used in a process to achieve an outcome, see [Figure 54](#). As a process strives to become more effective, methods can be exchanged or further developed due to newly acquired knowledge for example. However, it is always important that methodology supports the process.

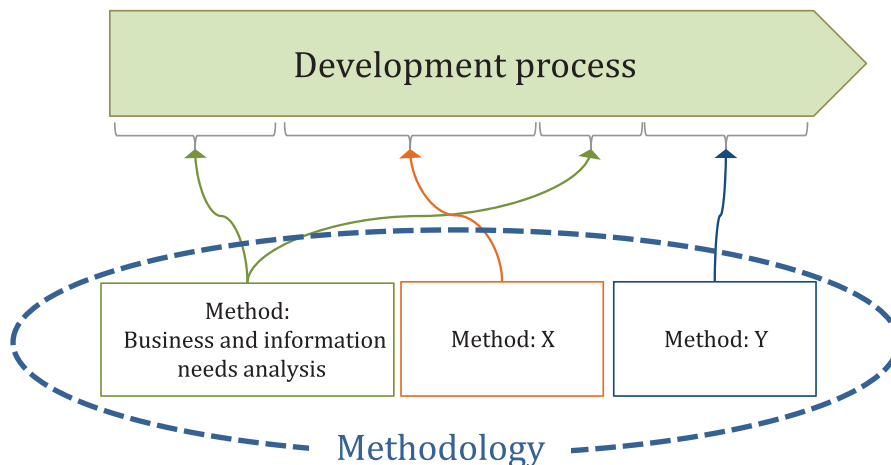


Figure 54 — Relationship between methods, methodology and process

9.2 Business-driven ICT development

A collaborative business and information needs analysis according BIA methodology determines ICT requirements. However, resultant models and descriptions are not always sufficient and can be complemented with other artefacts such as business use cases or usage scenarios descriptions.

It is also important to point out that requirement-settings work is an iterative task where different competencies interact. A clearly described development process should be followed in an iterative approach.

9.3 General development process overview

To move from a conceptual level to identification of the preferred solution should be done by collaborative work between a number of different knowledge areas. The development process starts from the point at which a decision is made to start a development project. Then it moves into a preliminary study which, depending on the organization's needs, could be either a short-term overview identifying possible solutions or more in-depth preliminary study with deeper analysis of problem statements in the form of a business description, see [Figure 55](#). The outcome of this analysis results in a decision on the next step.

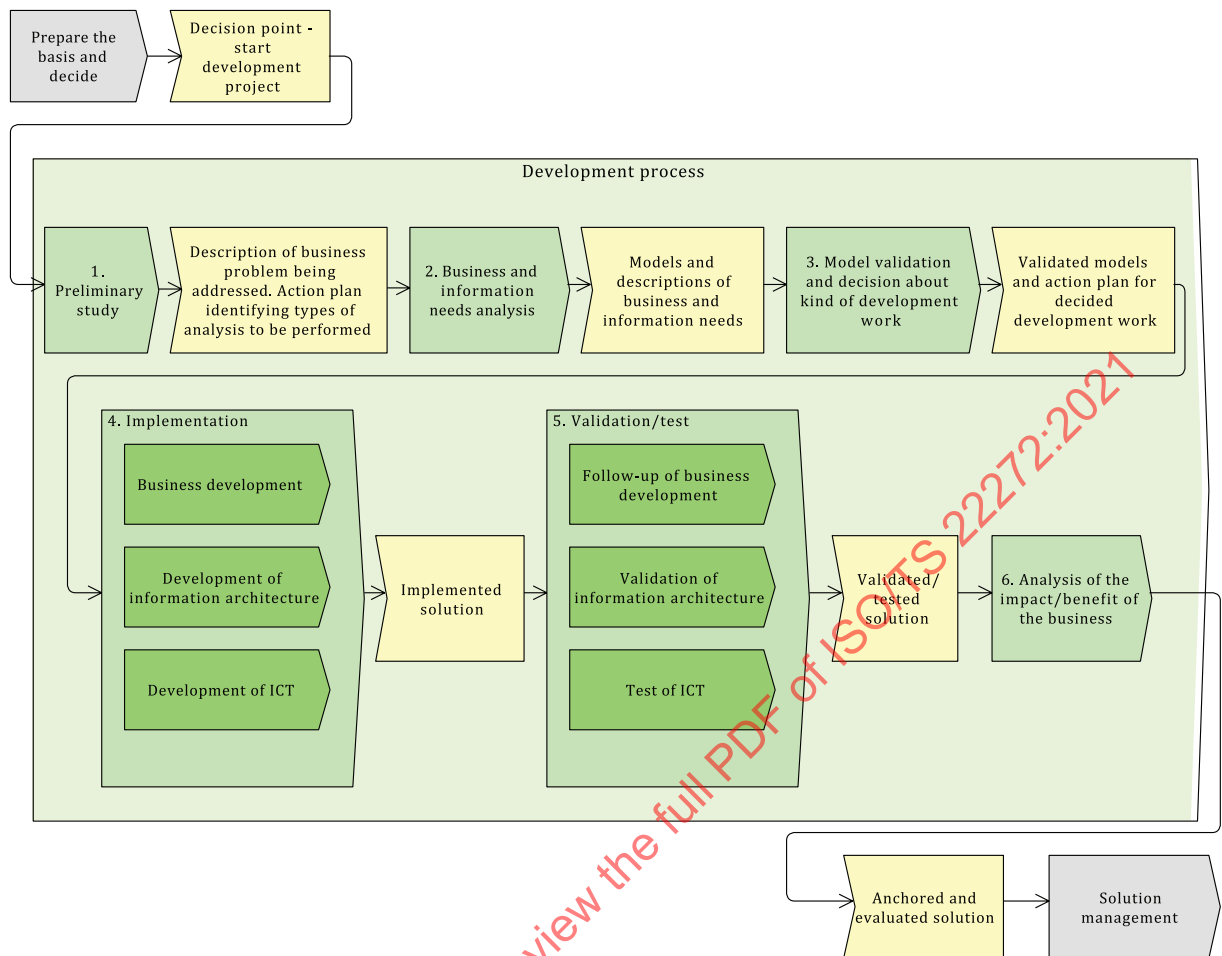


Figure 55 — General development process

Business and information needs analysis should follow a proven methodology suited to the requirements of the organization and the problem to be solved, identifying type of analysis and documenting them in an action plan.

To carry out a good business analysis shall include business expertise in different areas. Time and resources can be saved by reusing previous work rather than duplicating for each individual project though sometimes these descriptions should be updated.

Business analysis creates the basis for:

- business development;
- process implementation in the business;
- development of the ICT strategy;
- development of the information supply;
- introduction and use of concepts and terms within organization;
- management of the structured information within organization;
- use of the code systems;
- development and management of the structured information communication;
- requirements-settings of the ICT.

The generated business description should be examined and validated by an expert group that includes:

- relevant business representatives;
- methodology specialists;
- an enterprise architect;
- business, information, solution and IT architects.

The action plan should identify relevant development work and ongoing maintenance activities. Continuation work should consider:

- business development;
- (further) development of information supply;
- ICT development.

The changes should be validated and tested against the requirements then substantiated through a “run” of scenarios and use cases where business roles trial the code systems for further validation of the concepts, information structures and models.

The results of this process are then handed over to their future owner.

9.4 Business and information analysis deliverables

Business and information needs analysis according BIA methodology result in one or more deliverables in the form of models and textual descriptions:

- objective models;
- descriptions of the stakeholders;
- process models;
- concept models;
- descriptions of the information needs;
- information models;
- designated code systems and/or own defined code values, etc.

Deliverables for ICT-related requirements should also be included but these should be created by using other methodologies. Below is a non-exhaustive list of examples of such deliverables:

- business-related use cases;
- scenario descriptions;
- prototypes of user interface;
- non-functional requirements;
- requirements for information security, etc.

9.5 A development process using BIA methodology through BIA function

9.5.1 General

[Subclause 9.5](#) describes a development process for collaboration between a BIA function, that has a competence in applying of the BIA methodology in development work, and different development projects. The development process consists of five sub-processes:

- information;
- introduction;
- reconciliation;
- review;
- delivery receipt.

9.5.2 Information

When it is determined that an idea will proceed to an initialization phase, the BIA function should be asked to determine if there is a requirement for a business and /or information needs analysis, which types of analyses might be carried out, what knowledge sources and skills to be involved. An information meeting supports the work of transforming ideas into project directives as it illustrates in [Figure 56](#).

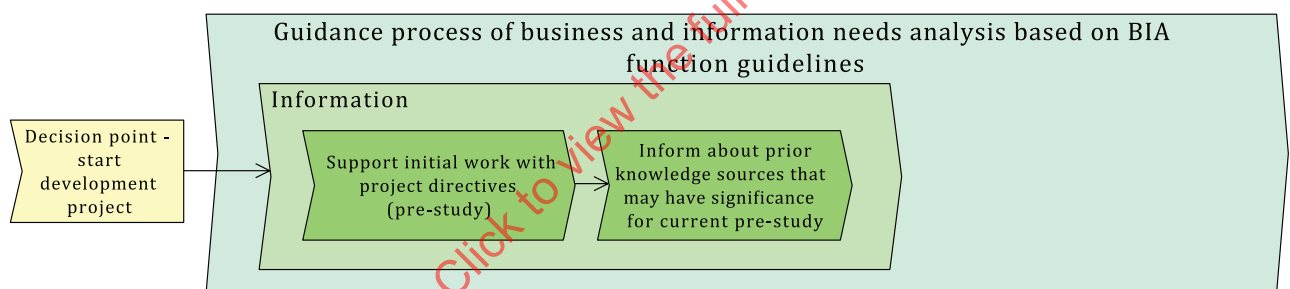


Figure 56 — Idea transformation into project directive

9.5.3 Introduction

An introduction meeting consists of several steps as it shown in [Figure 57](#).

Once the types of analyses and / or information needs are known, the BIA function can be asked to assist with:

- Identification of the fundamental area(s) within healthcare in which the analysis will be made, see [Figure 8](#).
- Identifying whether there are branch framework and/ or standards within the area to be analysed.
- Identifying the types of models or terminological work which describes the results of the analysis, such as objectives model, concept model, information model, etc.
- Discussing the methods to be used in the analysis work.
- Clarifying the rules on how the results of analysis will be documented.
- Providing the project team with templates for models and documentation.
- Identifying training for different roles in the project.

- Answering ad hoc questions.

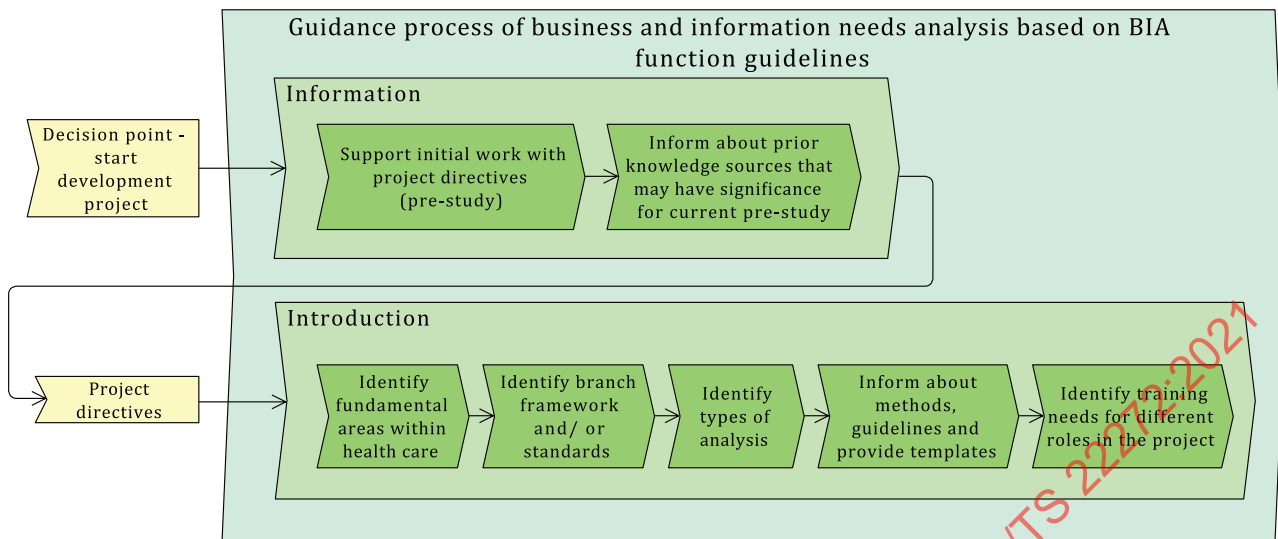


Figure 57 — Introduction meeting

9.5.4 Reconciliation

This stage validates that analysis has been conducted according to determined methodology and the results have been documented in a correct manner. Reconciliation, see [Figure 58](#), includes confirmation that:

- content is based on the requirements of the business;
- content is congruent with branch framework and chosen standards;
- models are described according to modeling rules;
- glossaries are consistent with terminological sources;
- there is a plan for how the content in the models will be verified and tested;
- the rules around change management are understood;
- owners of deliverables, including the BIA function, are identified;
- the project has described traceability between business requirements and the developed solution.

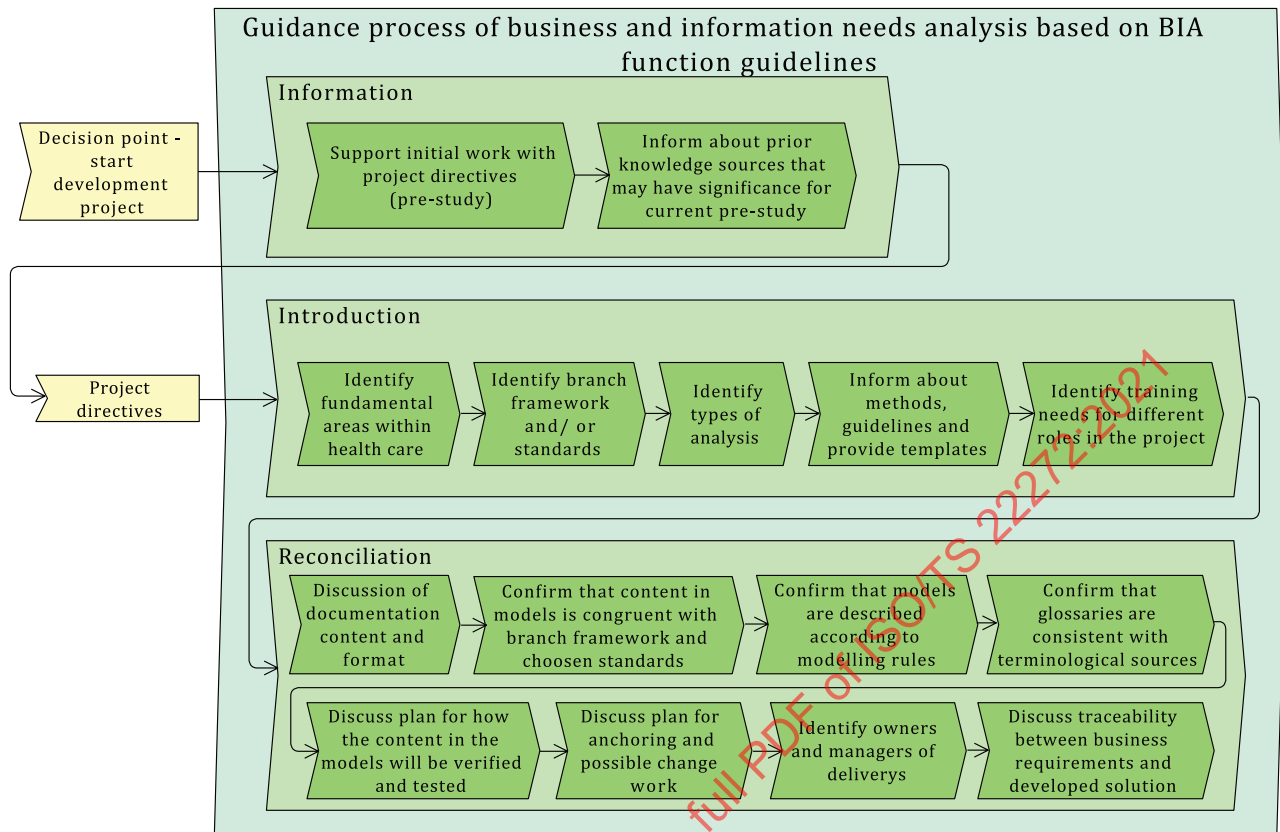


Figure 58 — Reconciliation

Following reconciliation, it could be necessary to change or supplement the analysis result.

9.5.5 Examination

Figure 59 shows that the BIA function can be called upon to review a project's deliverables, including following:

- content in the models and descriptions comply with business requirements;
- models are congruent and compatible with other relevant business components managed within the BIA function;
- result follows appropriate branch framework and standards;
- models have sufficient detail to allow them to be assembled into a single overall model;
- models could be reusable;
- documentation complies with regulations, i.e. that models are described according to an agreed notation and approved modeling tools are used;
- models are validated;
- deliverables which are to be managed by the BIA function are determined.

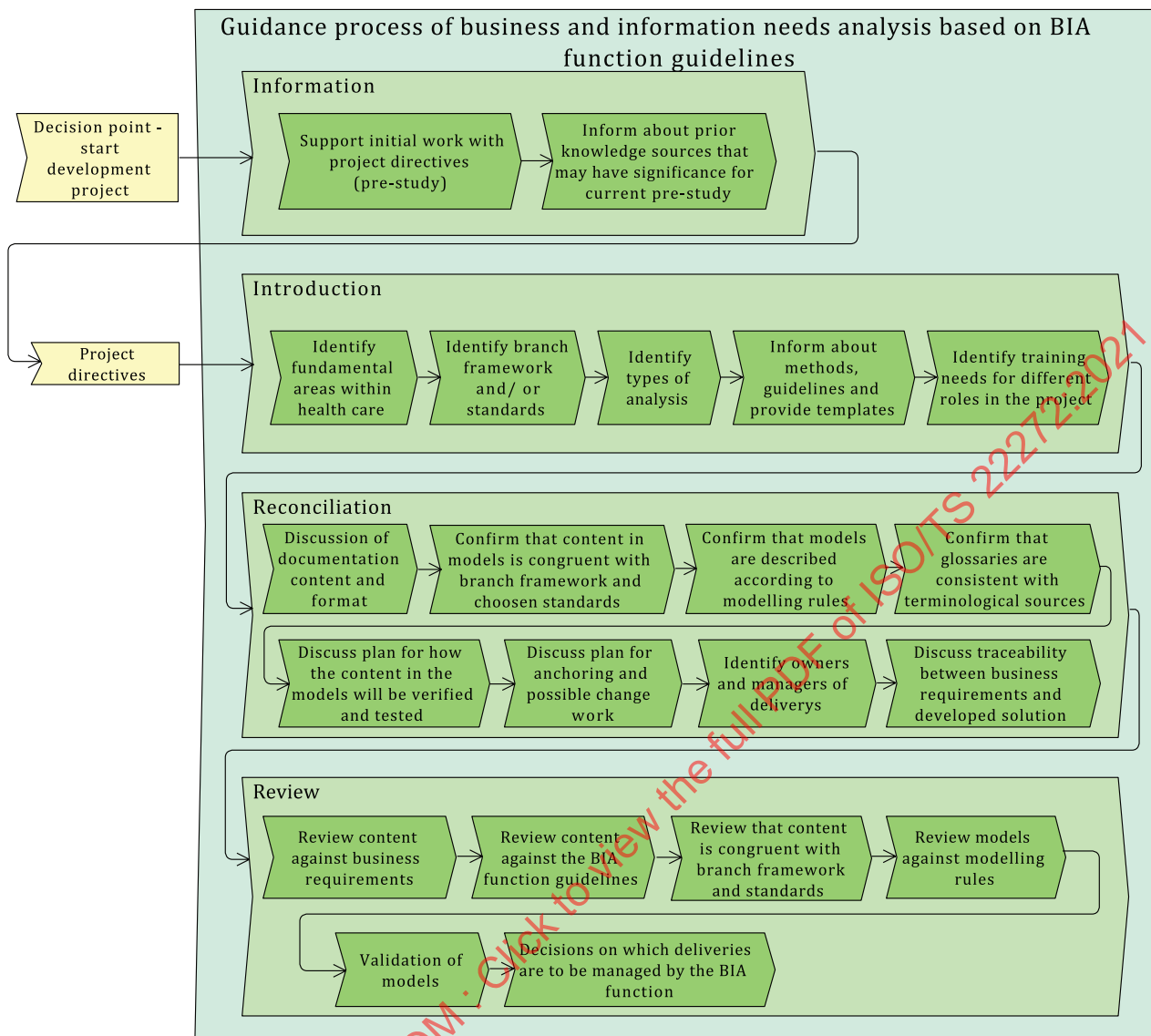


Figure 59 — Deliveries review

9.5.6 Delivery receipt

This sub-process refers to the deliverables to be managed by the BIA function as it shows in [Figure 60](#), which consists of:

- drawing up an action plan for the management of deliverables;
- designating a management resource to be responsible for these deliverables;
- receipt of deliverables.

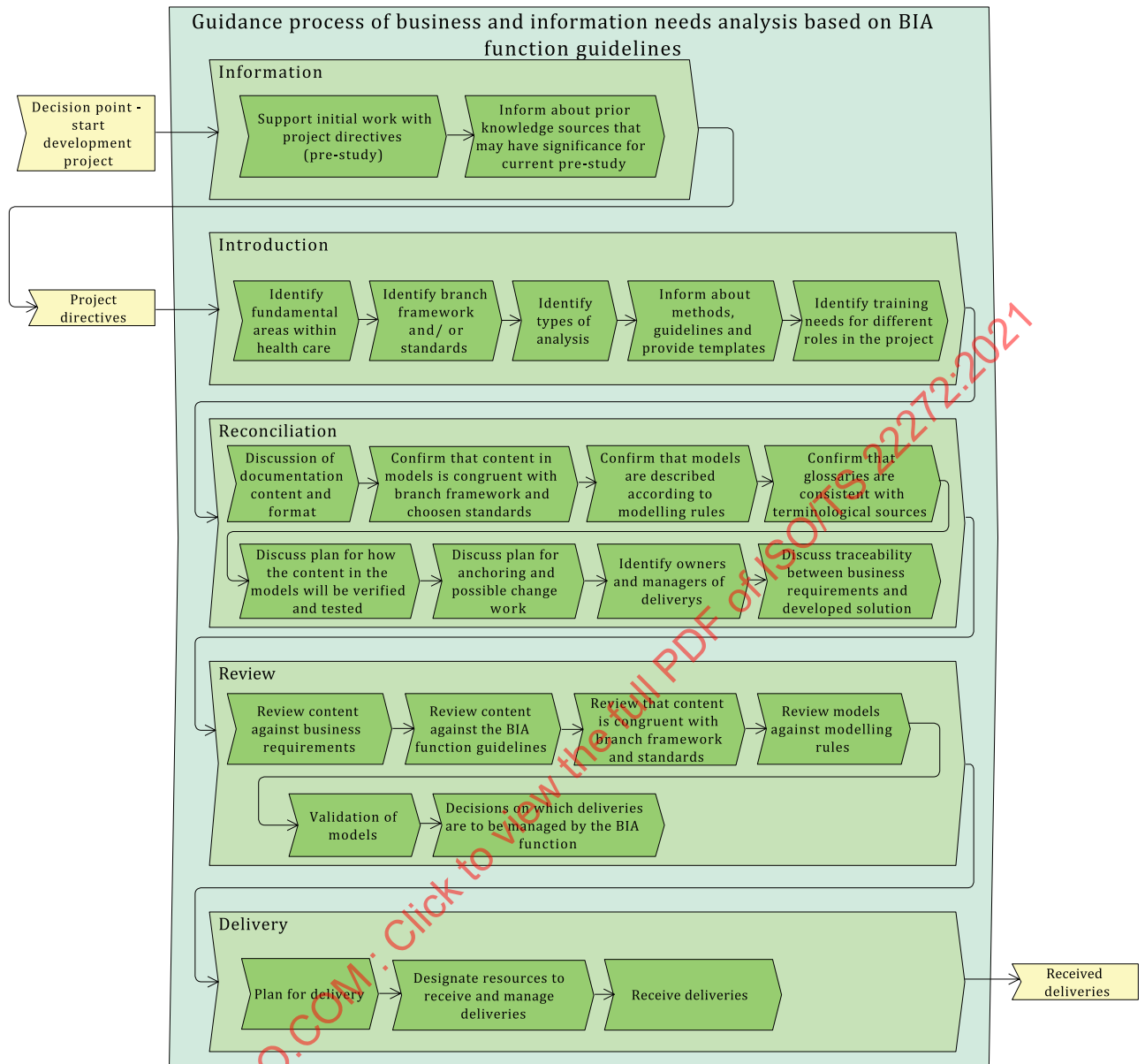


Figure 60 — Receipt of deliveries

Annex A (Informative)

Examples of notation in the different model types

Figure A.1 shows an example of notation for an objectives model. An objectives model normally contains the following parts:

- **Goals and objectives** detail what is to be achieved.
- **Objective relationships** show how the different goals and objectives relate to each other. By means of these relationships, it is possible to describe subordinate objectives and main goals.
- **Problems** are impediments to achieving an objective.
- **Actions** are measures or steps that should be taken to handle or eliminate problems as well as to achieve goals and objectives.

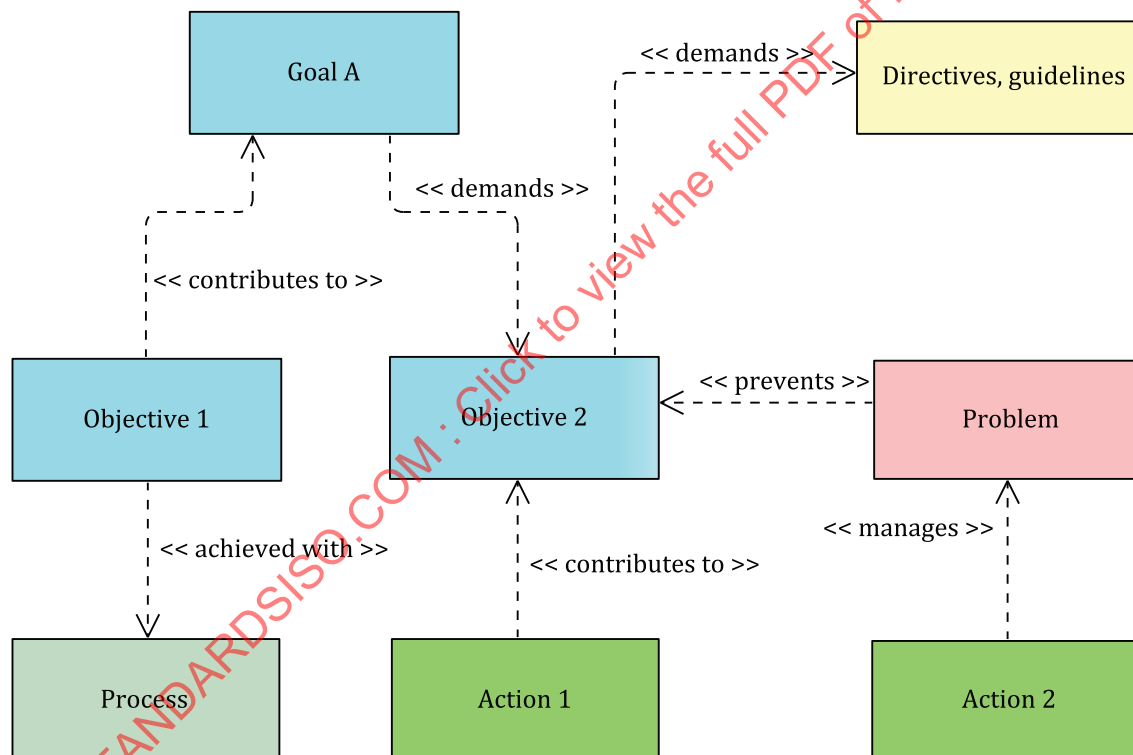


Figure A.1 — Example of notation for an objectives model

Figure A.2 shows an example of notation for the process from a collaborative perspective. It follows the set of regulations in Business Process Model and Notation (BPMN), 2.0 [4].

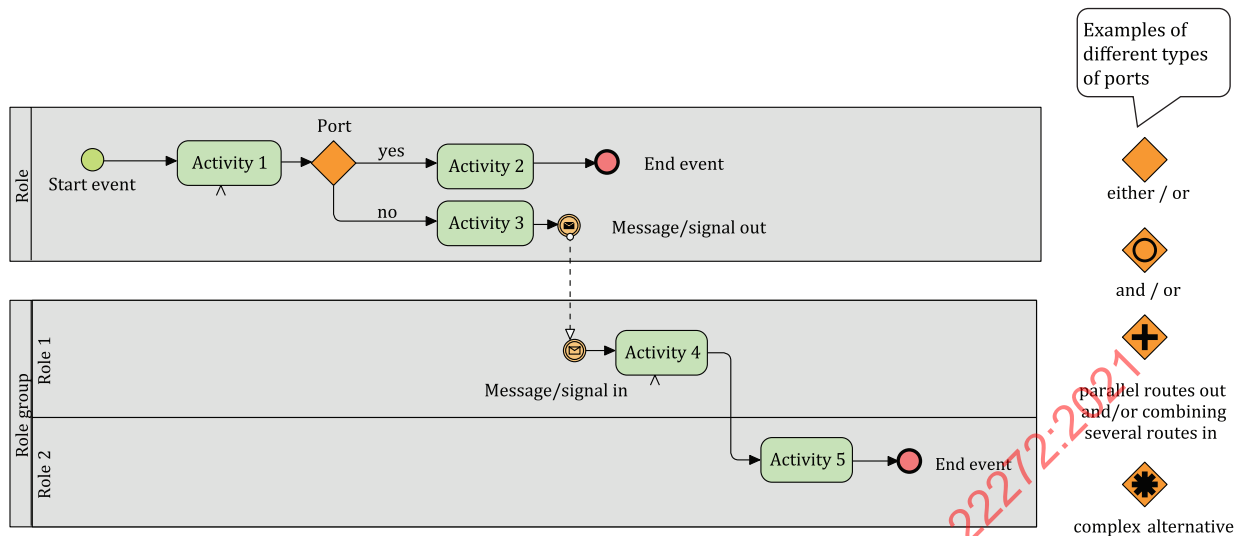


Figure A.2 — Example of a process description following BPMN

The model is made up of:

- roles with assigned responsibilities – grey field, sometimes called “swimlanes”;
- start event – green circle;
- end event – red circle;
- activity – green rectangle;
- port – option or alternative, also known as a yes / no decision;
- activity sequence – arrows;
- message signals – if activity sequences run between roles that do not belong to the same role group.

Figure A.3 shows an example of notation for a concept model. In many cases, concept models use the same notation as information models, which makes it difficult to identify its purpose. One such notation, for example, is the Unified Modeling Language (UML). If UML is used, then one solution can be to use different colours. Graphic notations are described in ISO 24156-1.

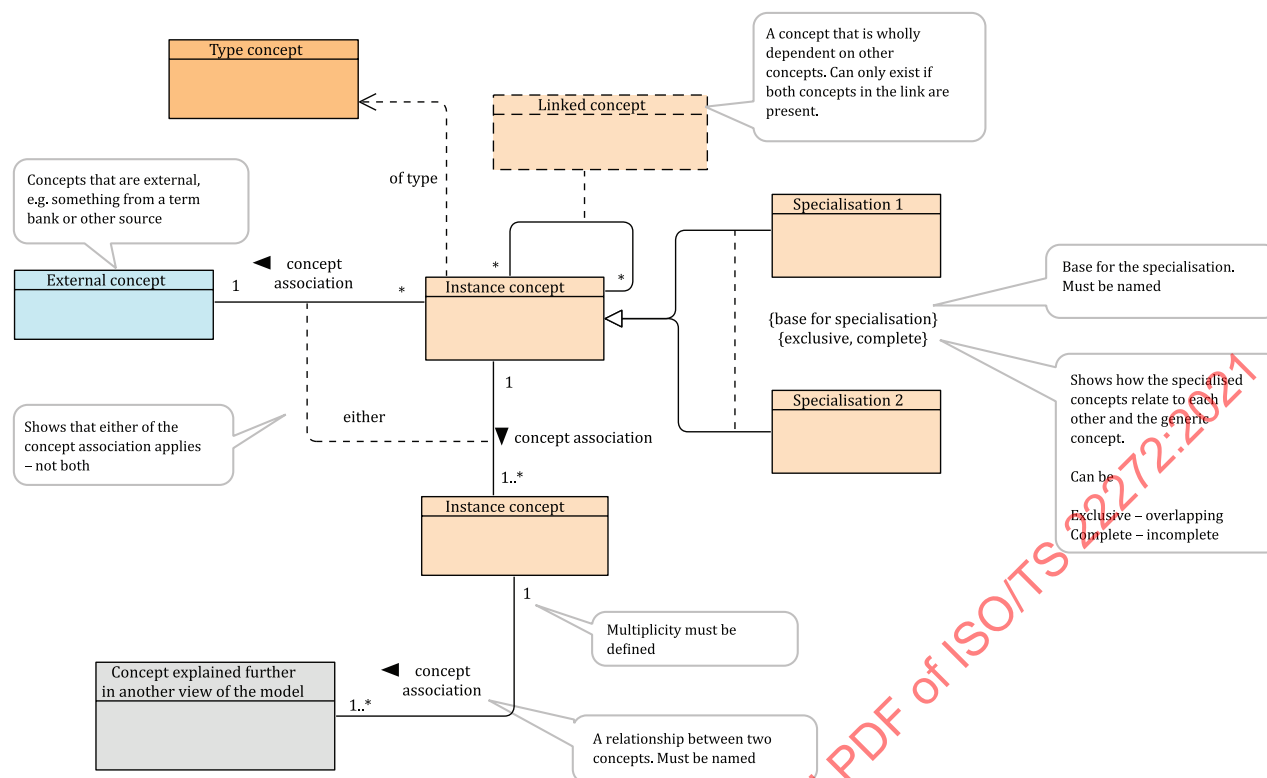


Figure A.3 — Example of concept model notation with UML

Figure A.4 shows an example of a process from a collaborative perspective with identified information needs.

Also, useful here, as well as in a process analysis from a collaborative perspective, is the notation for example, in accordance with BPMN 2.0. The process model from a collaborative perspective is supplemented with:

- description of set of information – into a specific activity from a specific information store or out from a specific activity into a specific information store;
- information store – a place where information is held, such as a specific data store.

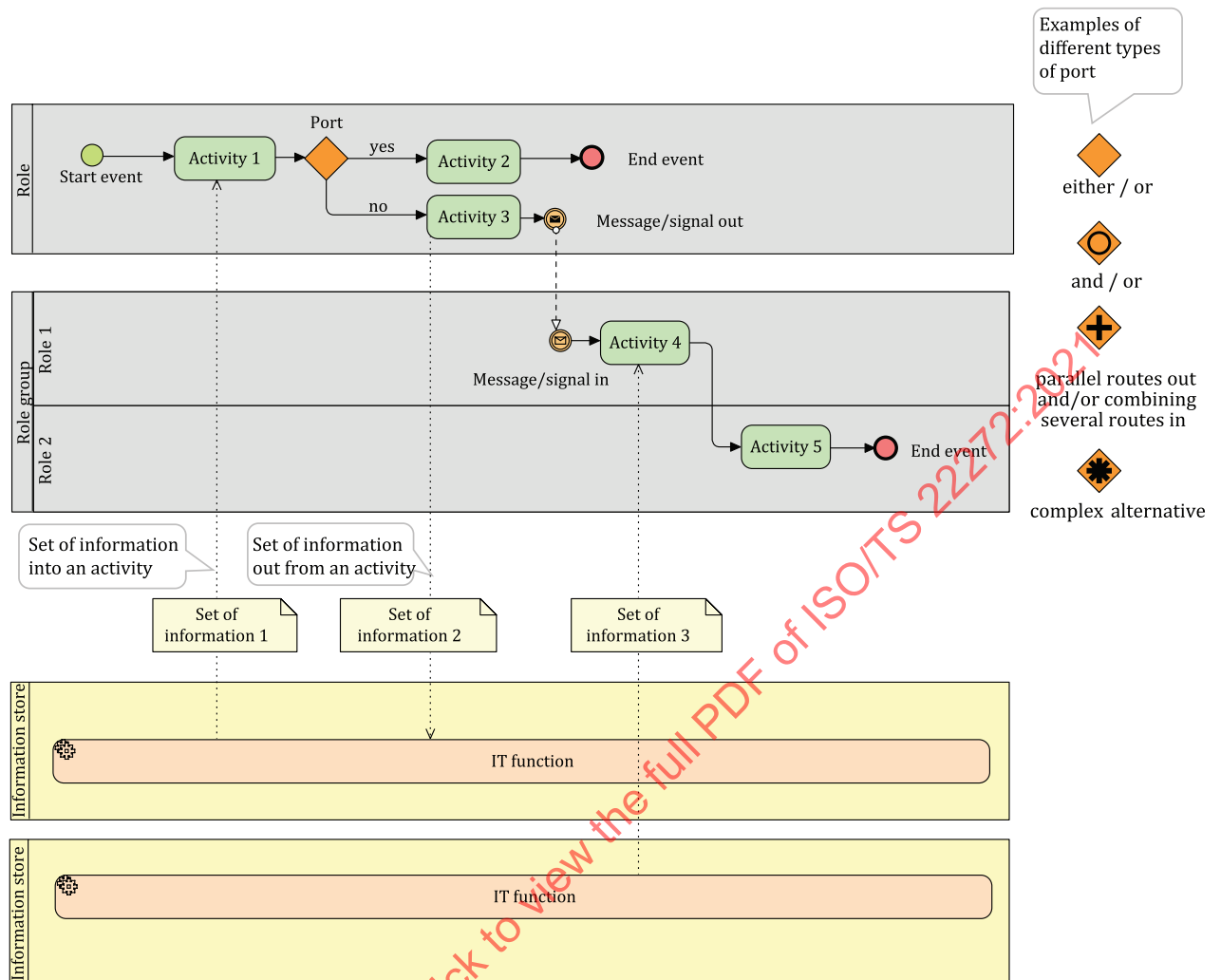


Figure A.4 — Process from a collaborative perspective with identified information needs

Figure A.5 shows an example of notation in an information model. UML is helpful for use as a notation for an information model [5].