SLOVENSKI STANDARD
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Upravljanje vrednosti - Analiza funkcij, osnovne značilnosti: Zahteve in navodila za izvajanje in doseganje rezultatov

Value management - Function analysis, basic characteristics: Requirements and guidance for implementation and achieving deliverables

Value Management - Funktionsanalyse, grundlegende Merkmale

Management par la Valeur - Analyse Fonctionnelle, caractéristiques fondamentales : Exigences et recommandations pour la mise en œuvre et la réalisation des livrables

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Value management - Function analysis, basic characteristics: Requirements and guidance for implementation and achieving deliverables

Management par la valeur - Analyse fonctionnelle, caractéristiques fondamentales

Value Management - Funktionsanalyse, grundlegende Merkmale

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (prEN 17952:2023) has been prepared by Technical Committee CEN/TC 279 "Value management, value analysis, function analysis", the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

It is part of the development of European standardisation documents to be used, within the context of the implementation of quality (EN ISO 9001), environment (EN ISO 14001), Value Management (EN 12973) and performance management, to reinforce the use of Function Analysis) methods. It is also a complement to the standard on the Functional Need Expression, the establishment and successful application of a Functional Performance Specification EN 16271:2012.

Function Analysis provides utilities with a method for defining their needs and evaluating of tenders, with respect to the defined needs.

Function Analysis is a specific method; it should not be confused with classic methods such as the Functional Analysis in applied mathematics.

All abbreviations and acronyms used in the text of this document will be explained on their first use.

0   Introduction

0.1 General

The purpose of this document is to provide effective support to any person or entity wishing to improve its effectiveness in its activities in the definition, development and/or the realization of any action or project.

Function Analysis involves and relies upon a way of thinking, based on a continuous process, with a dedicated team that encourages the search for the goal and the need to be fulfilled, before looking for ways to achieve it that applies at any level and in any process.

Function Analysis (FA) firstly, defines the objective in a concise and clearly expressed way, independent of any solution, and secondly, provides support and assistance in the process to effectively achieve the defined need. FA activities supports enhanced teamwork, assists in gaining a consensus agreement and collaboration in the collective pursuit of the chosen goal.

Function Analysis was linked to Value Analysis, Value Engineering and Value Management. Today Function Analysis has become a stand-alone method and is used by many disciplines such, for example, as concurrent or simultaneous engineering, systems engineering and risk management. The practice of Function Analysis shall meet specific requirements to ensure the validity of the expected results and ensure their use in the intended usage context. Function Analysis is a fundamental component in assisting in the optimum performance of organizations, allowing the pursuit of opportunities while identifying and significantly reducing threats throughout the life cycle and beyond.

This document separately establishes the process requirements applicable to deliverables expected from the Function Analysis. Firstly, Functional Need Analysis and secondly the Technical Function Analysis. The Technical Function Analysis (with the product related functions) has to endeavour to fulfil all the user related functions identified from the Functional Need Analysis.

0.2   Function Analysis at the heart of Management

For any management activity it is imperative to differentiate systematically the two distinct areas, in one area, the goal to be achieved (the objective), and in the other area, the way to achieve it (the means and resources, the process or the solution).

Function Analysis, with its two distinct areas, provides an effective and strong methodological support at any level and in any field, when dealing with challenges of whatever complexity. It could be used for example, in strategy planning, business and project management, product and market development, or in any process of problem solving. It provides you with the opportunity to improve the performance of your organization.

It is important to have in mind, for any project or action, that the quality of the result or answer will be at best as good as the question or the quality of the definition of the proposed action.

For example, Function Analysis is fundamental, in many ways a formal requirement of any Value Management approach, Value Analysis or Value Engineering action.

0.3   Contributions for the different users of the standard

The Function Analysis approach can assist the different users in clarifying, understanding and helping to define and resolve problems of any nature in an organization. Function Analysis assists in interrogating and challenging in two areas, firstly by clarifying the goal to be achieved and need to be met (Functional Need Analysis), and secondly, searching, researching and establishing the best solution to the identified need and goal (Technical Function Analysis).

The benefits from effectively applying Functional Need Analysis include:

— the identification or description, in a concise language, without any ambiguity, the need to be satisfied for a given study subject (the aim to be reached);

— the assurance of improved communication between everyone in the team involved in the project, within a common vision, free from unnecessary specialist jargon.

The benefits of the Technical Function Analysis include:

— a controlled traceability between identified needs and how those are satisfied by the proposal or solution;

— the supply of rational choices for a solution, supported by the identification and evaluation of the benefits and impacts induced and an assessment of the ability to meet the identified needs;

— a systematic method to facilitate the treatment of complexity, risks and uncertainties.

0.4   Key roles and responsibilities

A prerequisite for a Function Analysis (FA) lies in the clarity of the roles, areas of activity and the responsibilities of each actor, whether formalized or not.

In the case of a FA action, the following roles are fundamental:

— the "Decision-maker", who defines the purpose, objectives, resource allocation and ultimately will be responsible for decision-making, owner entity responsible for the definition of the need and for the specified objective, which procures the management of the project, the selection of the designer(s), pilots the action, and ensures, and finances the activity;

— the FA Action Leader, as a facilitator, responsible for the method, ensures the effective conduct of the action. FA project leader or facilitator person who has the knowledge, competence, and personality to organize, lead and coordinate a FA team in a professional and successful way, and as such has been put in charge of this responsibility by management;

— the FA team: chosen for their knowledge of the subject, the object of the action, which could be integrated in any team.

Apart from formal actions, Function Analysis can be used on a daily basis as an effective support for any reflection.

0.5   Function Analysis with its two application areas

Function Analysis assists in interrogating a challenge in two associated areas, firstly by clarifying the goal to be achieved and need to be met, and secondly, by searching, researching and establishing the best solution to the identified need and goal.

Function Analysis is used for the expression of a need or an objective (Functional Need Analysis, FNA area), as well as for the development and validation of the response to this need (Technical Function Analysis, TFA area). It applies to any product or subject of study: physical or intangible products, projects, services, software, complete systems, procedures and processes, tactics, strategies, objectives, goals, organizational structures, etc.

Function Analysis applies to all processes and tasks, involving contributors inside and outside the organization. It requires setting aside technical solutions to understand and interpret the objectives and finalities of the proposed action in order to promote creativity in the search and evaluation of the solutions.

Function Analysis enables:

— the identification of the functions of a product, a system or an organization;

— the quantification of the performances to be achieved;

— communication between all the people in a multidisciplinary team involved in the project with a common language;

— the identification of the principles of solutions and the benefits, impacts and risks which they generate;

— the establishment of an architecture and the operation of the solution;

— the evaluation of the capacity of a product to meet the expressed needs;

— a common understanding of the problem posed and potential solutions considered to solve it.

This is why Function Analysis, as a process, has its place upstream, alongside and downstream of any project. The Function Analysis result is the input datum in processing of any problem (the issue to resolve): be it evolution, creation, innovation, dysfunction, obsolescence, etc., for which one wishes to obtain the most effective response to satisfy the expressed need, while dispensing with a priori solutions.

Functional Need Analysis (FNA area) is intended to take into account all the needs and expectations of the different users, customers and selected stakeholders that are interested in the product throughout its life cycle and beyond.

Technical Function Analysis (TFA area) identifies the PRF and defines a function structure, provides a logical description of the technical functions and their relationships in order to examine alternatives and to propose a solution.

From an economic point of view, Function Analysis has proven to be very useful, if not essential, as it improves the profitability which can be achieved (with shorter development time, improved performance obtained, adequacy of solutions to expressed needs, etc.), even if an existing or potential solution may often be suffice.

Function Analysis, when timely and appropriately applied, assists in achieving the most appropriate proposition. The relationship between contributions arising from any "artefact" (art, phenomenon originating in human activity, whether in physical or intangible form) and the sum of expenses and impacts as a result of its provision, is a key focus of any Function Analysis action.

Function Analysis, with its method and tools, is referenced in Value Management (EN 12973:2020) and Functional Need Expression and the Functional Performance Specification (EN 16271:2012). Additionally, European Union (EU) directives such as the EU Public Procurement Directive 2014/24 and update notices, have also encouraged the market in the wider use of the Functional Performance Specification.

0.6 Conditions for success

The participants in any Function Analysis action need to be familiar with the general area of application. In order to be efficient, the team will be aware that the success lies in the clarity of the roles, areas of activity and the responsibilities of each actor whether formalized or not. An organization that implements the Function Analysis approach is liable to see the creative skills of their people improve which should enhance their organization's competitiveness. The Function Analysis process can be transformed and integrated into in any process in an organization.

The people involved are required to follow a structured path which allows scope for creativity in the pursuit of the appropriate solution. It is important to measure the effectiveness of the team over time with respect to the project or action type. Some people may need to be familiar with the area of activity

for which an action is required. The range of applications that can be assessed are infinite, with a particular choice of action based on priority and the availability of skilled staff that are familiar with the Function Analysis approach.

0.7 Function Thinking

We can talk about "Function Thinking" capability when some people are able, in a reflective way, to think first of all about the purpose of any action, before seeking a solution; and this in a formal or informal way.

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1   Scope

The field of application of Function Analysis has evolved from its first application to become, today, an effective support for any kind of project (or product), accompanying any process of definition and development of an action.

This document is applicable in principle to all sectors of activity and to all types of projects or products, tangible or intangible, for example, services, processes, organizations, strategies, tactics, goals and objectives. It is applicable in the context of relations between external partners (between a client and its suppliers) or internally (between two entities of the same organization for example).

The objective of any professional activity, private or public, is to be able to offer its internal or external customers, and users an efficient and competitive offer.

The "product" can be any kind of system or service, of any complexity, over all or part of its life cycle (and beyond). The "product" should meet an identified need, which constitutes the basis for a concerted development by internal and/or external partners.

The goal is to have the "best proposal" that meets the expectations of the various customers, users and other selected stakeholders involved.

This standard constitutes a reference document for any actor wishing to deploy or have to implement Function Analysis (Initiator may be at any level in the organization, anyone involved in any product definition or operating conditions during its complete life cycle).

It is also intended for anyone who wants to understand the issues and benefits of using this mode of work in order to advocate for it. This standard also sets out the rules and conditions for the implementation of the approach and associated methods and provides trainers with a solid framework for teaching them.

The Function Analysis approach can be implemented with benefits in all types of organizations, including enterprises. Function Analysis can also be used to conduct personal reflection for tasks of any size and nature.

To present the conditions for its implementation and development, the document:

— specifies the interests and areas of application of the Function Analysis;

— presents the variety of situations in which Function Analysis is used in different fields of application for its implementation, in support of projects of all types and sizes;

— outlines the methods, associated requirements, and tools for its implementation:

  — functional Needs Analysis (support for the process of defining the objectives and the goal to be achieved);

  — technical Functional Analysis (support for design or research processes and evaluation of solutions) and their combined operations;

— the process (FNA and TFA), creative in nature, can be, in accordance with the stated objectives, sometimes iterative to develop the "best" proposal;

— for the Functional Need Analysis (FNA), the standard sets out FNA requirements for the results (deliverables) expected from its implementation to establish the Functional Need Expression (FNE). These can serve as a basis for establishing an understanding of the overall needs of the market, the characterized representation of service functions, constraints and interfaces, an assessment of the changes made, whether or not the needs are under control, and to support the choice of solutions and the verification of the chosen solution. These deliverables can also serve as a basis for writing, characterizing functional interfaces, conducting preliminary risk and reliability studies, conducting

economic studies such as costs/impacts of functions, etc., and, if applicable, write a Functional Performance Specification (FPS);

— for Technical Function Analysis (TFA), the standard sets out the requirements for the expected results (deliverables) of the Technical Function Analysis approach. These will be used to establish, for example, function diagrams, function tree charts, tree charts of technological pathways, for assigning delivery elements to functions, costs per function, and other relevant allocations for decisions to be instructed to establish the most effective solution.

In addition, the process is based on methods that should be adapted according to the size and maturity of the product studied, the challenges related to its development and operation, and the available resources. Function Analysis will be all the more effective as it will intervene early ("anticipating" in the projects).

Additionally, European Union (EU) directives such as the EU Public Procurement Directive 2014/24 and update notices, have also encouraged the market in the wider use of the Functional Performance Specification.

NOTE 1   Function Analysis actions and reflections according to its principles constitute an essential basis and support for any Value Analysis, Value Engineering or Value Management action (standard EN 12973:2020).

NOTE 2   A specific use of the concepts and requirements defined in this document with the objective of establishing a Functional Need Expression and a Functional Performance Specification resulted in the development of a particular standard EN 16271:2012.

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.

EN 16271:2012, *Value management — Functional expression of the need and functional performance specification — Requirements for expressing and validating the need to be satisfied within the process of purchasing or obtaining a product*

EN 1325:2014, *Value Management — Vocabulary — Terms and definitions*

3   Terms and definitions

For the purposes of this document, terms and definitions given in EN 1325:2014 and the following apply.

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

— ISO Online browsing platform: available at https://www.iso.org/obp/

— IEC Electropedia: available at https://www.electropedia.org/

3.1
constraint
characteristic result or design feature which is made compulsory or has been prohibited for any reason, with no alternative possibility being left

Note 1 to entry: Constraints (in theory of technical nature) can generate limitations in the choice of the solutions for a project.

Note 2 to entry: Constraints can result from laws, standards and regulations in force. The links should be followed (traceability).

Note 3 to entry: To facilitate reading of the results of the Function Analysis, the constraints should be grouped in a particular section of the Functional Need Expression (FNE).

[SOURCE: EN 1325:2014, 2.1.6]

3.2
customer
person or organization who has the potential to be a **user** of a **product** at any time during its life cycle

[SOURCE: EN 1325:2014, 2.1.3]

3.3
decision-maker
entity or member of an organization who gives scope to the Function Analysis project and is the ultimate decision-maker of the chosen proposals of the FA team which will be implemented

3.4
enquirer
person or organization in search of a product and which is responsible for issuing the Functional Performance Specification, with a view to its purchase or acquisition and use by itself or by others

[SOURCE: EN 1325:2014, 2.2.4.2]

3.5
function
effect of a product or of one of its constituents

Note 1 to entry: Functions should be expressed in an abstract form, free of solutions.

[SOURCE: EN 1325:2014, 2.3.1.1]

3.6
function analysis (FA)
process that describes completely the functions and their relationships, which are systematically characterized, classified and evaluated

Note 1 to entry: The function structure is a part of the result of Function Analysis.

Note 2 to entry: Function Analysis covers two areas: The Functional Need Analysis (or External Function analysis) and the Technical Function Analysis (or Internal Function analysis).

[SOURCE: EN 1325:2014, 2.3.1]

3.7
function analysis project leader
person who has the knowledge, competence, and personality to organise, lead and coordinate a FA/VA/VE/VM team in a professional and successful way, and as such has been put in charge of this responsibility by management

3.8
function analysis team
multidisciplinary group of people, selected for their competence, expertise and/or responsibility in various aspects of the Function Analysis subject

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3.9
function structure
arrangement of functions resulting from Function Analysis, which can be presented in the forms of a tree, or of a diagram, giving a complete, visual, written presentation

Note 1 to entry: When product related functions are considered, the function structure shows the way in which the functions interact.

[SOURCE: EN 1325:2014, 2.3.1.5]

3.10
functional need analysis (or External); (FNA)
part of Function Analysis which describes the need that the product shall satisfy in the form of user-related functions and constraints

Note 1 to entry: The term "External Function Analysis" used in certain professional circles can be considered synonymous.

Note 2 to entry: Adapted from EN 16271:2012.

[SOURCE: EN 1325:2014, 2.3.1.2]

3.11
need
what is necessary for or desired by the Customer, User and or Stakeholder

[SOURCE: EN 1325:2014, 2.1.8]

3.12
product function architecture
deliverable result of the Technical Function Analysis (TFA) activity established by the product designer. It lists all the architecture descriptive elements of the solutions proposed and the solution adopted

Note 1 to entry: Product Function Architecture is concerned with system decomposition and is described by the Product Related Functions, their relationship, the selection of components.

Note 2 to entry: Product Function Architecture is a potential output as a result of the Technical Function Analysis, depending on a type of the study.

3.13
product related function (PRF)
effect of a constituent of a product or the effect between the constituents of the product for the purpose of performing user related functions

Note 1 to entry: This document, in accordance with established practice, recommends using the term "product related function"; the term "Internal Function" used in certain professional circles can be considered synonymous.

Note 2 to entry: When choosing an overall solution, the designer or organizer determines the product related functions.

Note 3 to entry: The product related functions of a complete product or system can be user related functions of a constituent element of the product.

Note 4 to entry: The product related functions can depend on the technology available or taken into account.

[SOURCE: EN 1325:2014, 2.3.1.4.2]

3.14
stakeholder
person or organization which has an interest in and influence on a **product** at any time during its life cycle

[SOURCE: EN 1325:2014, 2.1.2]

3.15
technical function analysis (or Internal); (TFA)
part of Function Analysis which contributes to studying and formalizing the product function architecture by identifying the product-related functions of the sub-assemblies or components

Note 1 to entry: The term "Internal Function Analysis" used in certain professional circles can be considered synonymous.

Note 2 to entry: The term "Performance Function Analysis" used in certain professional circles can be considered synonymous.

[SOURCE: EN 1325:2014, 2.3.1.3]

3.16
user
person or organization for which the **product** is designed and which exploits at least one of its **functions** at any time during its life cycle

Note 1 to entry: A user can be an external or internal customer.

[SOURCE: EN 1325:2014, 2.1.4]

3.17
user related function (URF)
effect expected of a product, or performed by it, in order to meet a part of the need of an user

Note 1 to entry: Users and the market are only interested in user related functions.

Note 2 to entry: Customer needs and specifications may be expressed as a set of user related functions.

Note 3 to entry: User related functions are either use or esteem functions.

Note 4 to entry: The term "External Function" used in certain professional circles can be considered synonymous.

[SOURCE: EN 1325:2014, 2.3.1.4.1]

4   Function Analysis overview

4.1 Context for Function Analysis

This clause describes the various aspects of Function Analysis.

Whenever management is faced with making a decision, the starting point is not the way in which the problem will be solved, but rather what goal is to be achieved. The need and objectives to be met should be defined in terms of the clearly identified functions which are expected. The subject may relate to any work, at any stage of it, from its beginning to its end, whether it be on a vision, a mission, a strategy, a process, or a product, including for example the design, development, marketing, delivery and support.