PD ISO/IEC TR 29110-5-2-1:2016

BSI Standards Publication

Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs)

Part 5-2-1: Organizational management guidelines

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National foreword

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ISO/IEC TR 29110-5-2-1

First edition
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Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs) —

Part 5-2-1: Organizational management guidelines

Ingénierie des systèmes et du logiciel — Profils de cycle de vie pour très petits organismes (TPO) —

Partie 5-2-1: Guide à la gestion organisationnelle

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Contents

Page

Foreword ..... **v**

Introduction ..... **vi**

1 Scope **1**
1.1 Fields of application 1
1.2 Target audience 1

2 Normative references **1**

3 Terms and definitions **1**

4 Conventions and abbreviated terms **1**
4.1 Naming, diagramming and definition conventions 1
4.2 Abbreviated terms 3

5 Overview **3**

6 Organizational Management (OM) process **5**
6.1 OM purpose 5
6.2 OM objectives 5
6.3 OM input products 5
6.4 OM output products 5
6.5 OM internal products 6
6.6 OM roles involved 6
6.7 OM process description 6
6.7.1 OM diagram 6
6.7.2 OM activities 7
6.8 OM incorporation to the Organizational Repository 10

7 Resource Management (RM) process **10**
7.1 RM purpose 10
7.2 RM objectives 11
7.3 RM input products 11
7.4 RM output products 11
7.5 RM internal products 11
7.6 RM roles involved 12
7.7 RM diagram 12
7.8 RM activities 12
7.8.1 RM.1 Resource planning and preparation (RM.01) 13
7.8.2 RM.2 Obtain and provide resources (RM.02) 14
7.8.3 RM.3 Periodic evaluations, monitoring and control of resources (RM.03) 15
7.9 RM incorporation to the Organizational Repository 16

8 Process Management (PSM) process **17**
8.1 PSM purpose 17
8.2 PSM objectives 17
8.3 PSM input products 17
8.4 PSM output products 17
8.5 PSM internal products 18
8.6 PSM roles involved 18
8.7 PSM diagram 18
8.8 PSM activities 19
8.8.1 PSM.1 Process management planning and monitoring (PSM.01, PSM.05) 19
8.8.2 PSM.2 Process definition, deployment and improvement (PSM.01, PSM.02, PSM.04, PSM.05) 21
8.8.3 PSM.3 Process evaluation (PSM.01, PSM.03, PSM.05) 22
8.8.4 PSM.4 Results gathering, analysis and reporting (PSM.03, PSM.04, PSM.05) 23
8.9 PSM incorporation to the Organizational Repository 24

9 Project Portfolio Management (PPM) process **24**

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9.1 PPM purpose ... 24
9.2 PPM objectives ... 25
9.3 PPM input products ... 25
9.4 PPM output products ... 25
9.5 PPM internal products ... 25
9.6 PPM roles involved ... 26
9.7 PPM diagram ... 26
9.8 PPM activities ... 27
9.8.1 PPM.1 Preparation and scheduling (PPM.01) ... 27
9.8.2 PPM.2 Generate and activate projects (PPM.01, PPM.02) ... 28
9.8.3 PPM.3 Evaluation and control of projects and customer accounts (PPM.01, PPM.03) ... 28
9.8.4 PPM.4 Project organization's closure (PPM.01, PPM.03) ... 29
9.9 PPM incorporation to the Organizational Repository ... 30

10 Roles ... 30

11 Product description ... 31

12 Software tools requirements ... 40
12.1 Resource Management process ... 40
12.2 Process Management process ... 41
12.3 Project Portfolio Management process ... 41
12.4 Organizational Management process ... 41

Annex A (informative) **Interactions between the Basic Profile and the Organizational Profile ... 42**

Annex B (informative) **Mapping between the objectives of this part of ISO/IEC 29110 and base standards ... 49**

Bibliography ... 55

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

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 document 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 and IEC 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 on 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 the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, Subcommittee SC 7, *Software and systems engineering*.

The full list of parts of ISO/IEC 29110 is available here.

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Introduction

Very Small Entities (VSEs) around the world are creating valuable products and services. For the purpose of ISO/IEC 29110, a Very Small Entity (VSE) is an enterprise, an organization, a department or a project having up to 25 people. Since many VSEs develop and/or maintain system and software components used in systems, either as independent products or incorporated in larger systems, a recognition of VSEs as suppliers of high quality products is required.

According to the Organization for Economic Co-operation and Development (OECD) SME and Entrepreneurship Outlook report (2005), "Small and Medium Enterprises (SMEs) constitute the dominant form of business organization in all countries worldwide, accounting for over 95 % and up to 99 % of the business population depending on country". The challenge facing governments and economies is to provide a business environment that supports the competitiveness of this large heterogeneous business population and that promotes a vibrant entrepreneurial culture.

From studies and surveys conducted, it is clear that the majority of International Standards do not address the needs of VSEs. Implementation of and conformance with these International Standards is difficult, if not impossible. Consequently, VSEs have no, or very limited, ways to be recognized as entities that produce quality systems/system elements including software in their domain. Therefore, VSEs are excluded from some economic activities.

It has been found that VSEs find it difficult to relate International Standards to their business needs and to justify the effort required to apply International Standards to their business practices. Most VSEs can neither afford the resources, in terms of number of employees, expertise, budget and time, nor do they see a net benefit in establishing over-complex systems or software lifecycle processes. To address some of these difficulties, a set of guides has been developed based on a set of VSE characteristics. The guides are based on subsets of appropriate standards processes, activities, tasks and outcomes, referred to as "profiles". The purpose of a profile is to define a subset of International Standards relevant to the VSEs' context; for example, processes, activities, tasks and outcomes of ISO/IEC/IEEE 12207 for software; and processes, activities, tasks and outcomes of ISO/IEC/IEEE 15288 for systems; and information products (documentation) of ISO/IEC/IEEE 15289 for software and systems.

VSEs can achieve recognition through implementing a profile and by being audited against ISO/IEC 29110 specifications.

The ISO/IEC 29110 series can be applied at any phase of system or software development within a life cycle. The ISO/IEC 29110 series is intended to be used by VSEs that do not have experience or expertise in adapting/tailoring ISO/IEC/IEEE 12207 or ISO/IEC/IEEE 15288 to the needs of a specific project. VSEs that have expertise in adapting/tailoring ISO/IEC/IEEE 12207 or ISO/IEC/IEEE 15288 are encouraged to use those International Standards instead of ISO/IEC 29110.

ISO/IEC 29110 is intended to be used with any lifecycle such as waterfall, iterative, incremental, evolutionary or agile. In the context of ISO/IEC 29110, systems are composed of hardware and software components.

The ISO/IEC 29110 series, targeted by audience, has been developed to improve system or software and/or service quality and process performance (see Table 1).

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Table 1 — ISO/IEC 29110 target audience

ISO/IEC 29110	Title	Target audience
Part 1	Overview	VSEs and their customers, assessors, standards producers, tool vendors and methodology vendors
Part 2	Framework for profile preparation	Profile producers, tool vendors and methodology vendors Not intended for VSEs
Part 3	Certification and assessment guidance	VSEs and their customers, assessors, accreditation bodies
Part 4	Profile specifications	VSEs, customers, standards producers, tool vendors and methodology vendors
Part 5	Management, engineering and service delivery guides	VSEs and their customers
Part 6	Management and engineering guides not tied to a specific profile	VSEs and their customers

If a new profile is needed, ISO/IEC 29110-4 and ISO/IEC TR 29110-5 can be developed with minimal impact to existing documents.

ISO/IEC 29110-1 defines the terms common to the ISO/IEC 29110 series. It introduces processes, lifecycle and standardization concepts, the taxonomy (catalogue) of ISO/IEC 29110 profiles and the ISO/IEC 29110 series. It also introduces the characteristics and needs of a VSE and clarifies the rationale for specific profiles, documents, standards and guides.

ISO/IEC 29110-2-1 introduces the concepts for systems and software engineering profiles for VSEs. It establishes the logic behind the definition and application of profiles. For standardized profiles, it specifies the elements common to all profiles (structure, requirements, conformance, assessment). For domain-specific profiles (profiles that are not standardized and developed outside of the ISO process), it provides general guidance adapted from the definition of standardized profiles.

ISO/IEC 29110-3 defines certification schemes, assessment guidelines and compliance requirements for process capability assessment (ISO/IEC 33020), conformity assessments (ISO/IEC 17021-1) and self-assessments for process improvements. ISO/IEC 29110-3 also contains information that can be useful to developers of certification and assessment methods and developers of certification and assessment tools. ISO/IEC 29110-3 is addressed to people who have direct involvement with the assessment process, e.g. the auditor, certification and accreditation bodies and the sponsor of the audit, who need guidance on ensuring that the requirements for performing an audit have been met.

ISO/IEC 29110-4-m provides the specification for all profiles in one profile group that are based on subsets of appropriate standards elements.

ISO/IEC TR 29110-5-m-n provides management, engineering and service delivery guides for the profiles in a profile group.

The future ISO/IEC TR 29110-6-x provides management and engineering guides not tied to a specific profile.

This part of ISO/IEC 29110 provides organizational management processes to VSEs which have already implemented the processes of the system engineering and/or the software engineering Basic profile.

Figure 1 describes the ISO/IEC 29110 International Standards (IS) and Technical Reports (TR) and positions the parts within the framework of reference. Overview, assessment guide, management and engineering guide are available from ISO as freely available Technical Reports (TR). The Framework document, profile specifications and certification schemes are published as International Standards (IS).

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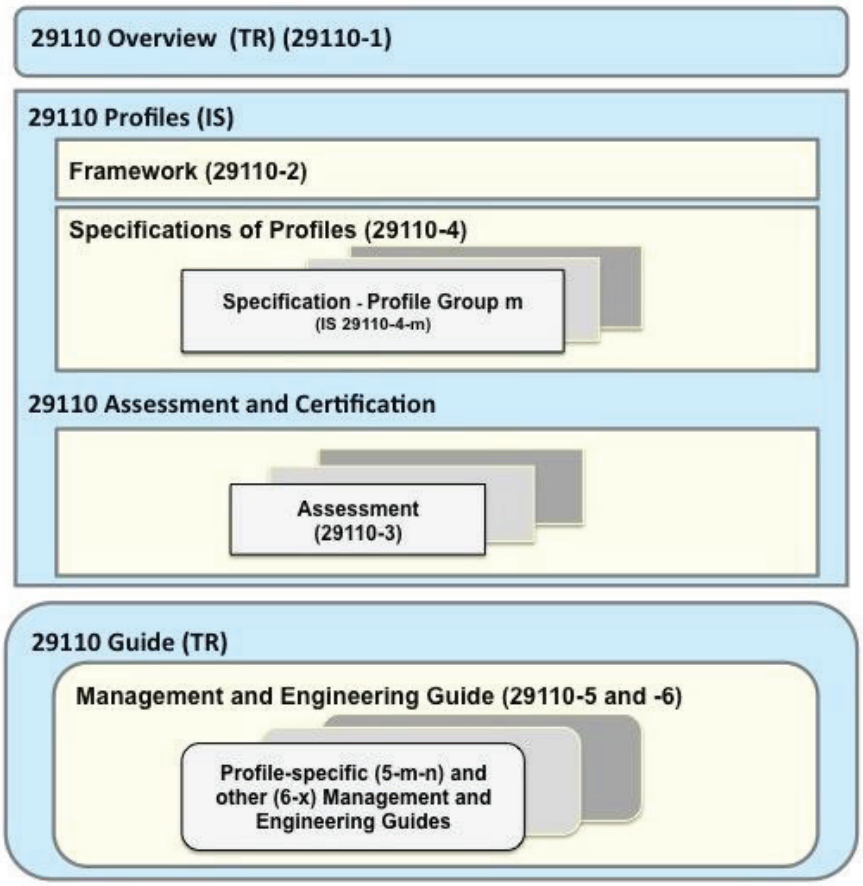

Figure 1 — ISO/IEC 29110 series

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Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs) —

Part 5-2-1: Organizational management guidelines

1 Scope

1.1 Fields of application

This part of ISO/IEC 29110 is applicable to Very Small Entities (VSEs). VSEs are enterprises, organizations, departments or projects having up to 25 people. The lifecycle processes described in the ISO/IEC 29110 series are not intended to preclude or discourage their use by organizations bigger than VSEs.

This part of ISO/IEC 29110 is the Organizational management guidance for profiles described in ISO/IEC 29110-4-1 through Organizational Management, Project Portfolio Management, Resource Management and Process Management Processes. It is not intended for a VSE to use the standardized profile to implement this part of ISO/IEC 29110.

Using this part of ISO/IEC 29110, a VSE can obtain benefits in the following aspects:

— multiple project execution and supervision of its performance, making sure all processes are executed according to the organizational strategy;

— continuous monitoring of the customer satisfaction;

— deployment and improvement of the organizational standard processes in all projects;

— controlled provision of required resources.

1.2 Target audience

This part of ISO/IEC 29110 is targeted at VSEs which already use at least ISO/IEC TR 29110-5-6-2 and/or ISO/IEC TR 29110-5-1-2 for their software projects.

This part of ISO/IEC 29110 is intended to be used with any processes, techniques and methods that enhance the VSEs' customer satisfaction, quality and productivity.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 29110-2-1 apply.

4 Conventions and abbreviated terms

4.1 Naming, diagramming and definition conventions

The following process structure description and notation are used to describe the processes.

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Name — process identifier, followed by its abbreviation in parentheses "()".

Purpose — general goals and results expected of the effective implementation of the process. The implementation of the process should provide tangible benefits to the stakeholders. The purpose is identified by the abbreviation of the process name.

Objectives — specific goals to ensure the accomplishment of the process purpose. The objectives are identified by the abbreviation of the process name, followed by a consecutive number, for example RM.01, PSM.02, etc. Each objective is followed by the square box which includes a list of the chosen processes for the Basic profile from ISO/IEC/IEEE 15288 or ISO/IEC/IEEE 12207 and its outcomes related to the objective.

Input Products — products required to perform the process and its corresponding source, which can be another process or an external entity to the process, such as the Customer. Input products identified by the abbreviation of the process name and showed as two-column table of product names and sources.

Output Products — products generated by the process and its corresponding destination, which can be another process or an external entity to the project, such as Customer or Organizational Management. Output products identified by the abbreviation of the process name and showed as two-column table of product names and destinations.

Internal Products — products generated and consumed by the process. Internal products identified by the abbreviation of the process name and showed as one-column table of the product names.

All products' names are printed in cursive and initiate with capital letters. Some products have one or more statuses attached to the product name surrounded by square brackets "[ ]" and separated by ",". The product status may change during the process execution. See Clause 9 for the alphabetical list of the products, its descriptions, possible statuses and the source of the product. The source can be another process or an external entity to the project, such as the Customer.

Roles involved — names and abbreviation of the functions to be performed by project team members. Several roles may be played by a single person and one role may be assumed by several persons. Roles are assigned to project participants based on the characteristics of the project. The role list is identified by the abbreviation of the process name and showed as two-column table. See Clause 11 for the alphabetical list of the roles, its abbreviations and required competencies description.

Diagram — graphical representation of the processes. The large round-edged rectangles indicate process or activities and the smaller square-edged rectangles indicate the products. The directional or bidirectional thick arrows indicate the major flow of information between processes or activities. The thin directional or bidirectional arrows indicate the input or output products. The notation used in the diagrams does not imply the use of any specific process lifecycle.

Activity — a set of cohesive tasks. Task is a requirement, recommendation, or permissible action, intended to contribute to the achievement of one or more objectives of a process. A process activity is the first level of process workflow decomposition and the second one is a task. Activities are identified by process name abbreviation followed by consecutive number and the activity name.

Activity Description — each activity description is identified by the activity name and the list of related objectives surrounded by parentheses "()". For example, PSM.1 Process Management Planning and Monitoring (PSM.01, PSM.05) means that the activity PSM.1 contributes to the achievement of the listed objectives: PSM.01 and PSM.05. The activity description begins with the task summary and is followed by the task descriptions table. The task description does not impose any technique or method to perform it. The selection of the techniques or methods is left to the VSE or project team.

Tasks description table contain four columns corresponding to the following.

— Role — the abbreviation of roles involved in the task execution.

— Task List — description of the tasks to be performed. Each task is identified by activity ID and consecutive number, for example PSM.1.1, PSM.1.2, and so on.

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— Input Products — products needed to execute the task.

— Output Products — products created or modified by the execution of the task.

Incorporation to the *Organizational Repository* — list of products to be saved in *Organizational Repository*; the *Organizational Repository Strategy* has to be applied to some of them.

NOTE Tables used in process description are for presentation purpose only.

4.2 Abbreviated terms

The following abbreviations are used in this document:

AS Assessor

CUS Customer

OM Organizational Management

PG Planning group

PSMG Process Manager

PPMG Project Portfolio Manager

PSM Process Management

PPM Project Portfolio Management

PJM Project Manager

PO Process Owner

RM Resource Management

RRM Resource Manager

VSE Very Small Entity

5 Overview

The Organizational Management Profile Guide applies to a Very Small Entity (VSE) (enterprise, organization, department or project having up to 25 people) which already follows at least ISO/IEC TR 29110-5-1-2 for their software projects or ISO/IEC TR 29110-5-6-2 for their systems engineering projects or any other profiles in the ISO/IEC 29110 series.

This part of ISO/IEC 29110 provides Organizational Management, Resource Management, Process Management, and Project Portfolio Management processes which integrate practices based on the selection of ISO/IEC/IEEE 15288, ISO/IEC/IEEE 12207 and ISO/IEC/IEEE 15289.

Using this part of ISO/IEC 29110, VSE can obtain benefits in the following aspects:

— multiple project execution and supervision of its performance, making sure all activities are executed according to the organizational strategy;

— continuous monitoring of the customer satisfaction;

— deployment and improvement of the organizational standard processes in all projects;

— controlled provision of required resources.

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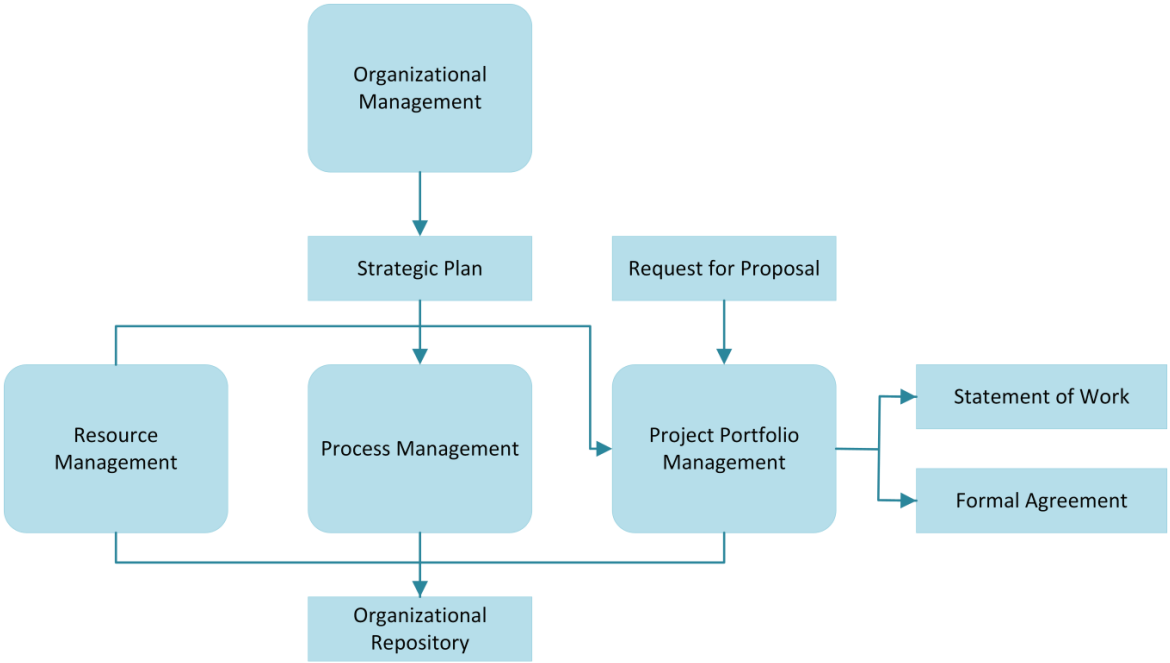
To use this part of ISO/IEC 29110, a VSE needs to fulfil the following entry conditions:

— VSE already uses the ISO/IEC TR 29110-5-6-2 or ISO/IEC TR 29110-5-1-2 or any other Basic Profile in the ISO/IEC 29110 series;

— VSE identifies the external or internal *Best Practices* sources (standards, models, methods and techniques) and uses them as a basis for the process definition and improvement.

The purpose of the Organizational Management Process is to make sure that value is delivered by the VSE to the customer through planning, organizing, monitoring and controlling organizational activities. The purpose of the Resource Management process is to obtain and provide the organization with the necessary resources. The purpose of the Process Management process is to establish and improve the organizational processes. The purpose of the Project Portfolio Management process is to generate projects for the organization, provide technical content to establish the projects Formal Agreement, and supervise its performance while monitoring the customer satisfaction.

The four processes are interrelated (see Figure 2).



NOTE Diagram notation is explained in 4.1.

Figure 2 — Organizational Management guide processes

The Organizational Management process will generate the *Strategic Plan* that will guide the activities of the VSE.

The Resource Management process, the Process Management process and the Project Portfolio Management process receive the *Strategic Plan* as an input that will guide the activities of the VSE.

The Resource Management process receives the *Resource Request* from all the processes and projects, analyses them and assigns resources to the processes and projects according to the *Resource Policies* and/or *Mechanisms.*

The Process Management process receives the *Process Improvement Suggestions* from all the processes, analyses them and applies suggestions to the processes in order to improve them. The Process Evaluation activity evaluates the processes implementation, finding strengths and weakness, and coordinates the resolution of the weakness.

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The Project Portfolio Management process receives the *Request for Proposal* from the Customers, activates the accepted projects and supervises the correct execution of these projects.

6 Organizational Management (OM) process

6.1 OM purpose

The purpose of the Organizational Management process is to make sure that value is delivered by the VSE to the customer through planning, organizing, monitoring and controlling organizational activities.

6.2 OM objectives

OM.01. Establish or refine an appropriate value proposition and its corresponding business model.

OM.02. Develop or revise objectives for the organization, based on the business model, and establish the strategies and resources necessary to support those objectives.

OM.03. Measure the achievement of the objectives, identify deviations and control actions.

6.3 OM input products

Table 2 — OM input products

Name	Source
Resource Report	Resource Management
Process Progress Report	Process Management
Project Portfolio Report	Project Portfolio Management
Market Information	External
Technology Trends	External
Competitors Information	External
Financial Information	Financial/Controlling area within the VSE

6.4 OM output products

Table 3 — OM output products

Name	Destination
Strategic Plan — *Budget*	Resource Management
Strategic Plan — *Required processes*	Process Management
Strategic Plan — *Projects and customer strategy*	Project Portfolio Management
Strategic Plan — *Mission, vision, values, objectives* — *Required functional areas* — *Objectives relationship table* — *Customer strategy*	Resource Management Process Management Project Portfolio Management

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6.5 OM internal products

Table 4 — OM internal products

Name
Planning Agenda
Budget Restrictions
Environmental Information Report — *Market Information* — *Technology trends* — *Competitors information*
VSE risk management plan
Business Model
Correction Register

6.6 OM roles involved

Table 5 — OM roles involved

Role	Abbreviation
Organizational Manager	OM
Planning Group	PG

6.7 OM process description

6.7.1 OM diagram

Figure 3 shows the flow of information between the Organizational Management process activities including the most relevant work products and their relationships.

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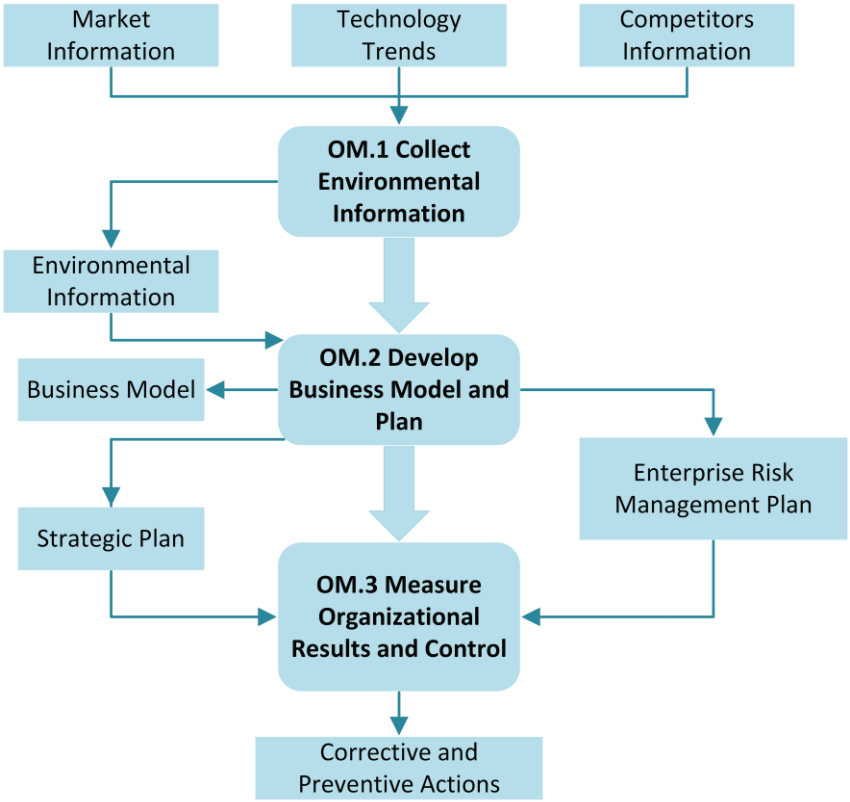

Figure 3 — Organizational Management process diagram

6.7.2 OM activities

The Organizational Management process has the following activities:

— OM.1 Collect Environmental Information;

— OM.2 Develop the Business Model and Plan Objectives and Strategies;

— OM.3 Measure Organizational Results and Control.

6.7.2.1 OM.1 Collect environmental information (OM.01)

The Collect Environmental Information activity is established to make sure the VSE has the necessary environmental information to plan with a solid basis. The activity provides a report with market information, technology trends and competitors information.

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Table 6 — OM.1 task list

Role	Task List	Input Products	Output Products
OM	OM.1.1 Collect information about market changes. • Review changes of consumer needs and habits	*Market Information [external]*	*Environmental information report* — *Market information* *[identified]*
OM	OM.1.2 Collect information about technology trends. • Review latest trends in information technology solutions and other related technologies	*Technology Trends* *[external]*	*Environmental information report* — *Technology trends* *[identified]*
	OM.1.3 Collect information about competitors. • Review important actions, market strategies and product improvements	*Competitors Information* *[external]*	*Environmental information report* — *Competitors information* *[identified]*

6.7.2.2 OM.2 Develop business model and plan (OM.02)

This activity is where the *Business model* and the *Strategic plan* are generated based on environmental information and budget restrictions. A risk analysis is realized in order to prevent possible risks and registered in the *VSE risk management plan.*

Table 7 — OM.2 task list

Role	Task List	Input Products	Output Products
OM	OM.2.1 Identify participants to the planning group. • The first time the group is formed with the main actors of the VSE • In subsequent times, the group is formed with each process responsible, including operational processes	*Process Definition* — *Process Owner*	*Strategic Plan* — *Planning group* *[created or updated]*
OM PG	OM.2.2 Schedule planning sessions. • Schedule planning sessions • Identify resources and or services needed • Acquire resources and services needed for the sessions	*Strategic Plan* — *Planning Group* *[created or updated]*	*Planning agenda* — *Date* — *Location* — *Participants* — *Resources and/or services* *[created or updated]*
OM	OM.2.3 Establish budget restrictions.	*Financial Information*	*Budget restrictions*

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Table 7 *(continued)*

Role	Task List	Input Products	Output Products
OM PG	OM.2.4 Develop or revise the business model. • Identify target customer segments based on market information and technology trends • Establish a value proposition identifying problems, needs and desires of customers • Identify the customer relationship type(s) and channel(s) to be established, including sales channel(s) • Identify key partners and suppliers needed to provide value to customers and the type of relationship to be established with them • Identify key processes, projects, activities and resources needed to provide value to customers, including those needed to establish and maintain customer and partners relationship • Identify key functional areas and organizational structure	*Planning Agenda* *[generated]* *Environmental information Report*	*Business model* — *Target customer* — *Value proposition* — *Customer channels* — *Partners and suppliers* — *Key processes* — *Key projects* — *Key resources* — *Key functional areas* — *Organizational structure* *[generated or updated]*
OM PG	OM.2.5 Develop or revise objectives for the VSE. • Develop or revise the VSE's *Mission*, *Vision* and *Values* • Establish middle and short-term objectives for the VSE, with indicators and goals for each indicator, including sales and quality objectives, based on the business model.	*Business Model* *Budget Restrictions*	*Strategic Plan* — *Mission* — *Vision* — *Values* — *Objectives* *[generated or updated]*
OM PG	OM.2.6 Establish the *Strategic Plan* for the VSE. • Establish processes, internal projects and functional areas needed for the achievement of the objectives of the VSE • Establish purpose, objectives, indicators and goals for each process, project and functional area, aligned with the objectives of the VSE • Establish resources needed for each process, project and functional area • Establish customer strategy • Establish budget	*Business Model* *Budget Restrictions* *Strategic Plan* — *Vision* — *Objectives*	*Strategic Plan* — *Required processes* — *Required internal projects* — *Required functional areas* — *Objectives relationship table* — *Customer strategy* — *Budget* *[generated or updated]*
OM PG	OM.2.7 Analyse business risks. • Identify risks that could interfere in the achievement of the objectives of the VSE • Assign probability and impact for each risk • Establish mitigation actions and contingency plans for each risk • Assign responsibility for each risk	*Business Model* *Strategic Plan*	*VSE risk management plan* *[generated or updated]*

6.7.2.3 OM.3 Measure organizational results and control (OM.03)

The Measure Organizational Results and Control activity contains tasks to review reports from Resource Management, Process Management and Project Portfolio Management processes, and to

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establish *Corrective actions.* If is necessary, adjust the *Strategic Plan* base on the VSE improvements proposals.

Table 8 — OM.3 task list

Role	Task List	Input Products	Output Products
OM RRM	OM.3.1 Review the *Resource Report*. • Periodically evaluate the achievement of objectives related to resources. If needed, establish actions to correct deviations or problems. Generate or update *Correction Register* and track them to closure • If necessary, adjust the *Strategic Plan* based on the *Resource Report* results	*Resource Report* *Strategic Plan*	*Correction Register [generated or updated]* *Strategic Plan [updated]*
OM PSMG	OM.3.2 Review the *Process Progress Report*. • Evaluate periodically the achievement of objectives of the VSE related to processes. If needed, establish actions to correct deviations or problems. *Generate or update Correction Register* and track them to closure • If necessary, adjust the *Strategic Plan* of the VSE based on the *Process Progress Report* results	*Process Progress Report* *Strategic Plan*	*Correction Register [generated or updated]* *Strategic Plan [adjusted]*
OM PPMG	OM.3.2 Review the *Project Portfolio Report*. • Evaluate periodically the achievement of objectives related to projects. If needed, establish actions to correct deviations or problems. *Generate or update Correction Register* and track them to closure • If necessary, adjust the *Strategic Plan* accordingly to the *Project Portfolio Report* results	*Project Portfolio Report* *Strategic Plan*	*Correction Register [generated or updated]* *Strategic Plan [adjusted]*

6.8 OM incorporation to the Organizational Repository

The list of products to be saved in *Organizational Repository* is shown in Table 9. After the incorporation, *Organizational Repository Strategy* has to be applied.

Table 9 — OM repository products

Product
Business Model
Strategic Plan
Correction Register
Planning Agenda
Environmental Information Report

7 Resource Management (RM) process

7.1 RM purpose

The purpose of Resource Management process is to obtain and provide the VSE with the necessary resources.

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7.2 RM objectives

RM.01. Define human resources and infrastructure policies and/or mechanisms to support the organization and projects.

RM.02. Respond to organization and project requests for resources according to defined policies and/or mechanisms.

RM.03. Monitor resource acquisition activities, human resources, training and infrastructure maintenance. Corrections to remediate problems are taken when requirements are not satisfied.

7.3 RM input products

Table 10 — RM input products

Name	Source
Strategic Plan *Budget*	Organizational Management
Resource Request	Process Management Project Portfolio Management Project Management

7.4 RM output products

Table 11 — RM output products

Name	Destination
Organizational Repository Strategy	Project Management Process Management
Resource Request	Process Management Project Portfolio Management Project Management
Resource Report	Organizational Management
Process Improvement Suggestions	Process Management

7.5 RM internal products

Table 12 — RM internal products

Name
Resource Policies and/or Mechanisms
Procurement Requirements
Human Resource Record
Goods or Services Record
Supplier List
Resource Request

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