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Foreword

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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 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/TC 279, *Innovation management*.

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.

0 Introduction

0.1 General

An organization's ability to innovate is recognized as a key factor for sustained growth, economic viability, increased well-being, and the development of society.

The innovation capabilities of an organization include the ability to understand and respond to changing conditions of its context, to pursue new opportunities, and to leverage the knowledge and creativity of people within the organization, and in collaboration with external interested parties.

An organization can innovate more effectively and efficiently if all necessary activities and other interrelated or interacting elements are managed as a system.

An innovation management system guides the organization to determine its innovation vision, strategy, policy, and objectives, and to establish the support and processes needed to achieve the intended outcomes.

The potential benefits of implementing an innovation management system in accordance with this document are:

a) increased ability to manage uncertainty;

b) increased growth, revenues, profitability, and competitiveness;

c) reduced costs and waste, and increased productivity and resource efficiency;

d) improved sustainability and resilience;

e) increased satisfaction of users, customers, citizens, and other interested parties;

f) sustained renewal of the portfolio of offerings;

g) engaged and empowered people in the organization;

h) increased ability to attract partners, collaborators, and funding;

i) enhanced reputation and valuation of the organization;

j) facilitated compliance with regulations and other relevant requirements.

0.2 Innovation management principles

This document is based on innovation management principles. An innovation management principle includes a statement of the principle, a rationale of why the principle is important for the organization, some examples of benefits associated with the principle, and finally examples of actions the organization can take to improve performance when applying the principle.

The following principles are the foundation of the innovation management system:

a) realization of value;

b) future-focused leaders;

c) strategic direction;

d) culture;

e) exploiting insights;

f) managing uncertainty;

g) adaptability;

h) systems approach.

The principles can be considered as an open set to be integrated and adapted within the organization.

0.3 Innovation management system

0.3.1 General

An innovation management system is a set of interrelated and interacting elements, aiming for the realization of value. It provides a common framework to develop and deploy innovation capabilities, evaluate performance, and achieve intended outcomes.

The elements can be gradually adopted to implement the system according to the particular context and circumstances of the organization. Full benefits can be gained when all the elements of the innovation management system, are adopted by the organization.

Ultimately, the effective implementation of the innovation management system relies on the commitment by top management and the ability of leaders to promote innovation capabilities and a culture supporting innovation activities.

0.3.2 Plan-Do-Check-Act cycle

The Plan-Do-Check-Act (PDCA) cycle enables continual improvement of the innovation management system to ensure that the innovation initiatives and processes are adequately supported, resourced, and managed, and that opportunities and risks are identified and addressed by the organization.

The PDCA cycle can be applied to the innovation management system as a whole or its parts. Figure 1 illustrates how Clauses 4 to 10 can be grouped in relation to the PDCA cycle. The cycle is informed and directed by the context of the organization (Clause 4) and its leadership (Clause 5).

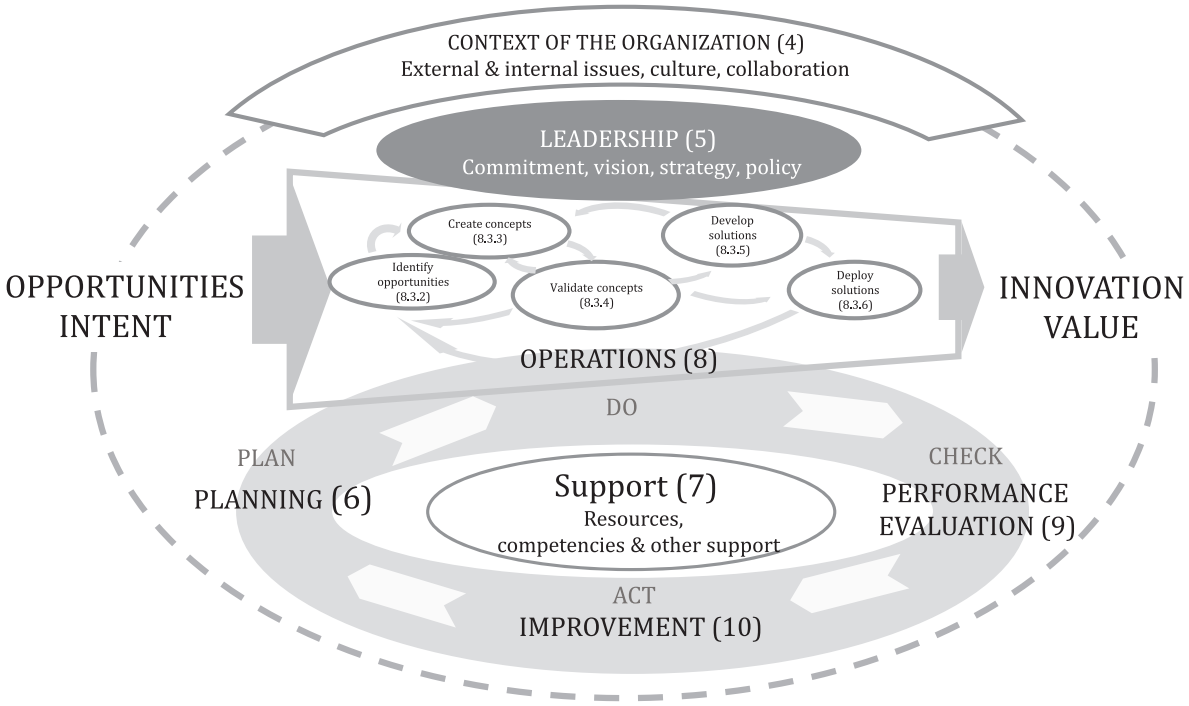

Figure 1 — Representation of the framework of the innovation management system with references to the clauses of this document

The cycle can be briefly described as follows:

a) Plan: Establish the objectives and determine the actions needed to address opportunities and risks (Clause 6);

b) Do: Implement what is planned in terms of support and operations (Clauses 7 and 8);

c) Check: Monitor and (where applicable) measure results against objectives (Clause 9);

d) Act: Take actions to continually improve the performance of the innovation management system (Clause 10).

0.3.3 Managing uncertainty and risk

Innovation activities need to address high degrees of variation and uncertainty, particularly during the early creative phases. They are explorative and characterized by search, experimentation, and learning. As the process progresses, knowledge is gained and uncertainty is reduced.

Innovation initiatives involve risk-taking and not all of these will result in innovation. Discontinued initiatives are an integral part of the processes and sources of learning as input to future innovation initiatives.

The acceptable degree of risk is dependent on the innovation ambition, the organization's capabilities and the types of innovations addressed by the organization. Managing risk can be addressed by different approaches, e.g. iterative learning, partnering, or portfolio diversification with different risk levels. A systems approach is critical for understanding interdependencies and managing uncertainties.

Innovation initiatives can be implemented by processes that identify opportunities, create and validate concepts, and develop and deploy solutions. These innovation processes are implemented iteratively and often in a non-linear sequence. They need to be flexible and adaptable to the types of innovations the organization seeks to achieve.

Organizations can establish unified or separate structures, to implement innovation activities. These may require different leadership styles, competencies, and cultures. Implementing an innovation management system can encourage the organization to challenge the status quo and established organizational assumptions and structures. This can help the organization to manage uncertainties and risks more effectively.

0.4 Relationship with other management system standards

This document applies the framework developed by ISO to improve alignment among its International Standards for management systems (see ISO/IEC Directives, Part 1, Consolidated ISO Supplement, Annex SL). This framework enables an organization to align or integrate its innovation management system with the guidance or requirements of other management system standards.

This document relates to the ISO 56000 family of standards, developed by ISO/TC 279, as follows:

a) ISO 56000[1)] *Innovation management — Fundamentals and vocabulary* provides essential background for the proper understanding and implementation of this document;

b) ISO TR 56004 *Innovation management assessment — Guidance* provides guidance for organizations to plan, implement and follow-up on an innovation management assessment;

c) ISO 56003 *Innovation management — Tools and methods for innovation partnership — Guidance;*

d) and subsequent standards provide guidance on tools and methods to support the implementation of the innovation management system.

The implementation of an effective and efficient innovation management system can have impact on, or be impacted by, other management systems and can require integration at several levels.

Management system standards complement each other but can also be used independently. This document can be implemented together with other management system standards, helping organizations to balance the exploitation of existing offerings and operations, with the exploration

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and introduction of new offerings. Organizations can find a balance between innovation management guidance and other management system standards.

Organizations that have not adopted other management system standards can adopt this document as stand-alone guidance within their organization.

Innovation management — Innovation management system — Guidance

1 Scope

1.1 This document provides guidance for the establishment, implementation, maintenance, and continual improvement of an innovation management system for use in all established organizations. It is applicable to:

a) organizations seeking sustained success by developing and demonstrating their ability to effectively manage innovation activities to achieve the intended outcomes;

b) users, customers, and other interested parties, seeking confidence in the innovation capabilities of an organization;

c) organizations and interested parties seeking to improve communication through a common understanding of what constitutes an innovation management system;

d) providers of training in, assessment of, or consultancy for, innovation management and innovation management systems;

e) policy makers, aiming for higher effectiveness of support programs targeting the innovation capabilities and competitiveness of organizations and the development of society.

1.2 All the guidance within this document is generic and intended to be applicable to:

a) all types of organizations, regardless of type, sector, or size. The focus is on established organizations, with the understanding that both temporary organizations and start-ups can also benefit by applying these guidelines in all or in part;

b) all types of innovations, e.g. product, service, process, model, and method, ranging from incremental to radical;

c) all types of approaches, e.g. internal and open innovation, user-, market-, technology-, and design-driven innovation activities.

It does not describe detailed activities within the organization, but rather provides guidance at a general level. It does not prescribe any requirements or specific tools or methods for innovation activities.

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 56000, *Innovation management — Fundamentals and vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 56000 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/

4 Context of the organization

4.1 Understanding the organization and its context

4.1.1 General

The organization should regularly determine:

a) external and internal issues that are relevant to its purpose and that affect its ability to achieve the intended outcomes of its innovation management system;

b) areas of opportunity for potential value realization.

4.1.2 External issues

The organization should regularly scan and analyse the external context, considering issues related to the:

a) different areas covering economic, market, social, cultural, scientific, technological, legal, political, geo-political and environmental aspects;

b) geographic scope, whether international, national, regional, or local;

c) past experience, present situation, and potential future scenarios;

d) speed of, and resistance to, change;

e) likelihood and potential impact of trends;

f) potential opportunities and threats, also those that might result from disruptions;

g) interested parties.

4.1.3 Internal issues

The organization should regularly analyse its internal context, including capabilities and assets, considering issues related to:

a) its vision, ambition-level, strategic direction, and core competencies;

b) existing management practices, organizational structures and use of other management systems;

c) overall performance of the organization and its innovation performance, e.g. achievements and failures over the recent past and compared with other relevant organizations;

d) operational aspects, e.g. processes, budgeting, controlling, and collaboration;

e) potential and maturity (position on the life cycle) of current offerings and value realization models;

f) the uniqueness of its people, knowledge, skills, technologies, intellectual property, ecosystems, branding, partnerships, infrastructure, etc.;

g) adaptability of strategies, processes, resource allocation, etc.;

h) cultural aspects such as values, attitudes, and commitment at all levels of the organization;

i) the innovation competencies of its people over time.

4.2 Understanding the needs and expectations of interested parties

External interested parties can be users, customers, citizens, local community, special interest groups, partners, external providers, consultants, unions, competitors, owners, shareholders, funding organizations, regulators, public authorities, standards bodies, industry, and trade associations.

Internal interested parties can be employees at all levels and other persons working on behalf of the organization.

4.2.1 The organization should determine, monitor and review:

a) the interested parties, internal or external, current or potential, that are relevant to the innovation management system and the areas of opportunity;

b) the relevant needs, expectations, and applicable requirements of these interested parties;

c) how and when to interact or engage with relevant interested parties.

4.2.2 The needs and expectations of interested parties can be related to:

a) current or future needs and expectations;

b) stated or unstated needs and expectations;

c) value realization, both financial and non-financial;

d) different degrees of novelty and change, from incremental to radical;

e) existing markets or the creation of new markets;

f) any product, service, process, model, method, etc.;

g) offerings within, adjacent to, or more distant from, the current scope of the organization;

h) the enhancement or replacement of current offerings;

i) the organization itself or to its value chain, network, or ecosystem;

j) statutory and regulatory requirements and compliance commitments.

4.3 Determining the scope of the innovation management system

The organization should determine its innovation intent and the boundaries and applicability of the innovation management system to establish its scope.

When determining this scope, the organization should consider:

a) the external and internal issues and areas of opportunity referred to in 4.1;

b) the relevant needs, expectations and requirements of interested parties referred to in 4.2;

c) interactions with other management systems.

Innovation intent can describe the scenarios of what could be possible in areas of opportunity, when faced with uncertainty.

When describing the scope, the organization should consider, e.g. offerings, processes, structures, functions, partners, collaborations, geographical, and time coverage, that are within or outside the scope.

The scope should be reviewed and amended when necessary and be available as documented information.

4.4 Establishing the innovation management system

4.4.1 General

The organization should establish, implement, maintain, and continually improve an innovation management system, in alignment with the innovation intent, including the processes and support needed and their interactions, in accordance with the guidance of this document and the innovation management principles.

The innovation intent is the basis for determining the innovation strategy. It is enabled by a supportive culture and through collaboration.

4.4.2 Culture

The organization should promote a culture that supports innovation activities, with the aim to enable the coexistence of creative and operations-oriented mindsets and behaviours as both are needed to innovate.

4.4.2.1 The organization should consider providing a work environment characterized by:

a) openness, curiosity, and user focus;

b) encouraging feedback and suggestions;

c) encouraging learning, experimentation, creativity, change, and challenging current assumptions;

d) encouraging risk-taking and learning from failure while keeping people engaged;

e) networking, collaboration, and participation internally and externally;

f) diversity, respect, and inclusiveness of different people, disciplines, and perspectives in innovation activities;

g) shared values, beliefs and behaviours;

h) balancing assumption-based and evidence-based analysis and decision-making;

i) balancing linear and non-linear planning and processes.

4.4.2.2 Organizations with a culture supporting innovation activities often have:

a) leaders at all levels that promote and demonstrate their commitment to innovation activities;

b) management of the coexistence of, and the effective transitions between, the different innovation activities, in terms of values, beliefs, and behaviours in the organization;

c) support and recognition of innovators, innovative behaviours, innovation initiatives, and innovation storytelling;

d) incentives for innovation achievements, with the focus on intrinsic motivators, e.g. increased autonomy and an inspiring purpose, rather than extrinsic motivators alone, e.g. monetary rewards;

e) development of competencies which support innovation activities;

f) assessment of the culture using relevant indicators;

g) structures for multidisciplinary collaboration.

4.4.3 Collaboration

The organization should establish an approach for the management of internal and external collaboration. Collaboration aims to facilitate sharing and access to knowledge, competence, other intellectual assets, and resources.

The organization should consider:

a) the innovation strategy, objectives and existing capabilities, resources, knowledge, and competencies;

b) the diversity of experiences, disciplines, competencies, perspectives, etc.;

c) different approaches, methods, rules, and agreements for external collaboration;

d) issues of intellectual property;

e) regularly reviewing and aligning the strategic relevance of collaborations;

f) the importance of respect, openness, and trust between parties.

Collaboration can support activities such as identifying user needs, expectations, and challenges, sharing of ideas, knowledge, competencies and know-how, accessing infrastructure, portfolios, markets, and users, acquiring new competencies, and resources, and jointly implementing innovation operations.

Collaboration can involve persons from the same or different teams, departments, units, and functions within the organization. It can involve users, customers, partners, providers, academia, industry and trade associations and other relevant interested parties and networks external to the organization, including parties outside of the own value networks.

5 Leadership

5.1 Leadership and commitment

5.1.1 General

Top management should demonstrate leadership and commitment with respect to the innovation management system by:

a) being accountable for the effectiveness and efficiency of the innovation management system;

b) ensuring that the innovation vision, strategy, policy, and objectives are established, are consistent and are compatible with the context and the strategic direction of the organization;

c) fostering a culture supporting innovation activities;

d) ensuring the adoption and integration of the organization's innovation management system requirements into the organization's existing structures and business processes, as appropriate;

e) supporting leaders at all levels and other relevant management roles to demonstrate their leadership and commitment to develop their leadership regarding innovation, as it applies to their areas of responsibility.

f) ensuring that structures, support, including resources and processes, needed for the innovation management system are available;

g) creating awareness and communicating the importance of effective innovation management and of adopting the innovation management system guidance;

h) ensuring that the innovation management system achieves its intended outcomes;

i) engaging, directing, and supporting persons to contribute to the effectiveness of the innovation management system;

j) encouraging and recognizing innovators to demonstrate good practices, ensure engagement, and facilitate learning from both successes and failures;

k) promoting performance evaluation at planned intervals and continual improvement of the innovation management system;

NOTE Reference to "business" in this document can be interpreted broadly to mean those activities that are core to the purpose of the organization's existence.

5.1.2 Focus on value realization

Top management should demonstrate leadership and commitment with respect to value realization, by:

a) identifying opportunities, through exploitable insights, based on current or future, stated or unstated needs and expectations;

b) considering the balance between opportunities and risks, including the consequences of lost opportunities;

c) considering risk-appetite and tolerance for failure;

d) allowing for conceptualization, experimentation, and prototyping, involving users, customers, and other interested parties to test hypotheses and validate assumptions;

e) promoting perseverance and ensuring the timely deployment of innovations.

5.1.3 Innovation vision

Top management should establish, implement, and maintain an innovation vision that:

a) is a description of a future state that the organization is aspiring for, in terms of innovation activities, including the future role of the organization and the desired impact of its innovations;

b) is consciously ambitious, challenges the status quo, and is not constrained by the organization's current capabilities;

c) serves as a guide for strategic choices and provides a framework for setting the innovation strategy, policy, and objectives;

d) can be communicated and understood internally to inspire people to commit and work towards;

e) can be communicated externally to enhance the reputation of the organization and to attract relevant interested parties;

f) is available as documented information.

5.1.4 Innovation strategy

5.1.4.1 Top management should establish, implement, and maintain an innovation strategy, or several innovation strategies, if appropriate, and ensure that it:

a) describes why innovation activities are important for the organization;

b) is flexible and adaptable, and allowed to change or emerge as a result of feedback and performance of innovation activities;

c) is communicated to, and understood by, relevant interested parties;

d) maintained as documented information.

5.1.4.2 An innovation strategy can include descriptions of the:

a) context of the organization;

b) innovation vision and policy;

c) roles, responsibilities, and authorities;

d) innovation objectives and the plans to achieve them;

e) organizational structures;

f) support and processes, including allocation of resources.

The rationale for a strategy dedicated to innovation activities can be to focus on value realization under conditions of uncertainty. This requires a balance of assumption-based and evidence-based decision-making, possibly new or modified practices, leadership, structures, and processes.

An innovation strategy can help the people in the organization and its interested parties to understand the decisions made to achieve the innovation objectives, while contributing to engaging and inspiring them.

5.2 Innovation policy

5.2.1 Establishing the innovation policy

Top management should establish, implement, and maintain an innovation policy, ensuring that it:

a) is describing the commitment to innovation activities;

b) is appropriate to the purpose and context of the organization and supports its strategic direction, in alignment with the innovation vision;

c) provides a framework for setting innovation strategy and objectives;

d) takes into consideration the innovation management principles;

e) includes a commitment to satisfy applicable requirements and to consider ethical and sustainability aspects;

f) includes a commitment to continual improvement of the innovation management system.

5.2.2 Communicating the innovation policy

The innovation policy should be:

a) available as documented information;

b) communicated, understood, and applied, within the organization;

c) available to relevant interested parties, as appropriate.

5.3 Organizational roles, responsibilities, and authorities

Top management should ensure that the responsibilities and authorities for relevant roles are assigned, communicated, and understood within the organization.

5.3.1 Top management should specifically assign the responsibility and authority for:

a) ensuring that the innovation management system meets the guidance of this document;

b) reporting to top management on the performance of the innovation management system and on opportunities for improvement in a timely manner;

c) ensuring that the integrity of the innovation management system is maintained.

5.3.2 Responsibilities and authorities can be assigned to:

a) existing roles, e.g. all leaders in the organization or roles related to specific functions, units, or offerings;

b) dedicated roles with a focus on general innovation management or specific innovation initiatives and activities.

6 Planning

6.1 Actions to address opportunities and risks

6.1.1 When planning for the innovation management system, the organization should consider the issues referred to in 4.1, the needs, expectations and the requirements referred to in 4.2, and determine the opportunities and risks that need to be addressed to:

a) give assurance that the innovation management system can achieve its intended outcomes;

b) enhance desired effects;

c) prevent, or reduce, undesired effects;

d) compare the effects of acceptance of risk against those of prevention;

e) achieve continual improvement.

6.1.2 The organization should plan:

a) actions to address these opportunities and risks, considering the:

   1) uncertainties associated with the opportunities;

   2) degree and type of risk that may or may not be accepted;

b) how to:

   1) integrate and implement the actions into its innovation management system processes;

   2) evaluate the effectiveness of these actions.

Besides the opportunities and risks affecting the management system, there are opportunities that can lead to innovation initiatives.

6.2 Innovation objectives and planning to achieve them

6.2.1 Innovation objectives

The organization should establish innovation objectives at relevant functions and levels.

The innovation objectives should:

a) be consistent with the innovation policy and aim for the innovation vision;

b) be consistent across functions and levels of the organization;

c) be measurable (if practicable) or verifiable;

d) take into account applicable requirements;

e) be monitored;

f) be communicated and understood;

g) be updated as appropriate.

The organization should retain documented information on the innovation objectives.

6.2.2 Planning to achieve objectives

When planning how to achieve its innovation objectives, the organization should determine:

a) what will be done, considering the identified areas of opportunity, and types of innovations to be focused on;

b) who will be involved, in terms of internal and external interested parties;

c) what will be required, e.g. organizational structures, support, including resources, and processes;

d) who will be responsible;

e) when it will be completed, in terms of planning horizons and relevant milestones;

f) what strategic and portfolio criteria will be used to assess innovation initiatives;

g) how the results will be evaluated, including the use of innovation performance indicators;

h) how the results will be protected, if applicable, and exploited;

i) how it will be communicated;

j) what documented information will be retained or maintained.

6.3 Organizational structures

Top management should:

a) ensure that relevant and adaptable organizational structures are in place to achieve the intended outcomes of the innovation management system;

b) consider how creativity and exploration on the one hand and deployment and efficiency on the other hand, can co-exist or be integrated within the organization;

c) consider establishing dedicated organizational structures appropriate to the size of the organization, when any of the following applies:

   1) innovations are expected to be disruptive or radical, with respect to, or competing with, existing offerings;

   2) different leadership styles, incentives, indicators, or cultures are needed;

   3) specific support, including resources, needs to be exclusively available for innovation activities;

   4) specific operations, including processes, that need to be adapted to a higher degree of uncertainty and variation compared to established processes.

6.4 Innovation portfolios

The organization should establish, manage, regularly evaluate, and prioritize the portfolio, or several portfolios, if appropriate, of innovation initiatives and ensure:

a) alignment of the innovation portfolio with, and contribution to, the innovation strategy and objectives;

b) consistency between initiatives within, as well as outside of, the innovation portfolios;

c) realization of synergies, including possibilities for re-use and optimization regarding, e.g. resources, technologies, platforms, and processes;

d) appropriate balance of risk versus return, degrees of novelty, types of innovations, as well as different horizons in terms of time and scope;

e) communication of the overall progress and achievements to top management and relevant interested parties;

f) improvement and adjustment of innovation portfolios, strategy, and objectives.

When managing the innovation portfolios, the organization can consider a combination of innovation initiatives related to the optimization or adjacent extension of current offerings as well as new solutions for new users, customers and other interested parties, e.g. new markets.

7 Support

7.1 Resources

7.1.1 General

The organization should determine and provide in a timely manner the resources needed for the establishment, implementation, maintenance, and continual improvement of the innovation management system.

The organization should consider:

a) a proactive, transparent, flexible, and adaptable approach for providing resources;

b) the capabilities of, and limitations on, existing internal support;

c) what needs to be obtained from external providers, e.g. by outsourcing or partnering;

d) internal and external collaboration, e.g. sharing or re-use, to optimize the use of resources;

e) securing resources for innovation activities separated from other activities;

f) the long-term build-up of capabilities for innovation activities.

7.1.2 People

The organization should determine, provide, and manage the people necessary for the effective implementation of its innovation management system.

The organization should consider:

a) the need to attract, recruit, and retain people;

b) forming teams with a diversity and mix of people including different disciplines, personal attributes, and backgrounds to encourage cross-pollination that can result in unexpected positive outcomes;

c) establishing appropriate incentives, including non-financial incentives, e.g. rewards and recognition;

d) protecting innovators given the potential higher degree of risk of innovation activities;

e) establishing and communicating the terms and conditions for the ownership of ideas, handling of patents and exploitation of innovations, which can be subject to different national laws, regulations, and other agreements.

7.1.3 Time

The organization should establish an approach for the management of time for the effective implementation of its innovation management system.

The organization should consider allocating time:

a) generally, for innovation activities and training in a balanced way, e.g. as a percentage of overall working time;

b) specifically, to each innovation initiative and for the different innovation processes;

c) for dedicated and other relevant roles in the organization, using allowances as appropriate.

7.1.4 Knowledge

The organization should establish an approach for the management of knowledge for the effective implementation of its innovation management system.

The organization should consider:

a) capturing internal and external knowledge, tacit or explicit, gained from intelligence and experience, e.g. understanding the context of the organization, lessons learned from success and failure of innovation initiatives and from analysis of performance data;

b) facilitating knowledge access and re-use to avoid the loss of, or duplication, of existing knowledge;

c) maintaining an appropriate mechanism for information analysis and for managing existing and future knowledge, e.g. directories of people's areas of expertise and interests, or resource planning data;

d) the level and means of confidentiality and protection of intellectual assets;

e) ethical issues related to the use of knowledge;

f) prioritizing external knowledge sources by, e.g. reliability, accessibility, and cost.

Knowledge can be individual or collective, tacit, or explicit. Collective knowledge is gained from people collaborating, codifying, and sharing their tacit and implicit knowledge.

External knowledge sources can be users, customers, partners, providers, competitors, consultants, databases, expert networks, conferences, standards, academia, etc.

7.1.5 Finance

The organization should determine and provide financial resources for the effective implementation of its innovation management system.

The organization should consider:

a) the financial opportunities, risks, and constraints associated with innovation activities, including the financial implications and other risks, of not innovating;

b) establishing funding principles, e.g. central financial resources versus funding through local or operational budgets;

c) allocating dedicated financial resources for innovation activities, e.g. as a percentage of annual budget or designating funds for innovation initiatives by top management;

d) identifying and accessing relevant financial resources outside the organization, e.g. from private and public investors, research agencies, partners, co-sponsors, innovation grants, tax credits for research and development, or crowdsourcing;

e) establishing investment principles, e.g. investing in internal versus external activities, investing in start-ups, corporate venture capital, or innovation accelerators;

f) the balance of funding across different time horizons, different degrees of risk, and different types of innovations, e.g. incremental innovation or radical innovation;

g) ensuring the funding of other relevant resources and support, e.g. people, time, infrastructure, or competence;

h) ensuring that the funding approach covers all activities needed.

7.1.6 Infrastructure

7.1.6.1 The organization should determine, provide, and maintain the necessary physical and virtual infrastructure for the effective implementation of its innovation management system.

The organization should consider:

a) infrastructure to support and facilitate the innovation management system and its processes;

b) separation versus sharing of infrastructure, when appropriate, considering factors such as flexibility, cost effectiveness, and coordination benefits;

c) what infrastructure needs to be obtained from external relevant interested parties, including users and customers, e.g. by outsourcing or partnering;

d) pro-actively evaluate and consider advances in infrastructures, including new technologies, tools and methods, and statutory and regulatory requirements.

7.1.6.2 Infrastructure to support innovation activities can include:

a) buildings, facilities, and associated utilities, e.g. creative environments, research and development labs, maker spaces, simulation labs, or living labs;

b) research and simulation equipment, physical tools, other hardware, software, methods, advanced technologies, and models;

c) transportation resources;

d) information and communication technology, e.g. for the management of collaboration, ideas, portfolios, insights, talent, projects, or programs, etc;

e) networks, e.g. knowledge networks, or market networks.

7.2 Competence

The organization should establish an approach for the development and management of competencies.

7.2.1 The organization should:

a) determine the necessary competence of persons doing work under its control that affects the performance, effectiveness, and efficiency of the innovation management system;

b) ensure that these persons are competent on the basis of appropriate education, training, or experience;

c) establish an inventory of existing competencies of the organization and identify gaps;

d) where applicable, take actions to acquire and continuously evaluate, improve, and renew the necessary competence, and evaluate the effectiveness of the actions taken;

e) consider the need for outsourced competence, e.g. collaborating with or commissioning academia, consultants, external partners, innovation support services, or online resources to assist with innovation activities;

f) establish the necessary connections and collaborations between people with different competencies to leverage the collective competence of the organization;

g) consider the need for aligning internal competencies with relevant external interested parties to achieve a common understanding and a convergence of vocabulary, attitudes, and approaches;

h) retain appropriate documented information as evidence of competence.

7.2.2 Competencies can include the ability to:

a) manage innovation activities, e.g. in terms of leadership, change management, resource allocation, engage and empower people, team facilitation, involvement, collaboration, foster a culture supporting innovation activities, manage uncertainty, conduct research and manage intellectual property;

b) identify insights and opportunities, using e.g. market and technology analysis, bottleneck and gap analysis, ethnography, data-driven experimentation and hypothesis testing, design thinking, scenario planning, analytics, and big data;

c) create ideas and concepts, e.g. creativity and provocative techniques, critical thinking, discovery skills (association, questioning, observing, experimenting, and networking), technical know-how, market analysis, business case writing, and value realization modelling that includes generating user-value equations;

d) develop and validate concepts, e.g. iterative learning techniques, design, testing and validation, value realization planning, and project management;

e) develop and deploy solutions to realize value.

NOTE Applicable actions can include, for example, the provision of training to, the mentoring of, or the re-assignment of currently employed persons; or the hiring or contracting of competent persons or organizations.

7.3 Awareness

The organization should ensure that all relevant persons doing work under the organization's control are aware of:

a) the innovation vision, strategy, policy, and objectives;

b) the meaning and importance of innovation for the organization;

c) their contribution to the effectiveness and efficiency of the innovation management system, including the benefits of improved innovation performance;

d) the implications of not meeting the innovation management system guidance;

e) the availability of support for innovation activities.

7.4 Communication

The organization should determine the internal and external communications relevant to the innovation management system, including:

a) on what it will communicate;

b) why to communicate;

c) when to communicate;

d) with whom to communicate;

e) how to communicate;

f) who communicates.

Communication can be done to create awareness, increase people engagement, prepare for action, establish thought leadership, influencing, build brand value, etc.

Communication can be internal, e.g. team meetings, notice boards, intranets, newsletters, games, magazines, staff conferences and training as well as external, e.g. web sites, annual reports, corporate literature, white papers, briefings to financial institutions, users, customers, partners, providers and other relevant interested parties, advertising, press releases, trade shows, and professional conferences.

7.5 Documented information

7.5.1 General

The organization's innovation management system should include:

a) documented information suggested by this document;

b) documented information determined by the organization as being necessary for the effectiveness of the innovation management system.

NOTE The extent of documented information for an innovation management system can differ from one organization to another due to:

1) the size of organization and its type of activities, processes, products, and services;

2) the complexity of processes and their interactions;

3) the competence of persons.

7.5.2 Creating and updating

When creating and updating documented information, the organization should ensure appropriate:

a) identification and description, e.g. a title, date, version, author, or reference number;

b) format, e.g. language, software version, graphics, and media, e.g. paper or electronic;

c) review and approval for suitability and adequacy.

7.5.3 Control of documented information

Documented information required by the innovation management system should be controlled to ensure:

a) it is available and suitable for use, where and when it is needed;

b) it is adequately protected, e.g. from loss of confidentiality, improper use, or loss of integrity.

For the control of documented information, the organization should address the following activities, as applicable:

1) distribution, access, level of confidentiality, retrieval, and use;

2) storage and preservation, including preservation of legibility;

3) control of changes, e.g. version control;

4) retention and disposition.

Documented information of external origin determined by the organization to be necessary for the planning and operation of the innovation management system should be identified, as appropriate, and controlled.

NOTE Access can imply a decision regarding the permission to view the documented information only, or the permission and authority to view and change the documented information.

7.6 Tools and methods

The organization should determine, provide, and maintain the necessary tools and methods for developing, maintaining, and improving the innovation management system.

The organization should consider:

a) selecting and providing a mix of appropriate tools and methods supporting innovation activities, as well as for different types of innovations activities;

b) creating awareness of, ensuring access to, and providing training for, the available tools and methods;

c) sharing, re-use and collaboration in the use of tools and methods.

Tools and methods can be of different types, including descriptive, provocative, participative, challenging, analytical, and communicative. They can take many forms and formats, including guides, instructions, games, templates, presentations, videos, software, and hardware.

Examples of tools and methods are back casting, ethnographic research, scenario planning, brainstorming, idea management, inclusive design, and business model templates.

7.7 Strategic intelligence management

The organization should establish an approach for the management of strategic intelligence.

The organization should consider:

a) the need to acquire intelligence from internal and external sources;

b) the need to collaborate with relevant interested parties;

c) the use of tools and methods, e.g. data mining, analytics, prediction markets, environmental scanning, and technology surveillance;

d) different perspectives, e.g. present and future, internal and external, demand and supply, providers and users, competitors, and related to new or changed products, services, processes, models, and methods;

e) the need for developing influencing activities to increase acceptance of innovations, e.g. evolution of regulatory requirements, standards, and innovation ecosystems.

Strategic intelligence can include activities to acquire, collect, interpret, analyse, evaluate, apply, and deliver to, or share between, decision-makers and other relevant interested parties, the necessary data, information, and knowledge.

7.8 Intellectual property management

The organization should establish an approach for the management of intellectual property aligned with, and supporting, the innovation strategy.

The organization should consider:

a) defining what intellectual property assets are to be, and not to be, protected and when, how, and where it will be protected, e.g. patent, copyrights, trademark, trade secrets, creative commons licensing, and open source licensing;

b) the rationale for creating, protecting, and utilizing intellectual property, e.g. value realization, obtain freedom to operate, and defend against infringement;

c) the rationale for not protecting intellectual property, e.g. confidentiality, cost, speed, and risks;

d) establishing and maintaining an inventory of the organization's intellectual assets;

e) regularly monitoring and analysing disclosed intellectual property that is relevant for the organization, as input to innovation activities, to ensure freedom to operate, as well as to avoid potential infringement;

f) the need for managing intellectual property, including establishing the appropriate processes, clarifying ownership in relation to external partners, e.g. in collaborative innovation initiatives, including clarification of the sharing of intellectual property in the idea generation phases;

g) how to realize value from intellectual property, e.g. through licensing, cross-licensing, sale, and collaborative partnerships;

h) establishing awareness and providing training in the organization about the approach, including ownership and confidentiality related to intellectual property, as well as the consequences of potential infringement of third-party intellectual property, e.g. licensing and litigation costs;

i) ensuring access or restriction to intellectual property to persons, internally and externally, when necessary for their work, e.g. through confidentiality agreements, procedures, and policies;

j) how to manage infringements, potential and actual, from other parties;

k) monitoring the development and differences of relevant national legislations and other internationally applicable legal requirements and compliance commitments.

Intellectual property can include inventions, technologies, literary, scientific or artistic work, symbols, designs, methodologies, names or images, software, data, and know-how.

Intellectual property can be used to achieve objectives such as brand building, differentiation and positioning of offerings, customer loyalty, research and development, revenue generation, etc.

8 Operation

8.1 Operational planning and control

The organization should plan, implement, and control innovation initiatives, processes, structures, and support needed to address innovation opportunities, meet requirements, and to implement the actions determined in 6.2, by:

a) establishing criteria for innovation initiatives and processes;

b) implementing control of the innovation initiatives and processes in accordance with the criteria;

c) keeping documented information to the extent necessary to have confidence that the innovation initiatives and processes have been carried out as planned.

The organization should control planned changes and review the consequences of unintended changes, taking action to prevent or mitigate any adverse effects, as necessary.

The organization should ensure that outsourced and collaborative innovation initiatives and processes are controlled.

Operational planning can require a different approach to control, especially regarding creative and experimentation activities, incorporating a higher degree of freedom and flexibility to manage uncertainty. This approach can be different from other established management control practices.

An innovation initiative is a set of coordinated activities, formal or informal, and can be an innovation project, an innovation program, or any other kind of approach. An initiative can be proposed by anyone in the organization and is characterized by having a starting and an ending point. The organization can establish one or more processes to manage these initiatives.

8.2 Innovation initiatives

8.2.1 The organization should manage each innovation initiative, considering to:

a) establish, and continuously review, the scope of the initiative, including the objectives, constraints, expected results, and deliverables;

b) determine indicators and how to apply them in order to evaluate and improve the initiative;

c) establish the management and decision-making structures, e.g. steering or reference groups;

d) ensure appropriate leadership and the necessary structures and support, including resources;

e) secure and retain the people with the right competencies and experiences, and build the team;

f) establish the necessary roles, responsibilities, and authorities, including people for managing and coaching;

g) identify and establish the necessary internal and external collaboration;

h) establish and implement the appropriate innovation processes;

i) ensure the protection of intellectual property and other critical assets;

j) consider internal and external requirements and the risk of not complying with legal and regulatory requirements, including social responsibility issues;

k) continuously capture lessons learned, to gain new knowledge and perspectives;

l) leverage failures as opportunities for the organization to learn.

8.2.2 The organization should determine how to implement each innovation initiative by using a single approach or a combination of different approaches, such as:

a) an internal approach in one unit or across several internal units;

b) crowdsourcing across an organization, in a permanent or temporary arrangement;

c) collaborative, in e.g. partnerships, alliances, joint ventures, public programs, ecosystems, and other clusters of organizations;

d) outsourced, fully or partly;

e) acquisition, full merger or partial investments;

f) divestiture, full or partial spin-off.

The approach can be re-considered during the processes.

8.3 Innovation processes

8.3.1 General

The organization should configure the innovation processes to suit the innovation initiative.

The innovation processes can be flexible and adaptable, and form different configurations, depending on, e.g. the types of innovations and the circumstances of the organization. They can:

a) form a fast track of selected processes;

b) have a non-linear sequence;

c) be iterative;

d) be implemented within, or independently from, other processes in the organization;

e) be connected to other processes in the organization.

The creative and experimentation processes focus on exploration to gain knowledge and can require resilience and flexibility.

The innovation processes can interact and interrelate with other processes in the organization. e.g. research, product development, marketing, sales, partnering, mergers and acquisitions, collaboration, and intellectual property.

Figure 2 illustrates an overview of the innovation processes.

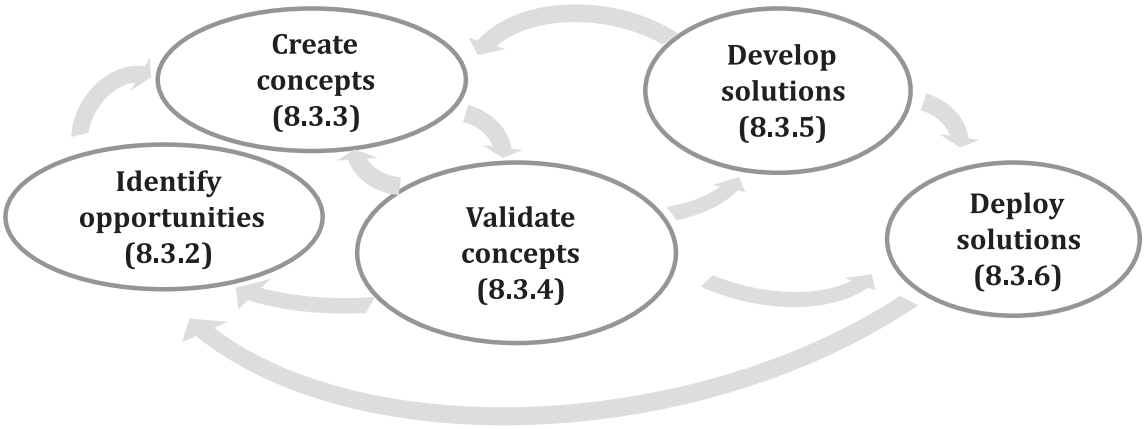

Figure 2 — Innovation processes

8.3.2 Identify opportunities

To identify and define opportunities the organization should consider the following inputs:

i) an understanding of the organization and its context;

iv) the innovation intent;

iii) the scope of the innovation initiative;

iv) learnings and experiences from previous innovation initiatives.

The organization should:

a) acquire insights and knowledge about stated and unstated needs and expectations;

b) acquire insights and knowledge about relevant trends and challenges, e.g. related to competitors, technologies, intellectual property, and markets;

c) identify and define opportunities or areas of opportunity, e.g. the impact to be achieved, the value that can be realized, or problem statements;

d) prioritize the opportunities.

Knowledge acquisition can include losses and benefits of current and potential users, customers, citizens, and other interested parties of the organization, market, or society.

Tools and methods can include basic research, scanning, prospective analyses, benchmarking, internal and external searches, interviews, ethnography, crowdsourcing, focus groups, foresight activities, user scenarios, risk analysis, dynamic system models, etc.

These activities can result in the following outputs:

— understanding of the potential value to be realized and other potential impacts;

— identified, defined, and prioritized opportunities, areas of opportunity or problem statements;

— understanding of state of the art, including intellectual property rights.

8.3.3 Create concepts

To create concepts the organization should consider identified and defined opportunities as inputs.

The organization should:

a) generate new ideas, potential solutions, or combinations of existing ones, from internal and external sources, using creative problem solving, ideation, or other methods;

b) investigate, document, and evaluate ideas and potential solutions, e.g. with regard to degree of novelty, risk, feasibility, viability, desirability, sustainability, and intellectual property rights;

c) select the preferred ideas and potential solutions based on established criteria;

d) develop concepts from ideas and potential solutions, including value propositions;

e) develop alternatives for how value can be realized, e.g. hypothetical business, operational, or marketing models.

These activities can result in the following outputs:

— concepts with preliminary value realization models that can be validated;

— understanding of the critical uncertainties or assumptions for each concept to be validated;

— initial assessment of risks, degree of novelty, and its implications for further development in terms of processes, structures, etc.

8.3.4 Validate concepts

To validate concepts, the organization should consider created concepts as inputs.

The organization should:

a) start validation early with an initial version of the concept;

b) consider one or more approaches to validation, e.g. tests, experiments, pilots, and studies;

c) address the concept, starting with the most critical uncertainties, hypotheses, or assumptions, to learn, get feedback, and create new knowledge to reduce uncertainty related to:

   1) interaction with users, customers, partners, and other interested parties;

   2) support, including resources;

   3) technical, legal, marketing, time to market, financial, and organizational aspects;

d) adjust and improve the concept based on lessons learned, feedback, and new knowledge;

e) evaluate the feasibility of the concept and if remaining uncertainties, hypotheses or assumptions need to be addressed;

f) consider further validation, if necessary.

These activities can result in the following outputs:

— validated concepts or proof of concepts with acceptable levels of uncertainty for further development;

— relationships with users, customers, partners, and other interested parties;

— new knowledge.

8.3.5 Develop solutions

To develop solutions, the organization should consider validated concepts as inputs.

The organization should:

a) develop the concept into a working solution, including the value realization model;

b) consider whether to develop the solution internally or through acquisition, licensing, partnering, outsourcing, etc.;

c) identify and address risks associated with deployment, e.g. user acceptance, legal requirements, scalability, budget cycle, and timing;

d) check the state of art to avoid infringement of existing intellectual property rights;

e) determine whether the solution can, and needs to, be protected;

f) develop and establish the necessary deployment capabilities, e.g. promotion, production, supply, partnerships, and ecosystems.

These activities can result in the following outputs:

— developed solutions with value realization models, including value propositions;

— plans with established activities, resources, relationships, and timing for a full or phased deployment of the solutions;

— fulfilment of deployment needs and requirements, including intellectual property rights considerations.

8.3.6 Deploy solutions

To deploy solutions, the organization should consider developed solutions as inputs.

The organization should:

a) make the solution available to users, customers, partners, and other interested parties, e.g. by launching, implementing, or delivering the solution;

b) promote and support the solution, e.g. sales, marketing, communication, awareness creation, and engagement with users, customers, partners, and other interested parties;

c) monitor adoption rates and feedback from users, customers, partners, and other interested parties;

d) monitor the impact in terms of realization or redistribution of value;

e) identify new implications for intellectual property;

f) capture new knowledge from the deployment to improve solutions, develop relationships, and trigger new opportunities.

These activities can result in the following outputs:

— realized value, financial or non-financial;

— impact in the form of adoption and new behaviours of users, customers, partners, and other interested parties;

— insights and new knowledge to improve solutions.

9 Performance evaluation

9.1 Monitoring, measurement, analysis, and evaluation

9.1.1 General

9.1.1.1 The organization should determine:

a) what needs to be monitored and measured, including which innovation performance indicators are to be used;

b) the tools and methods for monitoring, measurement, analysis, and evaluation, needed to ensure valid results;

c) when the monitoring and measuring should be performed;

d) when the results from monitoring and measurement should be analysed and evaluated;

e) who will be responsible.

9.1.1.2 The set of innovation performance indicators, quantitative or qualitative, can include a balance of:

a) input-related indicators, e.g. number of ideas, number of innovation initiatives, value creation potential of ideas, new sources of knowledge, new insights, resources, and competence;

b) throughput-related indicators, e.g. speed of experimentation, learning and development, number or ratio of employees, managers or users involved or trained, effectiveness of collaboration and relationships, new tools and methods adopted, time to profit, time to market, engagement level, and brand awareness;

c) output-related indicators, e.g. number or ratio of ideas implemented, return on innovation investment, revenue and profit growth, market share, ease of use, speed of adoption by users, user

satisfaction, rate of innovation diffusion, organizational renewal and transformation, social and sustainability benefits, cost savings, rate of learning, intellectual property, new users, and image.

Innovation performance indicators can be applied at system, portfolio, or initiative level and can be evaluated and improved, as appropriate. They can focus either on the evaluation of the elements of the innovation management system, their interactions, as well as on the results.

The organization can use comparisons with other organizations when monitoring and evaluating performance.

9.1.2 Analysis and evaluation

9.1.2.1 The organization should analyse and evaluate the innovation performance and the effectiveness and efficiency of the innovation management system.

The analysis and evaluation should consider:

a) the realization and redistribution of value, in relation to the innovation strategy and objectives, and as a result of innovation activities;

b) the elements of the innovation management system and their interactions, including portfolios, support, initiatives, and processes.

The frequency of analysis and evaluation, as well as the tools and methods used, can depend on the context of the organization, as well as on its ambition to further improve innovation performance.

9.1.2.2 The results of the analysis can be used to evaluate:

a) the level of understanding of the context;

b) the degree of leadership commitment;

c) the effectiveness of actions taken to address opportunities and risks;

d) the effectiveness of the innovation strategy;

e) the effectiveness and efficiency of innovation support and processes;

f) knowledge sharing and learnings from both successes and failures;

g) the need for improvements of the innovation management system.

The organization should retain appropriate documented information as evidence of the results.

9.2 Internal audit

9.2.1 The organization should conduct internal audits at planned intervals to provide information on whether the innovation management system:

a) conforms to:

   1) the organization's own requirements for its innovation management system;

   2) other applicable requirements;

b) is effectively implemented and maintained.

9.2.2 The organization should:

a) plan, establish, implement, and maintain an audit program including the frequency, methods, responsibilities, planning requirements, and reporting, which should take into consideration the importance of the processes concerned and the results of previous audits;

b) define the audit objectives, criteria, and scope for each audit;

c) select auditors and conduct audits to ensure objectivity and the impartiality of the audit process;

d) ensure that the results of the audits are reported to relevant management;

e) take appropriate correction and corrective actions without undue delay;

f) undertake follow-up activities, including the verification of the actions taken and reporting of the verification results;

g) retain documented information as evidence of the implementation of the audit program and the audit results, as well as of the follow-up activities.

9.3 Management review

9.3.1 General

Top management should review the organization's innovation management system, at planned intervals, to ensure its continuing suitability, adequacy, effectiveness, and efficiency.

The management review can take place over a period of time and can partially, or fully, cover all elements of the innovation management system. The depth and frequency of such reviews can vary with the circumstances of the organization.

9.3.2 Management review inputs

The management review should include consideration of:

a) the status of actions from previous management reviews;

b) changes in external and internal issues that are relevant to the innovation management system;

c) information on the performance of the innovation management system, including trends in:

   1) realization and redistribution of value;

   2) the extent to which innovation objectives have been achieved;

   3) the performance of innovation portfolios, initiatives, and processes;

   4) knowledge sharing and learning from both successes and failures;

   5) deviations, nonconformities, and corrective actions;

   6) monitoring, measurement, analysis, and evaluation results;

   7) audit results;

d) the consistency of the innovation vision, strategy, and policy with the strategic direction of the organization;

e) the adequacy of support, including resources and competencies;

f) the adequacy of innovation performance indicators;

g) the effectiveness of actions taken to address opportunities and risks;

h) opportunities for continual improvement.

9.3.3 Management review outputs

The outputs of the management review should include decisions, actions, and follow up related to:

a) opportunities for improvement;

b) any need for changes to the innovation management system, considering the organization's readiness for change.

The organization should retain documented information as evidence of the results of management reviews.

10 Improvement

10.1 General

The organization should determine and select opportunities for improvement and implement any necessary actions and changes to the innovation management system, considering performance evaluation results.

The organization should consider actions and changes to:

a) maintain or enhance strengths;

b) address weaknesses and gaps;

c) correct, prevent, or reduce deviations and nonconformities.

The organization should ensure that actions and changes are implemented in a timely, complete, and effective manner.

The organization should communicate actions and changes within the organization and to other relevant interested parties, in order to stimulate learning and improvement.

A deviation can be described as an identified gap, an undesired effect, or a difference from the expected performance, whereas a nonconformity is the non-fulfilment of a requirement.

10.2 Deviation, nonconformity, and corrective action

10.2.1 When a deviation or a nonconformity occurs, the organization should:

a) react to the deviation or nonconformity and, as applicable:

   1) take action to control and correct it;

   2) deal with the consequences;

b) evaluate the need for action to eliminate the causes of the deviation or nonconformity, in order that it does not recur or occur elsewhere, by:

   1) reviewing and analysing the deviation or nonconformity;

   2) determining the root causes of the deviation or nonconformity;

   3) determining if similar deviations or nonconformities exist, or could potentially occur;

c) implement any action needed;

d) review the effectiveness of any corrective action taken;

e) update opportunities and risks determined during planning, if necessary;

f) make changes to the innovation management system, if necessary.

Corrective actions should be appropriate to the effects of the deviations and nonconformities encountered.

10.2.2 The organization should retain documented information as evidence of:

a) the nature of the deviations or nonconformities and any subsequent actions taken;

b) the results of any corrective action.

10.3 Continual improvement

The organization should continually improve the suitability, adequacy, effectiveness, and efficiency of the innovation management system.

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