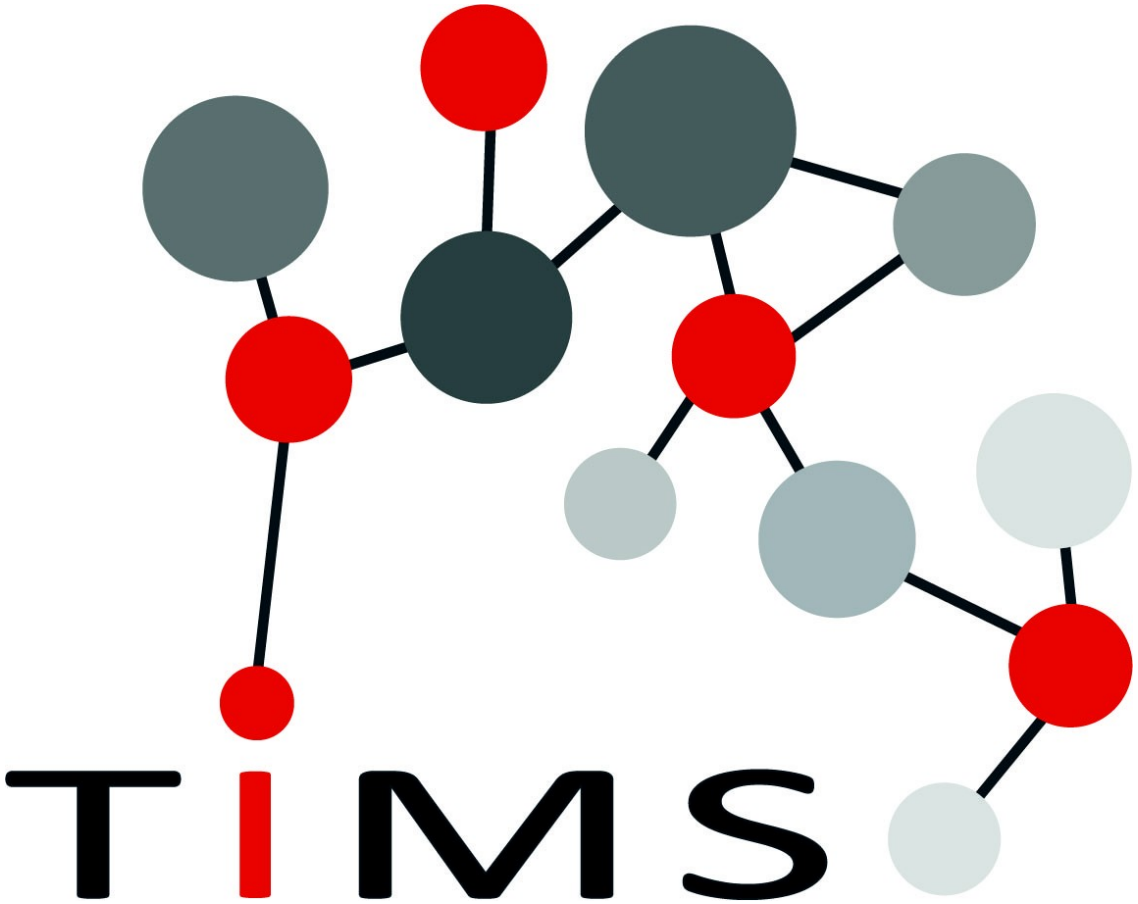

PR4.3 Risk & Opportunities Management Process

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1. Introduction

Organizations operate in a **volatile, uncertain, complex and ambiguous environment** which is characterised by

- **expanding knowledge flows**,
- **increasing global competition** and
- **rapid rates of change**.

This creates the **need to anticipate change**, **influence the environment** and **make timely and informed decisions** to ensure business objectives are continuously achieved and organization is moving forward to its future.

To this, **Innovation** and **Innovation management** seems to be a key to it.

Innovation according to Oxford learner's dictionary is a new idea, the introduction of new things, ideas or ways of doing something that have been introduced or discovered.

According to ISO56000 family, Innovation is a "new or changed entity" and/or "realizing or redistributing value". In this definition, "entity" can be product, service, process, model (e.g. organizational, business, operational or value realization model), method or a combination thereof. Entities can be material (e.g. an engine), immaterial (e.g. a project plan) or imagined (e.g. the future state of the organization).

Also "value" means gains from satisfying needs and expectations, that can be revenues, savings, productivity, sustainability, satisfaction, empowerment, engagement, experience, trust. Value can be financial or non-financial and is determined by the perception of the organization and interested its interested parties.

Gartner defines innovation management as **a business discipline that aims to drive a repeatable, sustainable innovation process or culture within an organization**. Innovation management initiatives focus on disruptive or step changes that transform the business in some significant way.

Innovation Management consists of a number of coordinated activities to direct and control an organization with regard to innovation, by establishing strategies, policies and objectives and processes to achieve those objectives.

An innovation management system becomes increasingly more important every day for the survivability and the development of modern companies. However, the know-how regarding the innovation management is almost non – existed in most companies, regardless their sector.

TIMS project presents itself as a possible answer to assist SMEs successively manage innovation by designing an innovative, digital and open access VET programme with a practical "Handbook for Innovation Agents" and "TIMS Self-Assessment Tool for Innovation" and will provide a holistic view for leadership and innovation by comprising managerial, interpersonal and reflective skills which will then be applied into building innovative modus operandi in European SMEs based on the ISO 56000 series standards for innovation management.

TIMS project aims to:

- Assist the organizations in need to scale up the existing quality management system to innovation management system for launching the competitive strategy.
- Promote innovation in SMEs as the main tool to facilitate sustainability, learning throughout life, and adjusting to the changes.
- Promote transnational networking and exchange between enterprises and VET providers at the European level, applying theory to the European (and not only) business scene.

For an SME several risks may occur and eventually threaten the successful transition of the organization to its future. This becomes more intensive and demanding when the organization is aiming to deploy or has already

deployed an Innovation Management System as part of its governance. Risks should be identified, analysed, evaluated, and treated accordingly, in a timely manner.

Analysis is not related only to "negative" risks. Through this analysis, "positive" risks might also be found that could reveal opportunities leading, for example, to new business, new markets, cost efficiencies or improved processes of boost innovation efforts.

This document will describe the "Risk & Opportunities management process" to be included in the TIMS project deliverables. Concepts from ISO31000 and ISO56000 series will be used, along with Project Risk and Change management best practices, found in the "PMBoK Guide" and related literature.

Finally, to assist the target groups to start exploring and tailoring the Risk/Opportunity Register to their unique environment and projects towards a CE business model, an indicative list of respective Risks and Opportunities is presented.

2. Purpose

The purpose of this document is to help SMEs understand and manage the risks and opportunities related to their business, operations and of course to Innovation Management lifecycle.

3. Reference Documents

I. **ISO 31000:2018 - *Risk management – Guidelines***
ISO 31000 is an internationally recognized standard for risk management, providing organizations with guidance and principles to effectively identify, assess, and address risks. It offers a systematic approach to risk management, enabling organizations to make informed decisions, improve performance, and enhance resilience. Using ISO 31000 can help organizations increase the likelihood of achieving objectives, improve the identification of opportunities and threats and effectively allocate and use resources for risk treatment.

II. **ISO 22316:2017 Security and resilience - Organizational resilience - Principles and attributes**
Climate change, economic crises and consumer trends are just some of the pitfalls that can dramatically affect the way an organization does business and survives. Organizational resilience is a company's ability to absorb and adapt to that unpredictability, while continuing to deliver on the objectives it is there to achieve.
ISO 22316 provides a framework to help organizations future-proof their business by creating a resilience culture, improve its capacity to anticipate and respond to threats and opportunities, and enable the organization to keep delivering on its commitments in the face of complex changes.

III. **ISO 56000 Family of Standards on Innovation management**
ISO 56000 is the international standard for innovation management. It is a set of standard operation procedures for all types of innovation and approaches. It is written with the common high-level structure of the ISO management system standards. It includes terms, tools, methods, and guidance for managing interactions, intellectual property, strategy, and ideas. It also defines vocabulary, basic concepts, and principles of innovation management. It is part of a family of standards designed to help organizations make their innovation management activities clear and reliable.

ISO standards for innovation help businesses effectively respond to change in order to maximize opportunities for growth and development while reducing associated risks. Companies can demonstrate their ability to manage innovation activities to achieve their intended outcomes: increased revenues and profitability, improved sustainability and resilience, greater ability to attract partners, collaborators and funding, and enhanced customer satisfaction.

IV. **PMBOK, Project Management Book of Knowledge by the Project Management Institute, PMI**
PMBOK is a global standard issued by the Project Management Institute (www.pmi.org), **an industry framework that incorporates best practices in project management**, including the Risk Management within Project and Program Management.

4. Definitions

Consequence
A consequence represents the outcome of an event and its impact on objectives. Consequences can be certain or uncertain, and they can have direct or indirect positive or negative effects. They can be expressed qualitatively or quantitatively. Consequences have the potential to escalate through cascading and cumulative effects.

Event
An event refers to the occurrence or change of a specific set of circumstances. It can have one or more instances, multiple causes, and various consequences. Events can include both expected and unexpected occurrences and can act as risk sources.

Likelihood
Likelihood is the chance of something happening. In risk management, likelihood refers to the probability or frequency of an event occurring over a given period. It can be defined, measured, or determined objectively or subjectively, using general terms or mathematical methods. In some languages, the term "probability" is used instead of "likelihood," but in risk management, "likelihood" is intended to have a broad interpretation like the concept of "probability" in languages other than English.

Opportunity
A favourable or advantageous circumstance or combination of circumstances. A potential event or condition that has the potential to create a positive outcome for a project or business objective if pursued.

Opportunities Register
A dynamic document repository is established to record and pursue opportunities.

Residual risk
Whatever risk level remains after planned responses are applied.

Risk
Risk refers to the effect of uncertainty on objectives. It involves deviations from expected outcomes, which can be positive or negative and can create opportunities or threats.

Risks are typically expressed in terms of risk sources, potential events, their consequences, and their likelihood. Objectives can have various aspects and categories and can be applied at different levels.

Risk appetite

It is the level of risk that an organization is prepared to accept in pursuit of its objectives, before action is deemed necessary to reduce the risk. It represents a balance between the potential benefits of innovation and the threats, that change inevitably brings.

The ISO 31000 risk management standard refers to risk appetite as the "Amount and type of risk that an organization is prepared to pursue, retain or take".

Risk Management
Risk management encompasses coordinated activities aimed at directing and controlling an organization in relation to risk. It involves identifying, assessing, and addressing risks to effectively mitigate their impact and achieve objectives.

Risk Register
A dynamic document repository is created and updated to record the results of the risk management process during the project/program. Risks are registered.

Risk Source
A risk source is an element that, either individually or in combination, has the potential to give rise to risk. It serves as a basis for the occurrence of events that may lead to positive or negative consequences.

Stakeholders
In business, a stakeholder is any individual, organization, group, or party that has an interest or stake in an organization and the outcomes of its actions.

Stakeholders can be categorised as either internal or external to an organisation. Internal stakeholders are individuals who have a direct relationship with the company, such as employees, owners or investors, and their interest in the organisation comes from this direct relationship.

On the other hand, external stakeholders are not directly engaged in the day-to-day operations of the firm but are being affected in some way by the actions and results of the firm. External stakeholders include entities such as suppliers, creditors, and various public groups.

5. Risk Management & Process

In order to avoid confusion, from this point on -unless otherwise noted- this document and the respective terminology will be focused on Risks. However, it should be relatively simple for the dedicated learner to adapt the process and **focus on the opportunities as well**, instead of risks only.

The Risk Management process should be closely associated with the management and decision making of the organisation and should be integrated into the structure, functions, and processes of the organisation. It can be implemented at different levels, such as strategic, operational, programmatic or project level. **And of course as an integral part of Innovation Management life cycle**.

Within an organisation, multiple applications of the risk management process can be adopted, designed to achieve objectives, and aligned with the specific external and internal context in which they are applied. While the risk management process is usually pictured as a sequential approach, in practice it is an ongoing process that allows for continuous improvements and adjustments.

The below is a typical flow for an effective and efficient Risk Management. The Risk management process has four (4) phases which comprise of seven (7) steps.

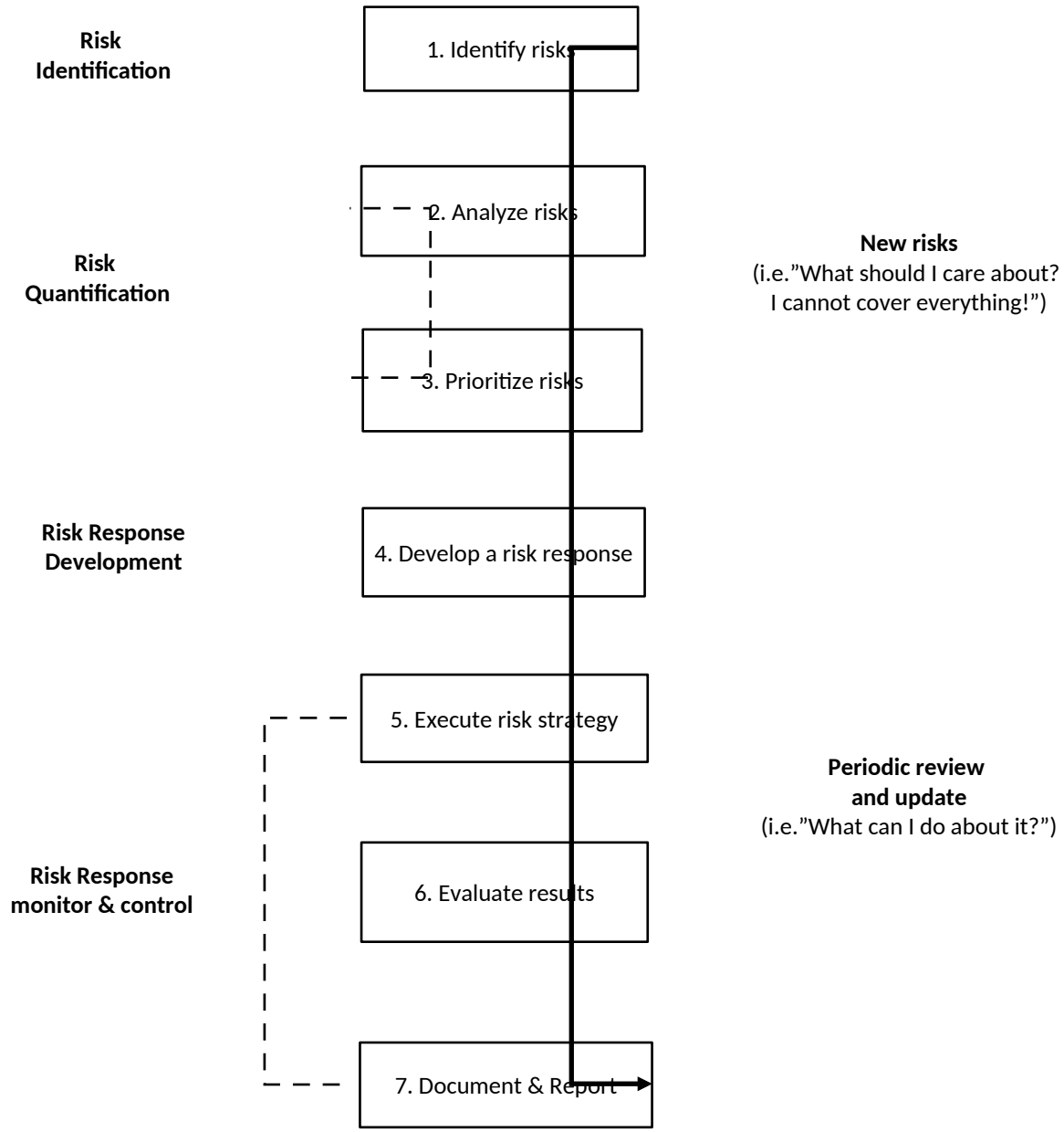

Figure 1. Risk Management Process

Throughout the risk management process, the dynamic and ever-changing nature of human behaviour and culture should be considered.

5.1 Risk Identification

The first step in Risk Management is the identification of risks and threats that could undermine key our initiatives or our Innovation Management project.

To effectively identify risks, all project activities and factors (internal or external) will be analysed for risks and threats that may impact the project negatively. Risk identification should be performed not only during project planning, but continuously through the project life cycle.

Both internal and external risks should be identified:

- **Internal** risks can be controlled or influenced by the project or planning team, such as resource assignments & availability, schedule and cost estimates, contract type.

- **External** risks are those risks beyond the control of influence of the project or planning team, such as customer decisions, market shifts or government actions.

The effectiveness of the entire risk management process is only as good as the quality and specificity of the threat event statements.

The following are two (2) recommended general formats for threat event statements either for risks or for opportunities):

- " _ _ _ _ _ _ may occur during _ _ _ _ _ thereby causing an impact to _ _ _ _ _ _ _".

- "If _ _ __ _ _ _ occurs, then an impact to _ _ _ _ _ _will occur".

Example of risk categories:

- Organizational
- Financial (including exchange rates, inflation, taxation, competition)
- Political
- Legal & Regulatory (including licensing, contract ambiguity, lawsuits)
- Social (including public interest)
- Environmental
- Technical & Knowledge (including technological maturity, complexity, customizations)
- Supply Chain
- Public interest
- Natural hazards
- Market changes

The most common tools and techniques used to identify risks are the following:

- Expert interviews
- Brainstorming
- Delphi technique
- Nominal Group Technique (NGT)
- Crawford Slip
- Proportion method
- SWOT analysis
- existing checklists, questionnaires, and templates (based on lessons-learned and the idea that no new project represents a completely new set of risks as well)

Indicative threats that may be discovered in relation to the specific project as:

- External factors (pandemic) affecting communication

- Potential Partners low involvement or performance
- Partner withdrawal
- Conflicts among partners
- Quality issues
- Delays (Project plan/Timeline risk)
- Budget deviations

All risks (and opportunities) discovered during the project lifecycle by participating members should be registered under the Project Risk (Opportunity) Registry where each risk is thoroughly analyzed and evaluated.

Risk Register

Next step within Risk Identification is the creation of a Risk Register - a form to document the risks identified.

Information can include (for both Risks & Opportunities):

- Risk / Opportunity ID
- Category
- Project (optional)
- Risk / Opportunity owner (person responsible to manage the opportunity)
- Risk / Opportunity event statement (a.k.a. risk / opportunity description)
- Probability
- Impact / benefit
- Risk / Opportunity score (probability * impact)
- Ranking / priority
- Response – treatment (could contain references to separate plan documents, control or measures)
- Residual Risk / Opportunity score after treatment (updated after every implementation of a response strategy)

The form provided below can be used. This form is called the Risk Register and is used to document and track the identified potential business risks, the likelihood, impact and severity of each risk, and the actions proposed and selected to address (minimize/mitigate) the risks.

Risk ID	Category	Project	Risk Owner	Risk / threat event statement	Probability	Impact	Risk Score	Ranking / Priority	Response – treatment	Residual Risk score
or Opportunity ID		(optional)	Or Opportunity Owner (Person responsible to manage the risk / opportunity)	Or Opportunity event (a.k.a. Risk / Opportunity Description)	Or Likelihood	Or Consequences	Probability * Impact	Priority to handle	(could contain references to separate plan documents, control or measures)	Or Opportunity score (updated after every implementation of a response treatment)

Figure 2. Risk & opportunities Register

Here is a template that can be used.


Risk &
Opportunties Regist

Examples

As this is one of the most important part of the effort, that is to use the categories to identify as many relevant risks (and opportunities) as possible, and not to worry if a risk is categorized under "Political" whereas it should be under "Legal". After all, a risk may belong to more than one category.

Examples are provided below, considering innovation in relation to green economy, sustainability, circular economy, digitalization and artificial intelligence.

Indicative Risks

Risk Category: **Organizational**

- Lack of change management mindset & capabilities/experience
- Lack of innovative company culture
- Pressure from shareholders/investors to achieve sustainability
- Lack of key resource management capabilities/experience
- No formal inclusion of artificial intelligence principles in the innovation management, strategy, objectives and performance indicators
- Very low risk appetite (company practically does not risk at all)
- Many hierarchy levels
- Lack of employee involvement & participation
- Lack of top-management support in innovation (of course this is a classic risk for all major change initiatives, regardless of the objective)
- Innovation management not aligned with the overall strategy and strategic direction of the organization
- Innovation management has not considered how innovation activities and innovation initiatives are expected to realize value for the organization and relevant interested parties
- Resources not allocated to support innovation management; poor organization structure does not support key activities and requirements as what will be required in terms of resources, structures and processes, who will be responsible, when it will be completed, and how results will be monitored, measured, evaluated, protected, communicated and documented etc.

Risk Category: **Financial**

- High up-front investment cost (e.g. for new products' equipment & processes, "green" innovation)
- Higher operating costs for business models (e.g. collecting, sorting & recycling waste material)
- Difficult access to operational and/or investment capital (e.g. when it comes to bank financing, SMEs - and especially very young small businesses- face difficulties in obtaining the collateral or guarantees required by the banks, which often consider SME financing a risky business)
- Cash flow risks (e.g. delayed cash flows as a result of pay-per-use models)

- SMEs may neglect the possible financial gains from improving their resource efficiency, adopting artificial intelligence, apply innovations and also consider resource efficiency practices to be costly for their business

Risk Category: **Political**

- Insufficient regulations for green economy and sustainability, not covering all industry/SME sectors
- Lack of government agencies to assist SMEs in the transition to circular economy or digitalization

Risk Category: **Legal**

- The inflexibility of national & EU legislative framework and slowness of change/adaptation to artificial intelligence, energy management, circular economy and sustainability existing and emerging requirements
- Warranty, maintenance/support and/or take back contractual and regulatory obligations and in general the responsibilities in case of malfunction
- Most tools for innovation and environmental management (such as the European Eco-Management and Audit Scheme - EMAS) are produced for larger companies, without taking into account the specificities of the SME sector
- Lack of clarity on several concepts of EU legislation (such as producer responsibility, quality of separate collection and definitions of recycling, re-use and recovery)

Risk Category: **Social**

- Public health risk (by using recycled materials or reusing raw materials)
- Many consumers are still focused on convenience and low-priced products
- Many consumers consider remanufactured products as low quality
- Innovations applied may be too early for the society to accept
- Changes in consumer base, perception, and behaviour (including fashion and lifestyle)

Risk Category: **Environmental**

- Customers are less sensitive to products that can be handled easily after their use.
- Low “eco-literacy” for many SMEs
- Substantially increased administrative burdens stemming from environmental legislation
- SMEs lack the specific knowledge & capacity to comply with the necessary energy management and environmental requirements (as a result, they often rely on external consultants at an extra cost)

Risk Category: **Technical & Knowledge**

- Use of unproven technologies
- Professionals lack awareness, knowledge and understanding of innovation, sustainability, green economy, circular economy
- Most products are not designed for disassembly (e.g. buildings)
- Many SMEs do not have the technical capacity to identify, assess & implement more advanced technical options that would enable them to reduce their environmental impacts while realising cost savings
- Lack of information (some SMEs are not even aware that circular business models are available and could be beneficial)

Risk Category: **Supply chain**

- A limited number of suppliers offering circular materials
- Uncertainty in the quality & volume of the return flows against investments in innovation , energy management etc

- Absence of network support, both by customers & suppliers, to apply pressure in the direction of green procurement and/or products life extension
- The industry is still largely attached to the linear model (the result being, for example, that management does not invest to promote resource efficiency or better waste management, but does invest in a new marketing campaign)
- Closed-loop & reverse loop supply chains, could increase the cost of logistics, transportation & energy
- SMEs due to their small size and bargaining power, have little influence on their suppliers' engagement in sustainable and green economy activities
- Suppliers are reluctant to foster a greener supply chain due to the potential costs that could harm their competitiveness

Indicative Opportunities

Opportunity Category: **Social**

- Improved relationships between local societies and SMEs
- Employment opportunities from the green, sustainability and energy management business
- Employment opportunities for design graduates & professionals with circular economy related expertise

Opportunity Category: **Financial/Economic**

- Resource productivity, material cost reduction & increased revenue from waste sales
- Allay demand-driven price volatility of raw materials & supply risk (thus improving the security of raw materials supply)
- Reputational advantage
- Increased revenue and market share due to increased competitiveness
- Waste management could unlock new business opportunities

Opportunity Category: **Environmental**

- Conservation of natural resources (especially non-renewable resources such as water, fossil, fuels, and minerals)
- Reduced environmental impacts (through efficient energy and material and less water discharge, avoidance of toxic materials, the extended life cycle of landfill sites, and recovery of the local ecosystem)
- Protecting human health and biodiversity

Opportunity Category: **Technology**

- Resource efficiency and waste minimization (by increased innovation and adoption of cleaner technologies)
- Assistance in industrialization through industrial symbiosis (i.e. the exchange of waste materials between two or more companies)

5.2 Risk Quantification (Analysis & Prioritization)

After completing the previous step, more information needs to be collected in the Risk Register document.

However, when viewed from a management perspective, this raw risk list lacks differentiation in terms of company concerns and requirements. It fails to provide management with a comprehensive understanding of the following:

- Which risks are significant and which risks are not.
- Which risks require immediate attention and which could potentially be overlooked.
- Which risks are urgent, and which can be addressed later.

Without answers to these questions, it becomes difficult to make informed decisions about risks.

Should you prioritize and focus on the top ten risks or solely on those considered most important? What if the company does not have the necessary resources to address all the risks listed?

It is important to find a way to quantify and prioritise the risks so that each employer, manager or risk expert/consultant can start working on the most important ones without wasting time, money, and resources on those that are of secondary importance.

To do this (Quantification and Prioritisation) the calculation and evaluation of two factors for each of the risks is required. These factors are Probability (Likelihood) and Impact (Consequences).

A. Probability (**Likelihood**) of a risk is directly related to the probability of the risk occurring.
Our aim is to prioritise the risks so that we can decide which ones to deal with first.
For the purposes of our work, it is sufficient - and applicable in almost all cases - to use our common sense and understanding of the business environment along with the simple approach outlined below.
In the context of a typical risk hierarchy, it is sufficient to define and use a Probability Scale using a 3, 4 or 5 step (or more) scale.

SCALE		PROBABILITY TO HAPPEN[1]
1	Unlikely	Less than 7% Never happened or may happen once every 15 to 20 years
2	Moderate	Between 8% and 40% Expected to happen once every 6-15 years
3	Likely	Between 41% and 80% Expected to happen once every 1-5 years
4	Almost Certain	Greater than 80% Expected to happen more than once every year

Figure 3. Probability (Likelihood) Assessment Matrix

The levels for calculating the Probability (Likelihood) of risk as for our above example are:

Unlikely: A risk event is not very likely or rare to occur

Moderate: A risk event can happen

Likely: A risk event has a high probability of happening

Almost certain: A common risk phenomenon

B. Impact (Consequences) refers to the estimated impact / consequences that a risk may have on the business when it occurs**.**

[1] You could change the numbers of years and percentages according to your needs, the data presented on this example are for presentation purposes only.

Risk (negative impact)		
SCALE		IMPACT (CONSEQUENCES)[2]
1	Insignificant	Health & safety: none Financial: loss of < 500 € Operational: operations interruption less than 1 day Reputational: no impact Regulatory / Legal: none
2	Minor	Health & safety: first aid treatment Financial: loss between 500 € and 2.500 € Operational: operations interruption 1 to 2 days Reputational: few unsatisfied customers Regulatory / Legal: minor non-compliance with regulatory requirement
3	Major	Health & safety: Medical treatment required Financial: loss between 2.500 € and 10.000 € Operational: operations interruption 3 to 5 days Reputational: several unsatisfied customers. Limited spread of news Regulatory / Legal: Significant noncompliance with key regulatory requirements – Legal action against the owner or the company
4	Severe	Health & safety: Death or extensive injuries Financial: loss of more than 10.000 € Operational: operations interruption more than 5 days Reputational: many unsatisfied customers. Publication in town media. Regulatory / Legal: Long-term / permanent non-compliance with key regulatory requirements – Loss of permit – More than one Legal actions against the owner or the company

POSITIVE RISKS (OPPORTUNITIES) IMPACT SCALE		
SCALE		IMPACT (CONSEQUENCES)[3]
1	Insignificant	Health & safety: none Financial: unexpected sales (or savings) of < 1.000 € Operational: none Reputational: no impact Regulatory / Legal: none

[2] All numbers and estimates can be changed.
[3] All numbers and estimates can be changed.

POSITIVE RISKS (OPPORTUNITIES) IMPACT SCALE		
SCALE		IMPACT (CONSEQUENCES)
2	Minor	Health & safety: none Financial: unexpected sales (or savings) between 1.000 € and 10.000 € Operational: required operations improvements of 5% (to support extra sales) Reputational: Positive statements from a couple of customers Regulatory / Legal: none
3	Major	Health & safety: none Financial: unexpected sales (or savings) between 10.000 € and 30.000 € Operational: required operations improvements of 20% (to support extra sales) Reputational: Positive statements from some customers. Limited spread of news in a couple of blogs, result in new sales and several phone calls Regulatory / Legal: new sales contracts require legal support
4	Severe	Health & safety: none Financial: unexpected sales (or savings) of more than 30.000 € Operational: required operations improvements of 70% (to support extra sales) Reputational: Positive statements from several customers. Extended spread of news in media, result in new sales and huge number of phone calls. Regulatory / Legal: new sales contracts require extended legal support

Figure 4. Impact Assessment Criteria

C. **Risk Score**, the quantification of a Risk by producing a value that provides an insight into the 'size' of the Risk in terms of Probability and Impact and in relation to the magnitude of these values.

This is calculated by multiplying the probability score by the Impact score:

Risk Score = Probability (likelihood) x Impact (consequences):

Risk Matrix is a grid-style **"traffic light system**" that is used to help visualize the rating of identified risks. Colours are used in the form of traffic lights to differentiate the severity of the risks and help work better with risks prioritization: Scale starts from **Green** (the least severe risks) and ends to **Red** that colours the most severe risks in the scale for the scales of 1-4 we have picked above.

Here is a Risk as well as an Opportunity matrix.

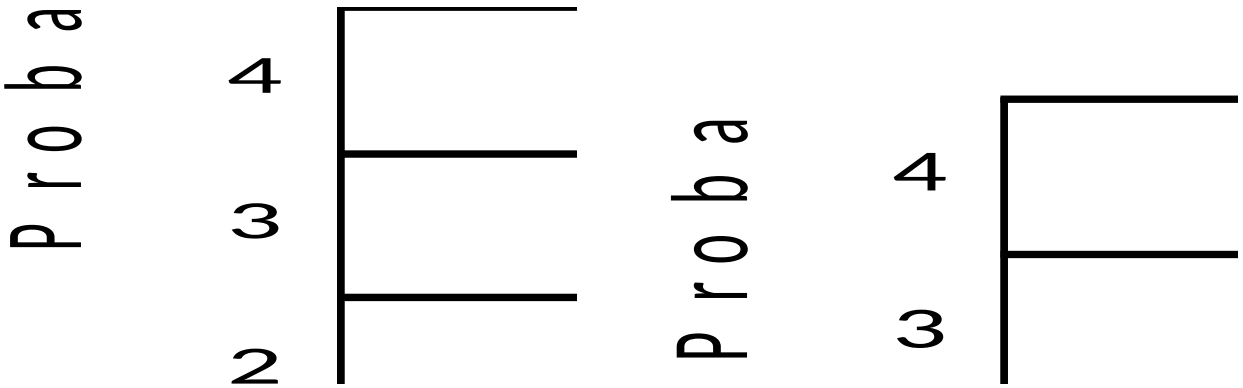

Figure 5. Impact Assessment Criteria

The areas in each of the matrix defines the significance of the risk that may be evaluated to be at the specific box.

- **Red (deep blue)** = Significant risks that must be treated asap (Severe)
- **Orange (blue) =** Less significant Risks that should be treated (Minor)
- **Yellow (light Blue)** = Medium risks that may be treated (Major)
- **Green (very light blue) =** Minor risks that company need not spend resources in treating as long as they retain the same rating (Insignificant),

It is clear that the above list defines the priority the risks in relation to urgency and significance of treatment.

Looking at the Matrix, we understand that the most important risks are those that have **both high Probability AND high Impact therefore are in the top right corner of the Matrix.**

Here is an example of three Risks (Riks 1, Risk 2 and Risk 3) that have been analyzed and their risk is quantified.

Risk ID	Category	Project	Risk Owner	Risk / threat event statement	Probability	Impact	Risk Score	Ranking / Priority	Response – treatment	Residual Risk score
or Opportunity ID		(optional)	Or Opportunity Owner (Person responsible to manage the risk / opportunity)	Or Opportunity event (a.k.a. Risk / Opportunity Description)	Or Likelihood	Or Consequences	Probability * Impact	Priority to handle		
R-01	Financial		Finance Dept	Risk 1	2	4	8	2nd		
R-02	Operational		Logistics Dept	Risk 2	1	3	3	3rd		
R-03	Reputational		Marketing Dept	Risk 3	4	3	12	1st		

Figure 6. Risk & opportunities Register

5.3 Develop a Risk Response and execute the Risk Strategy.

Based on the prioritization that took place in the previous step, we then have to move forward and decide on the measures to implement to ensure we will minimize the risk (that is to reduce its Probability and / or Impact and therefore reduce its Risk score and the overall impact it may have on the organization.

There are 4 types of risk treatment response:

I. **Avoid the risk**: (remove it completely, away from company's life) by deciding not to start or continue with the activity that gives rise to the specific risk;

   Risk avoidance is sometimes adopted when an activity or situation involves a high level of risk which cannot be adequately treated to an acceptable level by another approach.

   The risk might be too high against the potential benefits for the company associated with the activity / situation as well as the costs of a risk mitigation solution could also be too high to be affordable or to balance the benefits.

II. **Mitigate the risk**: By choosing this risk management response, it is possible to reduce the probability of a risk or minimize its impact if it occurs.

By applying this strategy to a particular threat, it becomes vital to implement one or more control measures that alter the overall level of risk.

These controls can take various forms, such as policies, procedures, practices, technical measures, devices, and other actions that reduce the overall risk.

III. **Transfer the risk**: A risk transfer strategy involves switching all or part of the risk to another place or party. Although the probability of the event remains unchanged or unaffected, this approach minimizes the impact on the organization.

Transferring the risk is somehow a form of Risk Mitigation Strategy. Transferring is usually in the form of:

(a) insurance coverage in cases of high impact risks, so that you get back the monetary amount related to the value of the destruction / loss of premises, goods, equipment, profits, health etc. including legal liability risks

(b) subcontracting or outsourcing of a project or an activity (usually secondary to business objectives) or a service to a third party.

IV. **Accept the risk**: To acknowledge the risk and be willing to accept the consequences if it happens. There are two ways to approach this:

- Passive acceptance: Making a conscious decision to take no action in response to the risk.
- Active acceptance: Developing a disaster plan and implementing it if the risk event happens.

Based on the above, a number of measures and controls are decided and implemented, that result in the mitigation of existing risk exposure of the organization (or the project).

As of our example, the picture could be as below:

Risk ID	Category	Project	Risk Owner	Risk / threat event statement	Probability	Impact	Risk Score	Ranking / Priority	Response – treatment	Residual Risk score
or Opportunity ID		(optional)	Or Opportunity Owner (Person responsible to manage the risk / opportunity)	Or Opportunity event (a.k.a. Risk / Opportunity Description)	Or Likelihood	Or Consequences	Probability * Impact	Priority to handle	(could contain references to separate plan documents, control or measures)	Or Opportunity score (updated after every implementation of a response treatment)
R-01	Financial		Finance Dept	Risk 1	2	4	8	2nd	Deployment of measure 1 and measure 2 that change the Impact to 2 while probability remains 2	4
R-02	Operational		Logistics Dept	Risk 2	1	3	3	3rd	No measures taken	3
R-03	Reputational		Marketing Dept	Risk 3	4	3	12	1st	Deployment of measure 3 and measure 4 that change the Probability to 3 and the Impact to 2	6

Figure 6. Risk Register with risk treatments.

We can clearly see the residual risk exposure of the organization to be significantly lower (see last column above) once the measures decided were implemented.

5.4 Examples of risks and possible treatment plans

We have developed some examples of the risks with possible treatment approached, considering the above techniques:

You will also notice that “Accept” as an option of risk treatment is discussed at the end of the examples.

Risk Category	Risk	Possible Treatment Plans	
Operational	Inappropriate training programs and strain operational capabilities	Mitigate	Offer specialised training programmes and set up support systems to help employees in their roles.
		Transfer	Exploration the possibility of outsourcing some training and support functions to external service providers or partnering with organizations that specialize in innovation management.
		Avoid	Allocate specific innovation training programs which are united in the whole responsibility and timeline training of a new employee.
	Impact in productivity, and efficiency	Mitigate	Regular communication and coordination will be crucial to maintain productivity and efficiency.
		Transfer	Engagement and creation of relevant groups from employees and stakeholders in the process of integrating or adapting work processes with innovation standards.
		Avoid	Have group tasks that help the employees work together
	Difficulty executing innovation projects on time	Mitigate	Use agile development methodologies and track progress closely.
		Transfer	Outsource some or all of the innovation project to a third-party vendor.
		Avoid	Carefully plan innovation projects.
Financial	Difficulty executing innovation projects within budget	Mitigate	Develop a budget for innovation and track spendings carefully
		Transfer	Outsource some or all the innovation project to a third-party vendor with a set price.
		Avoid	Carefully budget innovation projects.
	Financial losses due to product liability lawsuits or other legal claims related to innovation.	Mitigate	Obtain adequate product liability insurance.
		Transfer	Transfer the risk of financial losses due to product liability lawsuits to an insurance company.
		Avoid	Avoid developing or selling innovating products or projects that are inherently risky.
Legal	Failure to comply with applicable laws and regulations related to innovation, such as	Mitigate	Frequently review and update policies, practices, and procedures to align with legal requirements.
		Transfer	Cooperation with legal counsel specializing in innovation law to ensure full compliance with

Risk Category	Risk	Possible Treatment Plans	
			innovation-related laws and regulations.
		Avoid	Working with specialist innovation advisors and overseeing all legal documents, equipment and building units for greater company coverage.
	Failure to obtain necessary permits or licenses.	Mitigate	Train staff in HR and managers of appropriate documentation practices to ensure accuracy and knowledge in response to legal questions.
		Transfer	Engage with third-party service providers who can undertake the task.
		Avoid	Working with specialist innovation advisors and overseeing all legal documents for greater company coverage.
Strategic	Failure to identify and prioritize innovation opportunities	Mitigate	Invest in market research and competitive intelligence.
		Transfer	Partner with external innovation experts.
		Avoid	Develop a systematic process for identifying and prioritizing innovation opportunities.
Reputational	Public backlash against an innovation that is perceived as harmful to society or the environment.	Mitigate	Conduct thorough societal and environmental impact assessments before developing and releasing new products or services.
		Transfer	Establish a third-party oversight body to review the innovation and advise the company on how to minimize its negative impacts.
		Avoid	Focus on markets where there is strong public support for the innovation.
	Potential boycott or reputational damage on social media platforms	Mitigate	Have a process in place for users to appeal content removal decisions.
		Transfer	Partner with third-party organizations to help with content moderation.
		Avoid	Avoid developing features that could lead to boycotts or reputational damage.

Risk Category	Risk	Possible Treatment Plans	
All Categories	Inappropriate training programs and strain operational	Mitigate	Offer specialised training programmes and set up support systems to help employees in their roles.
		Transfer	Exploration the possibility of outsourcing some training and support functions to external service

Risk Category	Risk	Possible Treatment Plans	
			providers or partnering with organizations that specialize in innovation management.
		Avoid	Allocate specific innovation training programs which are united in the whole responsibility and timeline training of a new employee.

Risk	Strategy Respond Method	Possible Actions
Every Risk Category	Acceptance	• Passive Acceptance: This means that the risks are being recognized but the company does nothing to minimize the cause or the effects. • Active Acceptance: The organization has identified the threats that might be in the operational, financial, reputational, legal field, and has created a disaster or emergency plan to face these risks in the appropriate time. A resilience plan includes all the untreated threats a company might face and provides solutions and fast action-responds to each one of them.

5.4 Evaluation of results & reporting

Evaluation of the initial implemented action plan

Once the action plan is implemented, an evaluation is required to ensure that risk mitigation, as decided and implemented, was effective and efficient and risk remains within the acceptable limits. If a gap or weakness is identified in the overall assessment and implementation further steps and actions where the organization can follow are necessary.

Some typical steps of this evaluation and related decisions are listed below:

Figure 7. Actions after Risk Evaluation

Finally, the updated Risk Register, is maintained to ensure risks are documented and monitored as required.

5.6 Risk Monitoring and Control

This represents the final stage in a process of effective risk management within an organization.

Throughout this process, it is important to maintain frequent communication with your organization and other stakeholders who may be affected by the risks.

The organization must establish a systematic approach to monitoring and reviewing its risk management strategy. This is necessary because risks are constantly evolving. The risk management strategy should be included in a document that will be regularly updated to reflect changes affecting the business. New risks will arise while existing risks may decrease or intensify.

These changes may result from internal organizational changes as well as external factors beyond your control.

To ensure effective monitoring and review of the risk management strategy, there are many valuable methods that can be used depending on the risk the company is facing.

Let's share a step-by-step risk monitoring and review methodology:

a) Maintain a comprehensive and easily accessible project documentation file, with particular emphasis on the Risk Register. Ensure that emergency and recovery plans are available at agreed points and locations for quick access in the event of a disaster.

b) Provide appropriate information and training to all staff regarding the solutions and controls implemented. Schedule regular training sessions, at least once or twice a year, to raise awareness and share the necessary knowledge among responsible individuals. Clearly define the roles and responsibilities outlined in selected measures and controls, ensuring they are diligently followed by staff.

c) Foster a culture of risk awareness in your company's day-to-day operations. It is important to encourage everyone to approach every new process, action, or decision with a risk management perspective. Ultimate success would be to embed risk management as a standard in all decision-making processes.

d) Annual repetition of the risk management cycle, updating the Risk Register, improving risk assessments by implementing new measures and controls, preparing plans, and improving overall resilience. With each repetition, the process will become smoother and more efficient, leading to greater resilience for the company.

e) Establish a regular review process, such as quarterly or semi-annually, to assess the effectiveness and efficiency of implemented solutions-practices, measures, and controls. Monitor changes in the internal and external business environment, identify emerging risks and revise risk treatments and priorities accordingly. Update the Risk Register and address new or modified risks as required.

f) Conduct annual emergency plan exercises, ensuring they remain up-to-date and enabling your teams to effectively recover systems, operations, and services as planned. Confirm that the personnel involved in the exercises understand their roles and responsibilities as defined in the plans and can respond effectively when needed.

g) Maintain a file to record adverse events (including near misses), changes, trends, successes, and failures. Analyze these incidents to learn from negative incidents and failures and improve the company's resilience by strengthening existing measures or implementing new ones.

6. Management of Opportunities

6.1 Fields and Identification of Opportunity Step

Throughout the project lifecycle or business, opportunities can be identified that lead to significant time and cost savings. However, if these opportunities go undetected, they may be lost completely. Therefore, the management of positive risks should receive considerable attention.

The process of identifying opportunities is not meant to reveal every possible fortunate incident that could happen. Instead, it concentrates on identifying major events with a realistic likelihood of happening, including those with a reduced probability of incidence.

There are three different and independent ways to identify an opportunity:

Observing the trends

Entrepreneurs can gain awareness of developing trends by two methods: thorough study and observation, or by gaining customized predictions and market analyses from independent research firms. These trends can exist in the economic, social, technological, political, or regulatory field.

Solving a Problem

Sometimes, identifying opportunities leads to identifying a problem and devising a solution to it. These problems can be identified by observing trends, but they can also arise through simpler means, such as intuition, luck or chance. Some business ideas clearly come from a desire to address a particular problem. In this case we are interested in the evolution and new business ideas through employees.

Discovering gaps in the market

These gaps exist when a product or service is necessary for a particular group of people, but the size of the market is not large enough to attract the attention of major distributors or manufacturers.

The question at this stage is “What are the changes and the potential opportunities?”. The opportunity can be “count” by the level of importance it has to the company and the probability percent to happen.

As the previous risk Register, a positive risk Register must be created with the number of the opportunities, the causes, the category of the positive risk, the dates raised and treated dates. It would be simpler to record all the positive threats in our document to be ready in every circumstance and prepared for similar future events.

We will follow the same pattern as in Risk Identification. The opportunities also can be called as positive risks, in order these to be found in a particular business field, some techniques can be used:

- Brainstorming
- SWOT Analysis
- Market Needs – Market research
- Project Plans
- Stakeholder Interviews etc.

For every potential opportunity there is ongoing analysis and management throughout its life-cycle. The following actions are taken:

a) Create a sustainable opportunity capture management plan.

b) Coordination of specific tasks related to opportunity seizing.

c) Implementation and supervision of opportunity seizing activities.

d) Regular reporting on the status of opportunity.

Based on the survey conducted in the participating countries, it was observed that the issue of innovation in SMEs is treated with caution and skepticism in all six countries (Greece, Austria, Spain, Portugal, Latvia, Latvia, Romania). However, despite these concerns and challenges, there are opportunities that arise from any risk associated with prevention of problems. For example, the issue can create:

- new ideas and opinions,

- identifying new industries that can be served by the organization,

- developing new partnerships,

- creating new communication channels and improving technology within the company with regard to ISO 56000

The above examples on the target group of the project are divided into 3 categories of opportunities:

Technological

The company can start using technology more through innovation programs. From the trainings that will be done remotely to the implementation of the ideas and their realization. The company is likely to create, integrate and further improve its hybrid or remote working models and to go a step further in developing its internal systems such as CRM, Intranet and internal websites, G suite, etc.

Market

By acquiring the right expertise and taking the right steps, the market can open new perspectives for the company and start implementing its innovative ideas. Employees will start working in new and more innovative contexts and development will now be a given.

6.2 Opportunity Analysis Step

Once there is an identification of the opportunities that the company can engage in, we choose which ones to reject and which ones to accept. As shown in the table below, depending on how important they are to the business and the impact they have, they can be rejected or accepted.

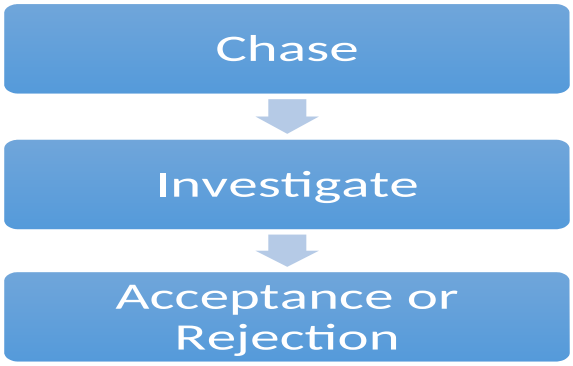

Figure 8. Decision Making Process

The step-by-step methodology of opportunity decision making process is:

I. Chase the opportunity: Continuously monitor market trends, customer needs and business environment changes to identify opportunities. New ideas, technologies and new business models may be closer than you think.
II. Investigate the opportunity: Evaluating the potential benefits and risks of an opportunity and making informed decisions about pursuing it. It would be more conscious to adapt flexibility and willingness strategies based on market and business needs and dynamics to optimize success.
III. Decision making:
    a) Decline the opportunity: In this stage we consider that this decision is not beneficial for the company and its targets. We move forward seeking new positive risks.
    b) Accept the opportunity:
    After accepting the opportunity some steps must be implemented
        i. Devoting necessary resources, time, and effort to the smooth execution of the opportunity.

ii. Create a strategic plan that outlines the specific steps, and timelines required to effectively execute the opportunity.
iii. Implementation of the planned plan to turn the opportunity into reality and achieve the desired results.
iv. Continuous monitoring and management of potential risks and challenges that may arise while pursuing the opportunity.

The assessment stage involves quantifying, characterizing, and prioritizing opportunities of the company once they have been identified in the Opportunities Register document, as in the same step of the risk management. The objective is to hierarchize the list of opportunities, highlighting those that demand the highest level of management attention.

In the assessment process, a consistent quantitative assessment is given to the opportunities which have been identified, considering both their likelihood and their consequences.

After identifying opportunities, we prioritize them using a positive risk assessment document. We then update the positive risk register or create one if one does not exist. We develop a table with a traffic light system (using a different color) to assess the positive risk. This approach helps us to provide a visualization of the hierarchy of positive risks. By organizing the register list by the positive risk rating column, we can easily answer questions such as "Which positive risks do we need to address first?" and "Which opportunities will benefit our company the most?"

6.3 Opportunity Respond Step

Opportunity analysis includes evaluating various options to respond to detected chances looking at how the outcomes may change depending on the adjustments to the risk factors. Through these analyses, the most crucial factors are identified, providing valuable insights into preferred risk management strategies. There are four techniques or options available for managing risks and opportunities:

- Opportunity control or mitigation of risks/opportunities involves actively managing risks to reduce the likelihood of their occurrence or minimize their impact on the organization.
- Opportunity avoidance entails eliminating high-risk sources and replacing them with lower-risk solutions.
- Opportunity transfer relates to the re-allocation of opportunities from one part of the system to another or the transfer of opportunities to external stakeholders.
- Opportunity acceptance or acceptance of the status involves the recognition of the presence of a specific opportunity condition and a conscious decision to accept the relevant level of opportunity without the need for further control attempts.

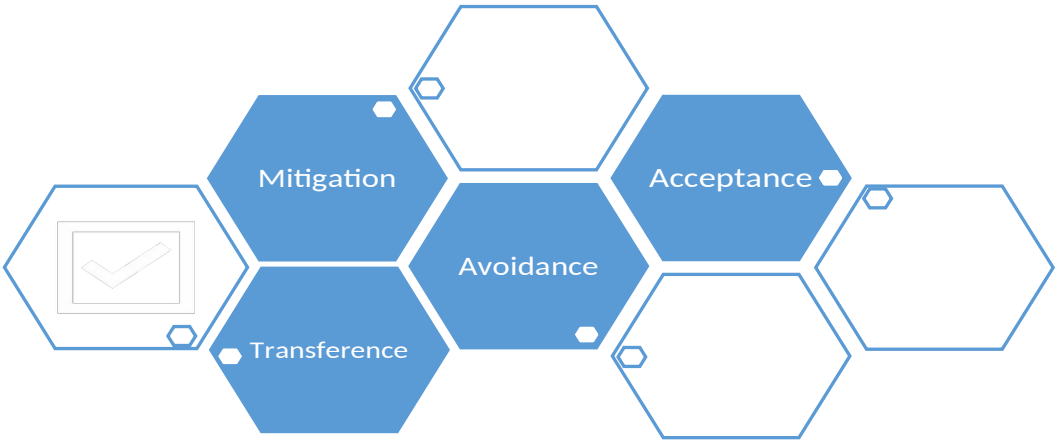

Figure 9. Respond Strategies

Regardless of which of the four techniques is chosen, a risk/opportunity management plan is developed that includes the tasks to be performed, a schedule for performing the tasks, the resources required and the total cost. For example:

- Avoidance may identify additional planning tasks to develop lower risk solutions

- Transfer may identify tasks to restructure procurement plans and related contracts.

- Control/reduction identifies proactive tasks to increase the opportunity Probability and/or Benefits

- The acceptance may identify actions to be taken if the risk/opportunity materializes

6.4 Evaluation of Opportunities Step

In order to assess the management of the opportunities pursued by a company, and in particular the opportunity to apply innovative ideas, the company or the department managing these situations must review the strategic plan implemented.

In this case for the reported opportunity, it should be checked whether the way in which the company changed its hiring model and implemented new standards is properly structured and understood by the rest of the workforce.

Various opportunity assessment methods can help to evaluate this. Some of them are:

- Management by objectives

- Self-assessment

- Assessment scale

- Performance testing

Once the weaknesses of the strategic goal achievements are identified, then it would be good to record them on the opportunity document, which includes the categories, dates, management methods, application areas and people who will follow or contribute to this effort.

This will make it easier for opportunity managers to oversee and implement new methods and ways of dealing with risks, but also to handle similar situations that may arise in the future.

6.5 Opportunity Monitoring & Review Step

The opportunity monitoring and review step is an important part of the positive risk management process for every business sector. This step involves continuous monitoring and evaluation of the implemented opportunity management strategies to ensure their effectiveness and relevance in the dynamic business environment.

The following is a detailed outline of the risk monitoring and review process:

a) Establish a monitoring and review plan that outlines the frequency, scope, and methodology of the opportunities monitoring and review process.
b) Identify the opportunity indicators that alert the business owners or HR managers to changes in the corporate environment.
c) Collect and analyze data on the risk indicators, for example the HR department can arrange meetings with the workforce to identify some factors that affect their performance or accessibility audits on the company building or equipment so that no one is marginalized.
d) Evaluate the effectiveness of opportunity management strategies: Use the data collected to evaluate the effectiveness, efficiency, and relevance of the implemented opportunity management strategies in addressing identified positive risks.

e) Identify gaps and weaknesses in the opportunity management process such as inadequate opportunity assessment or treatment strategies and take corrective action.
f) Take corrective action such as revising risk management strategies, implementing additional opportunity controls, or improving the positive risk management process.

Figure 10. Opportunity Monitoring and Review Process

7. Change Management Theories

7.1 Purpose of change

The implementation of change can be planned by organizations and businesses to enable them to cope with the demands or opportunities in their operating environment. The purpose of change can be in one or more of four categories, according to Gilgeous and Chambers (1999):

Commercial purposes: All those actions to be taken to increase competitive advantage (opening up new markets, increasing market share)

Technological purposes: Actions to adopt and become familiar with new technology and increase the productivity of the organization.

Innovative purposes: Actions to renew the organization (if the management wishes) that express the culture of the company.

Organizational purposes: Actions that regulate the operation and vision of the organization, identifying the right people, providing an increase in the degree of motivation, etc.

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