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Course: Risk Management
Assignment 2 – Evaluating Methods

Risk Management in a Software Development Project

1. Introduction

In the first assignment was presented an application of Risk management in an IT organization. The overview is based on a fictional Software Company called *Software House Inc.* The aim was to analyze and manage the different types of risk that an IT company encounters during the development of new software, according to the risk management process presented by Hopkin (2018).

This paper explains three alternative risk analytical methods, including PESTLE, SWOT, and BOW-TIE. The purpose is to evaluate the pros and cons of the different techniques and choose the one that best suits the case study presented.

2. Qualitative approach

"There is a wide range of risk assessment techniques available, and International Standard ISO/IEC 31010 'Risk Management: Risk Assessment Techniques', was published in 2009. This standard provides detailed information on the full range of risk assessments techniques that can be used" (Hopkin, 2018).

The most important techniques for risk assessment presented in this standard are:

- Checklists and questionnaires
- Workshop brainstorming
- Inspections and audits
- Flow charts and dependency analysis

Hopkin (2018) claims that the most common risk assessment approaches are the use of checklists/questionnaires and the use of brainstorming sessions.

Nevertheless, these techniques have disadvantages. In the first case, there is the possibility that any risk not referenced by appropriate questions may not be recognized as significant. Regarding workshops and brainstorming, the disadvantage can be that the more senior people in the team may dominate the conversation and contradicting their opinions may be difficult.

In the following section are presented three different brainstorming structures that are in common use.

2.1. PESTLE

PESTLE is a risk classification system for classifying and analyzing risks. It considers the political, economic, social, technological, legal, and ethical (or environmental) risks faced by the organization.

Hopkin (2018) claims that this classification risk works better with hazard risks (especially with external risks) and less so with reputational, financial, and infrastructure risks.

The table "PESTLE classification system" (Hopkin, 2018, Table 11.3) is presented below:

Category of risk	Description
Political	Tax policy, employment laws, environmental regulations, trade restrictions and reform, tariffs, and political stability.
Economic	Economic growth/decline, interest rates, exchange rates, and inflation rate, wage rates, minimum wage, working hours, unemployment (local and national), credit availability, cost of living, etc.
Sociological	Cultural norms and expectations, health consciousness, population growth rate, age distribution, career attitudes, emphasis on safety, global warming.
Technological	Technology changes that impact your products or services, new technologies, barriers to entry in given markets, financial decisions like outsourcing, and supply chain.
Legal	Changes to legislation that may impact employment, access to materials, quotas, resources, imports/exports, taxation, etc.
Ethical or Environmental	Ethical and environmental aspects, although many of these factors will be economic or social in nature.

In the following table, there is an overview of the advantages and disadvantages of this system presented by Hopkin (2018):

Advantages	**Disadvantages**
simple framework	can over-simplify the amount of data used for decisions
facilitates an understanding of the wider business environment	needs to be undertaken on a regular basis to be effective
encourages the development of external and strategic thinking	requires different people being involved with different perspectives
anticipates future business threats	access to quality external data sources can be time-consuming and costly
helps identify actions to avoid or minimize the impact of threats	difficult to anticipate developments that may affect an organization in the future
facilitates identification of business opportunities	risk of capturing too much data that makes it difficult to see priorities

Following the consolidated structure of the PESTLE presented above, it is possible to analyze and classify the possible risks of *Software House Inc.* during the development of new software.

Category of risk	Description of risk
Political	Violation of GDPR/ Data Protection compliance
Economic	Bad estimation of time, cost and resources
Sociological	Inadequate cooperation between team members
Technological	Problems with obsolete technologies used by customers
Legal	Changes to legislation that impact employment and resources
Ethical or Environmental	Violation of ethical or environmental agreements

2.2. SWOT

SWOT analysis is a strategic planning technique used to help an organization identify strength, weaknesses, opportunities, and threats related to business competition or project planning.

Strengths and weakness are related to internal risks, while opportunities and threats commonly focus on the external environment. The name is an acronym that stands for:

- *strengths*: characteristics of the business or project that give it an advantage over others
- *weaknesses*: attributes of the business that place the business or project at a disadvantage relative to others embedded within business procedures and protocols;
- *opportunities*: elements in the environment that the business or project could exploit to its advantage
- *threats*: factors in the environment that could cause trouble for the business or project.

The identification of SWOTs is a fundamental step in planning for the achievement of the company's objectives. If a goal is considered not feasible, decision-makers of the company should select a different target and repeat the process.

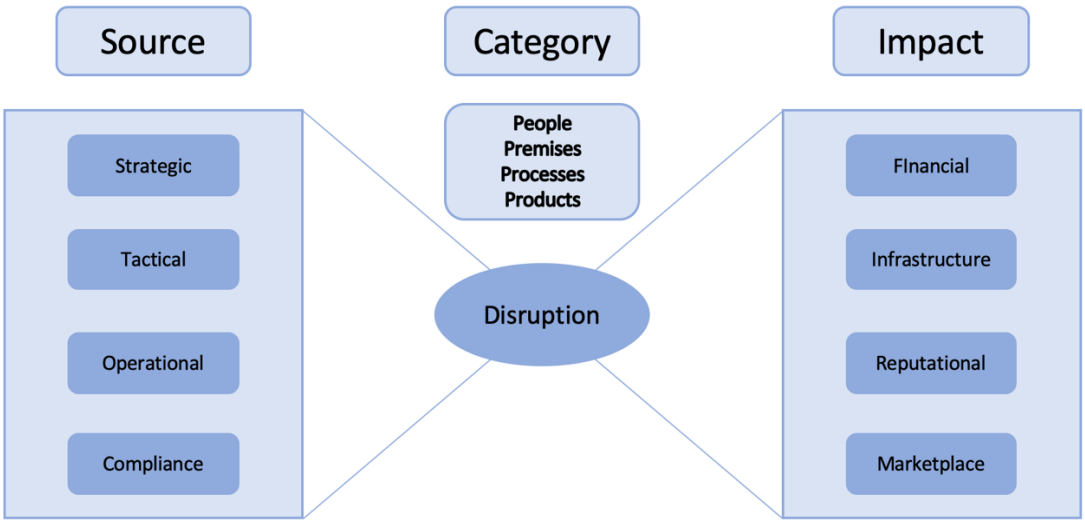
This system is applied to the risks of the case study of *Software House Inc* in the following figure.

2.3. BOW-TIE

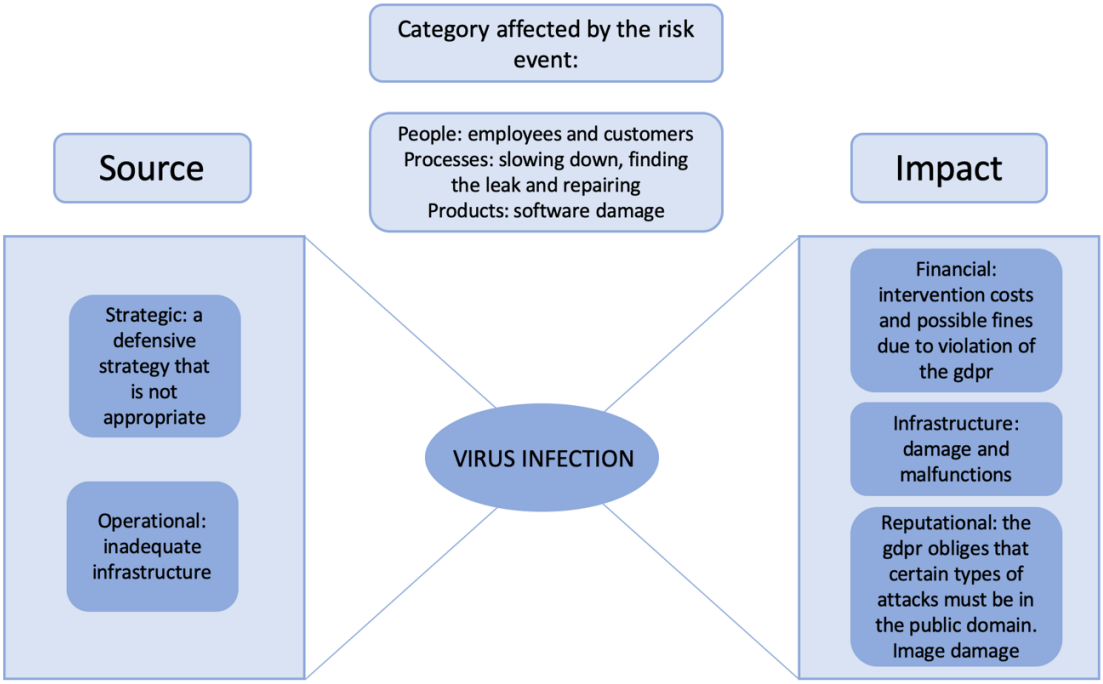
Bow-tie is primarily a quantitative risk analysis tool. It is applicable to events that can cause disruption to normal efficient operations of an organization.

"The left-hand side of the bow-tie represents the source of a particular hazard and will indicate the classification system used by the organization for sources of risk. These sources of risk used are the high-level sources of strategic, tactical, operational, and compliance (STOC) risks. The right-hand side of the bow-tie sets out the impact should the risk events occur: the high-level components of financial, infrastructure, reputational, and marketplace (FIRM) impact of a risk materializing.

In the center of the bow-tie is the risk event. The purpose of using the bow-tie illustration is to demonstrate the risk classification systems used by the organization and the potential range of impacts should a risk materialize" (Hopkin, 2018).



Differently, from the two approaches presented above, bow-tie is mainly used for hazard risks and is less suitable for describing compliance and control risks.
In the following figure is presented an application of the bow-tie in which it is described a possible virus infection, the sources of risk, the categories affected by the risk event and, finally, the impacts.



3. Discussion

Through the use of a fictitious company, it has been possible to carry out a risk management process on pseudo-real problems, highlighting some of the risks that need to be considered during the development of software.
Each company, according to its risk aversion and the environment in which operates, has to choose the most suitable evaluation methods for the analysis and classification of risks.
Qualitative approaches as PESTLE and SWOT analysis, are useful for a starting global overview. These systems make it easy to classify legal and sociological risks.
PESTLE allows to divide risks into six areas, so it is possible to rely on a team composed of different risk specialists. SWOT, on the other hand, bases its classification on the division between internal and external risks. This makes it easier to focus on the weak points of the company, and one of the main objectives must be to turn these weak points into opportunities.
Software House Inc. should use these evaluation techniques during the planning phase of software development. Hopkin (2018) argues that these two techniques can be used together, limiting the disadvantages of individual approaches.
For the management of delicate risks, such as hazard risk, these two methods may be insufficient. The application of a bow-tie system makes it possible to assess the individual event more thoroughly. It makes it possible to highlight the sources of risk, carry out an analysis of the categories affected, and estimate the potential impacts. The impacts should be classified with the FIRM system into four different areas: financial, infrastructure, reputational, and marketplace. Also, it is possible to add inside the bow-tie some preventive and responsive controls, to mitigate the negative outcomes of hazard risk.

For these reasons, the application of bow-tie is necessary to analyze the most critical risks for a company specifically. A possible combination of techniques for the Software House could be to use a PESTLE structure during the planning phase and then go into detail with the application of the bow-tie method to the most dangerous risks.

4. References

- *Paul Hopkin, 2018; Fundamentals of Risk Management: Understanding, Evaluating, and Implementing Effective Risk Management. 5th edition.*
- *Emet GÜREL and Merba TAT, 2017, SWOT ANALYSIS: A THEORETICAL REVIEW, The Journal of International Social Research*