

**Evaluating the Effectiveness of Risk Management Systems in Industrial Companies:
"Sankyu Company as Case Study"**

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1. Introduction

Each firm encounter hazards that could constitutes threats to its productivity . Risk is the potential of an action and its effects. managing is the practice of utilizing operations, techniques and tools to manage these hazards . It concentrates on determining what could occur wrong, assessing which hazards should be processed with and executing practices and procedures to address those hazards (Kádárová and Durkáčová, 2012). Industrial firms accustomed to encounter several events that can result in adverse influence, positive influence, or both. Actions or accidents with a adverse influence presents hazards, that can prevent creating value or gnaw current value. Actions or accidents with positive influence can offset negative influences or presents chances. Chances are the potential that an action will happen and positively influence the fulfilment of goals. Hazards are the potentials that actions will happen and negatively influence the fulfilment of goals. Enterprise risk management (ERM) addresses hazards and potentials influencing value creation or preservation, consequently should be a central portion of any their strategic administer. In general, it is a strategic operation that assists and supports making decision at both strategic and operational levels in a firm. Improved understanding and management of all risks potential to influence the firm will result in better performance and competitive benefits, in particular when risks and threats are determined , and the hazards evaluated and controlled, in the same way as for chances and incentives (Mark,2021).

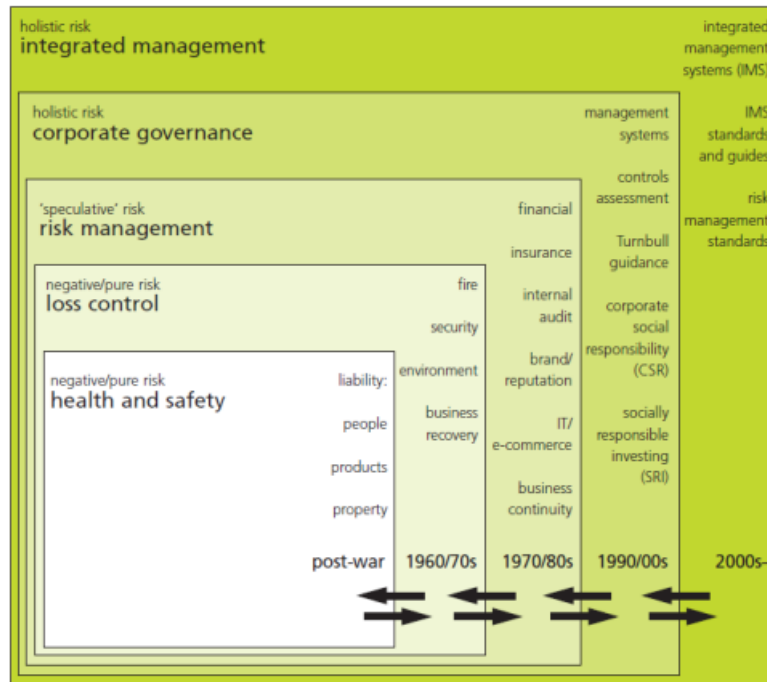


Figure 1 BRM Development Since 1945(Mark,2021)

The procedures of risk management requires several steps are illustrated in Figure 2

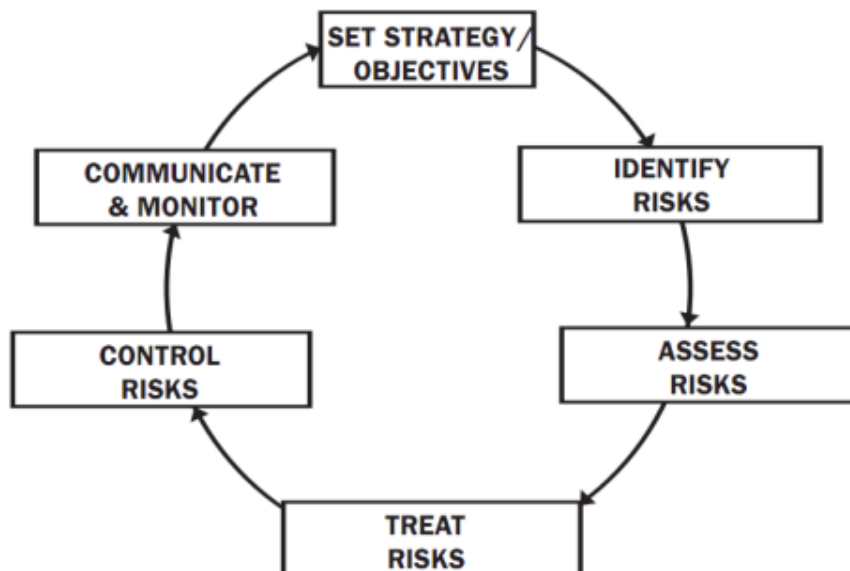


Figure 2. The procedures life cycle of hazards management (Paul and William,2018).

This procedures include identification, assessment and control, in addition to monitor process, audit and review stages common to all efficient management systems.

Figure 3 shows the organization's strategic objective through risk assessment that include :Risk assessment, Risk evaluation, Risk reporting and monitoring

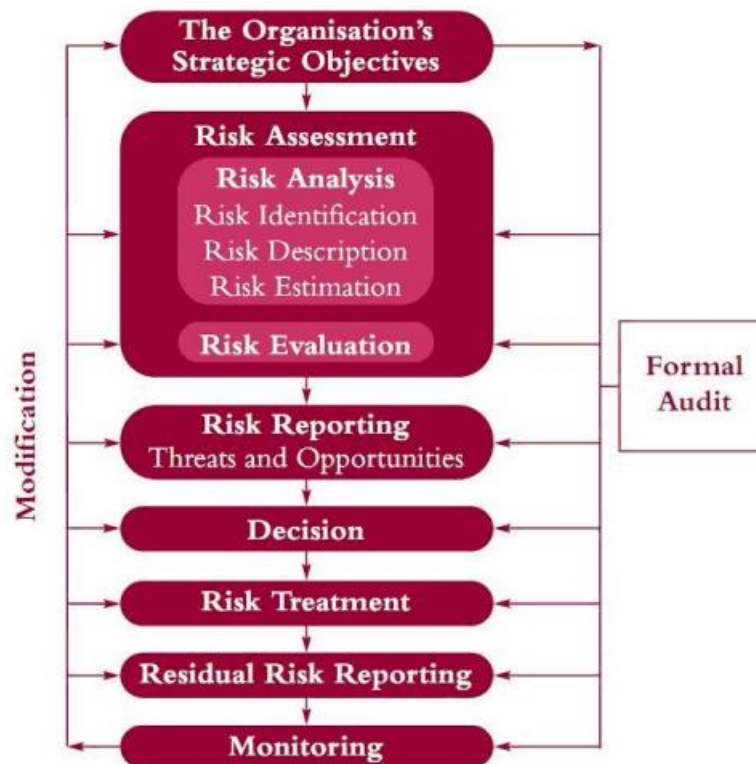


Figure 3. Risk Management Procedures

To create this efficient management system, all sections of the firm contribute basic views [5]: Senior executives identify the degree of risk a firm can stand. They express their risk desire in concrete terms like profits fluctuation and possible losses of capital, equity or assets; The risk organization, in cooperation with line managers, continuously examines the possible influence of several hazards (such as strategic, business, financial and operational hazards) on the enterprise (RIGBY, D. – BILODEAU, 2009). They make a decision whether to avoid the exposure fully, efficiently reduce it (for instance, via a transform to another party) or utilize the firm hazard perspective and risk management abilities as a chance to create more profit from the exposure; Line managers embed risk management concepts into everyday business decisions and activities; Managers separate risk-taking and risk monitoring responsibilities to prevent possible conflicts of interest.

Risks results from manufacturing and operating in industrial companies are categorized into the following types: strategic risks, financial risks, operational risks and compliance risks.

This study addresses the risk management in industrial companies addressing risks from several aspects in addition to upgrade the risk management strategies in Saudi industrial Companies.

2. Problem Statement

Each manufacturing and operating companies encounter unfavourable and undesirable setback in daily operations. These are indicated by operational troubles in this study. The disturbances set the company at production, economic and occupational hazards. Saudi companies are considered one of the first countries to adopt various industries, especially major companies in the field of manufacturing, maintaining and operating mechanical mechanisms. To achieve the goal of this study, Sankyu Company was tested as a case study because it represents the largest companies in various engineering services, especially in the areas of manufacturing, maintenance and operation of heavy equipment and machinery (Islam & Tedford,2012), So this study addresses the gaps in the evaluation procedures that can prevent the successful execution of risk management.

3. Theoretical Framework and Literature Review

3.1 Risk

Enterprises encounter a wide scope of hazards every day that can influence their capacity to fulfil specific business goals and preserve their business. Risk evaluation is a significant and developed operation utilized to evaluate an organization's hazards so that it can lessen and reduce hazards to an acceptable degree. Risk indicates the uncertainty that surrounds future accidents and results. It is expressed of the potential and influence of an event with the potential to impact the fulfilment of an enterprise's goals (Uzorh, 2017)

3.2 Risk Management

Two several safety management concepts can be noted: safety management based on consequence supposes that the most potential events at an installation should not include consequences external specific limits, and therefore design regimes under safety to insure this. Risk management that means risk based safety management insure that the remaining hazards must be analysed both with respect to the potential and the risk nature, and thus inform for more risk reduction. This means that unexpected events may be tolerated. Risk management is not novel instrument and a lot of legislations and guidelines are obtainable (ACT 2004, AZ/NZS 2004, Committee 2004). It is an integral part of good management and making decisions at all organization levels. All organization departments manage hazard regularly whether they recognized it or not, sometimes more rigorously and systematically, sometimes less. Risk management happens most clearly in those sections whose basic function is to preserve the ecology and public health and safety. currently, an additional generic legislation on hazard management is prepared as a popular ISO/IEC standard (IEC 2007) explaining a approach top down in addition a functional bottom up systemic as illustrated in Fig. 4) This legislation aims to support current industry.

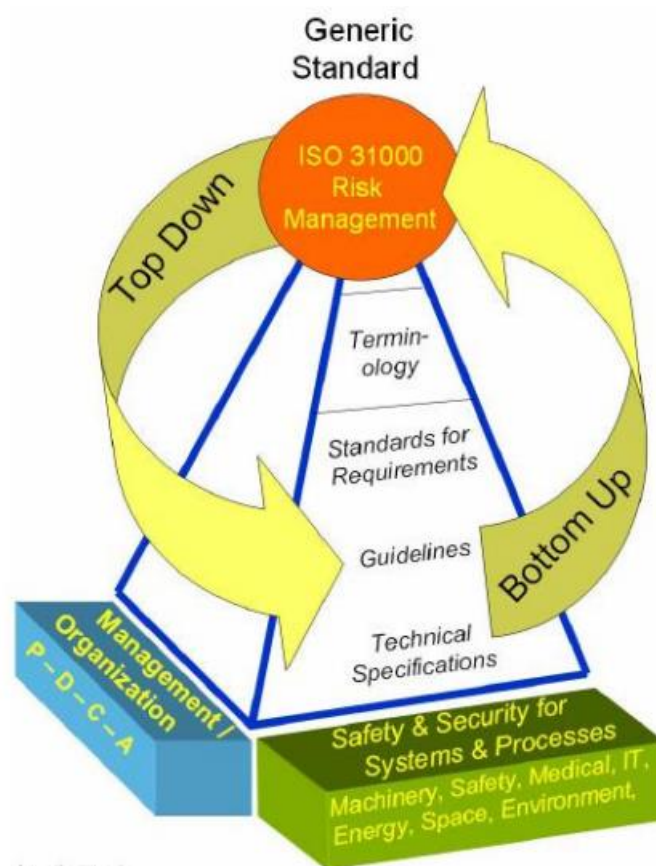


Figure 4. planned general legislation approach on risk management(IEC 2007)

3.3 Risk Management Tools

The procedures risk management as illustrated in Fig. 5 are:

1. identifying objectives and context such as the risk ecology),
2. defining hazards,
3. Analysing the defined hazards,
4. hazards evaluation
5. Processing or administering the hazards,
6. Monitoring and reviewing the risks and the risk environment continuously, and
7. regular communication, consulting with stakeholders and reporting. Some tools of the risk management are explained in (IEC 2008) and (Oehmen 2005).

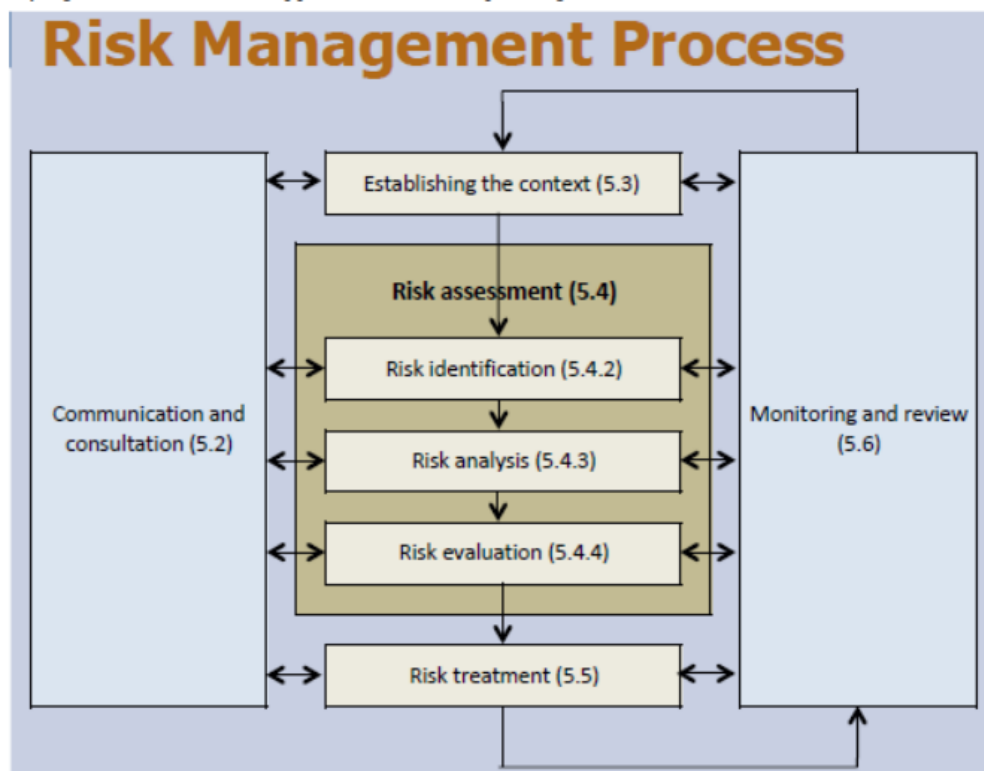


Figure 5 Tools of Risk Management

2.1 Identifying Objectives and context

This step can give knowledge of the ecology in which the respective organization operates, which indicates to comprehensive understand the exterior ecology and the interior organization culture .

The analysis is executed via:

- identifying the strategic, organizational and risk management of the enterprise, and
- defining the limitations and chances of the operating ecology. .(Uzorh,2017)

2.2 risks Identification

The proper risk determination technique will based on the area of utilization (activities nature and the

hazard set), the project nature, the project stage, resources ,legislation and client demands as to goals , desired result and the demanded level of details.

The following tools utilization and methods might further help the determination of hazards:

- Potential risk resources identification,
- List of probable business risks and cheat hazards,
- Typical hazards in phases of the procurement operation,
- Planning of Scenario as a hazard evaluation instrument,
- Process mapping, and
- Documentation, relevant audit reports, program evaluations and / or research reports.(Uzorh,2017)

2.3 risk Analyzation

Risk analysis requires taking into account the risk source , the effects and probability to evaluate the inherent .In addition, It requires determination of the controls, an assessment of their effectiveness and the resultant degree of hazard with controls in place. Often qualitative methods can be utilized for investigating hazards while more hazards are being exposed to more expensive quantitative methods as demanded. Risks can be evaluated in qualitative and quantitative method utilizing instruments as hazard matrices, hazard graphs, hazard matrices.

Utilizing the hazard matrix, it is demanded to identify for each hazard its profile utilizing probability and consequences standard. Typical definitions of the likelihood and consequence are contained in the risk matrix are illustrated in Table 2

Table 2 Risk Matrix (Uzorh ,2017)

Risk Rating Matirx					
Likelihood					
Impact	Rare	Unlikely	Possible	Likely	Almost certain
Catastrophic	moderate	moderate	high	critical	critical
Major	low	moderate	moderate	high	critical
Moderate	low	moderate	moderate	moderate	high
Minor	very low	low	moderate	moderate	moderate
Insignificant	very low	very low	low	low	moderate

2.4 Assessment the risk

As soon as the hazards have been analysed, they can be compared versus the documented earlier and accepted tolerable hazard standard. When utilizing hazard matrices this tolerable risk is generally documented with the hazard matrix. If the protected hazard be higher than the tolerable hazard than the certain hazard requires more control procedures or enhancements in the effectiveness of the current controls.(Uzorh,2017)

2.5 The risk Treatment

An unacceptable hazard demands treatment. The goal of this phase of the hazard evaluation operation is to develop cost efficient option for addressing the hazards.

Treatment options (as illustrated in Fig. 6),which are not necessarily mutually exclusive or appropriate in all conditions, are depends on results that comprise:

- the risk avoidance,
- the risk reduction
- Transferring (sharing) the risk, and
- approving the risk.

the risk avoidance is not executing the activity that is probable to occur the hazard.

Mitigating the risk - controlling the likelihood of the risk occurring, or controlling the influence of the results if the risk happened. .(Uzorh,2017)

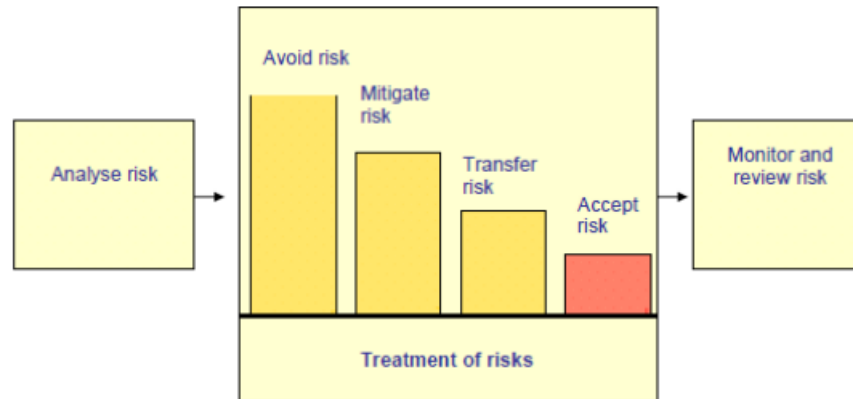


Figure 6 Risk Treatment.(Uzorh,2017)

2.6 Literature Review

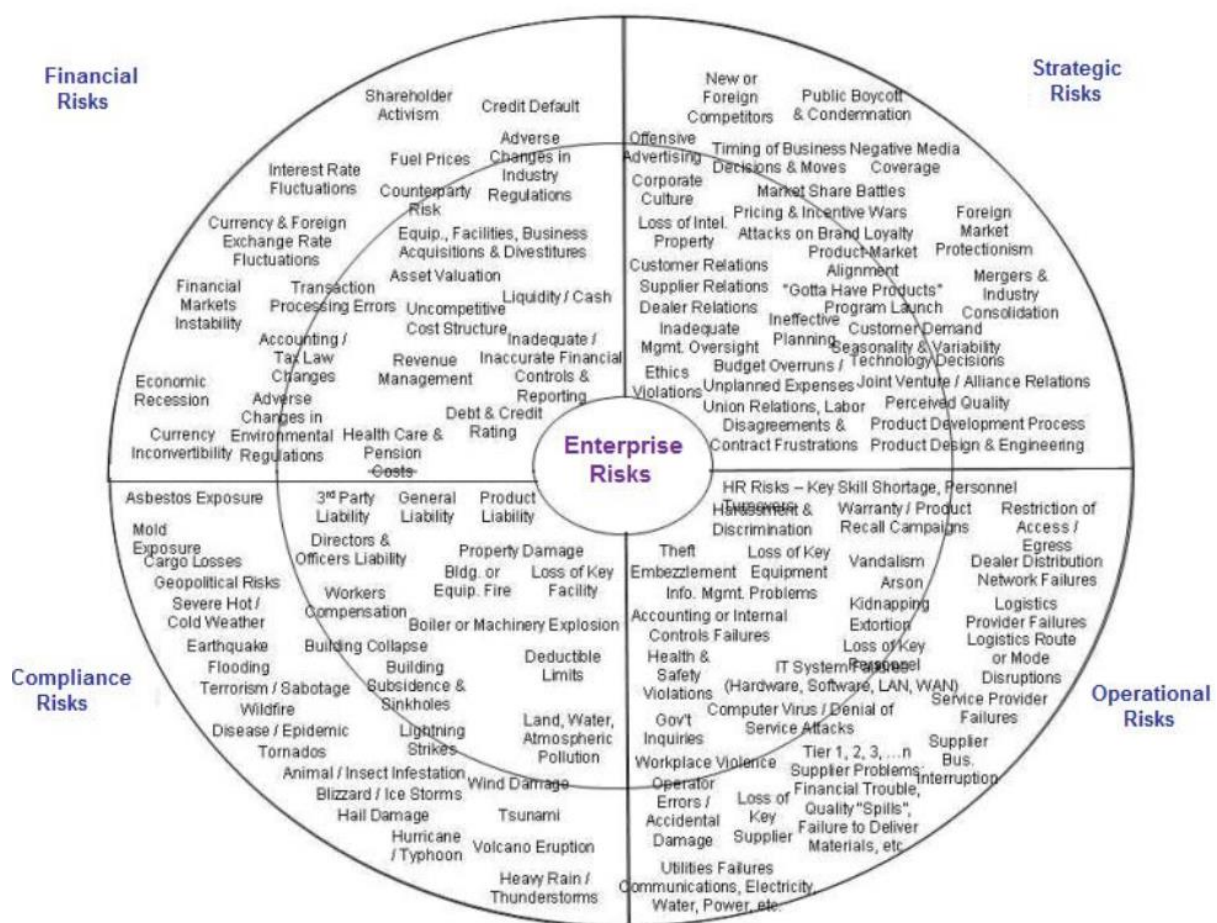
In the fields of risk management in industrial organizations, several studies conducted researches in order to evaluate the effectiveness of risk management in industrial companies in addition to upgrade risk management in industrial companies:

Uzorh et al., (2017) carried out a study to explain the several procedures in the risk management operation that techniques are utilized in the several stages, and introduces some instances for hazard and control measures. In this study, Trelleborg AB has been selected as case study to show the challenges that can be found regarding to risk management in a large firm huge with several business fields. In this study, Trelleborg AB has been selected as case study to show the limitations that can be found regarding to risk management in a huge firm with many business fields. One typical challenges is accessing the staff. Another typical limitation is no system existed to control and follow up on the findings of the risk analysis that has been executed.

Nevertheless, not only manufactures but also governmental enterprises, institutes and hospitals are presently providing risk management . the findings found that the outcomes of technical hazard evaluation are one section of an overall risk or safety evaluation of an enterprise or company.

(Islam and Tedford,2012) implemented study in order to develop a conceptual model which explains the general method of risk evaluation and determines the limitations in the evaluation steps that can prevent the successful execution of risk management. An empirical verification with several examples in New Zealand has been performed to verify the model. Finally, a comprehensive framework is improved for successful execution of risk management in industry companies.

(Kádárová and Durkáčová,2012) identified the risk that occurs in industrial companies and categorized them into four types: operational risk, financial risk, strategic risk and compliance risk as illustrated in Figure 7



The study identified the potential risk that may occur according to each type of risks Moreover , several methods to identify and analyze company hazards were suggested .

Oduoza,(2020) created a planning for risk management suitable for utilization particular by small and medium size companies in the fabricating field. Utilizing an integration of Bayesian Belief Network (BBN) and Analytical Hierarchical Process (AHP) search algorithms, enabled to determine major hazards indicators that can affect on business performance.

4. Research Significance

The importance of this study from a theoretical standpoint is to enrich the academic side with evidence about all the risks resulting from manufacturing, operation and maintenance in industrial companies in the Kingdom of Saudi Arabia, in addition to finding the necessary solutions and measures to mitigate the risks.

This study is also useful from an applied perspective to inform heavy equipment and machinery maintenance companies of the potential risks during operation, maintenance and manufacturing.

5. Research Objective

This study aims to evaluate the effectiveness of risk management in Saudi industrial companies specialized in the maintenance, operation, and manufacturing of heavy equipment and machinery, as it is one of the specializations that most faces many risks that negatively affect the quality and cost of the studied and implemented projects. This study also aims to achieve a number of sub-objectives, which are:

- 1- Identifying operational risks, financial risks, strategic risks and health risks that faces industrial companies in Saudi Arabia
- 2- Assessment risks that are identified previously in order to investigate the severity and magnitude of the risks.
- 3- Suggesting strategic solutions in each field to treat and process the potential risks in case study company.
- 4- Addressing impact of risks that will be identified on the cost and quality products in the industrial companies.

6. Research Methodology

This study adopts descriptive approach using quantitative method. SPSS software will be used for this purposes. The quantitative method is suitable method to study effectiveness assessment of risk management in industrial companies. In order to apply the quantitative approach survey questionnaire will be designed and distributed targeting employees in Sankyu industrial company in Saudi Arabia that has been selected as case study then the data will be extracted and analysed.

6.1 Study Population

This study adopts case study present SANKYU company for engineering services in the field of manufacturing ,maintenance and operating equipment , plants and mechanical machines. This field of industry results in a lot of threats and risks that affects on company performance .The total numbers of employees in this field is 1084 personnel .

6.2 questionnaire design

The design of questionnaire will depend on identifying the risks and strategies solutions based on the literature in addition content validity using experts will be executed to modify add and delete the content of the questionnaire

6.3 Study Tools

The study will adopt 5- point likert scale as measurement tool to measure the survey questionnaire. Reliability analysis using Cronbach's Alpha will be employed to ensure reliability of the measurement tool and its validity .Also, pearson correlation will be used in order to ensure the consistency the content of questionnaire

Moreover, mean score and standard deviations and relative importance index swill be employed to assess the severity and magnitude of risks in addition to identify the most significant strategies to mitigate thee risks .

Also, In order to study the impact of risks on the cost and quality of the product ,regression analysis will be adopted to achieve this purpose .

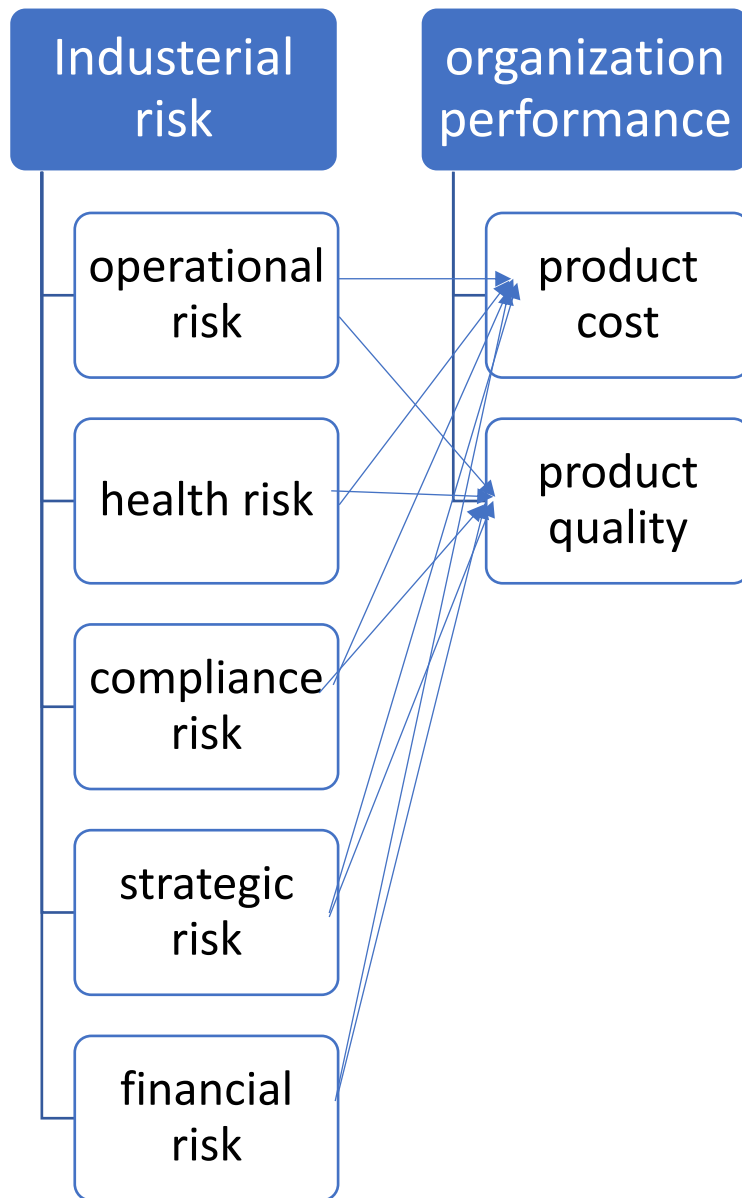
6.4 Dependent and Independent variables

Independent variables: operational risks, financial risks, strategic risks, compliance risks and health risks will be considered as independent variables

Dependent variables: product cost and product quality

And the following scheme 1 will depict the correlation between dependent and independent variables.

scheme 1 Dependent and Independent variables



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