# DEVELOPMENT A KEY COMPETITIVENESS INDICATORS FOR DISASTER MANAGEMENT

### ABSTRACT

Industrial organizations are often encouraged to develop proactive and rigorous disaster management practices. Disaster improvements are often very expensive. Thus, industries try to use more and more innovative and effective tools to reduce the disaster risk. The purpose of this study is to identify and prioritize the key competitiveness indicators to develop a model for the analysis of disaster costs using AHP technique.

Keywords: AHP, Disaster, Cost Reduction, Optimization, Industrial plant.

## 1. Introduction

The disaster management is one of the most important element in the company, but the disaster improvements are usually expensive. In this paper an innovative assessment framework is developed using an Analytic Hierarchy Model (AHP) (Saaty, 1980; Farrow, 2002).

## 2. Literature Review

The Analytic Hierarchy Process breaks down a decision-making problem into several levels in such a way that they form a hierarchy with unidirectional hierarchical relationships between levels (De Felice and Petrillo, 2014). The AHP approach is extremely useful for developing a disaster model to mitigate costs (Aminbakhsh *et al.*, 2013; De Felice et al., 2015).

## 3. Hypotheses/Objectives

The objective of the study is the development of an AHP model for the analysis of disaster costs. The assumptions underlying the model are the complete economic quantifiable of disaster improvements. The consistency of judgments is provided by the AHP model.

## 4. Research Design/Methodology

The AHP  model (Figure 1) is built with the help of disaster management of the company.
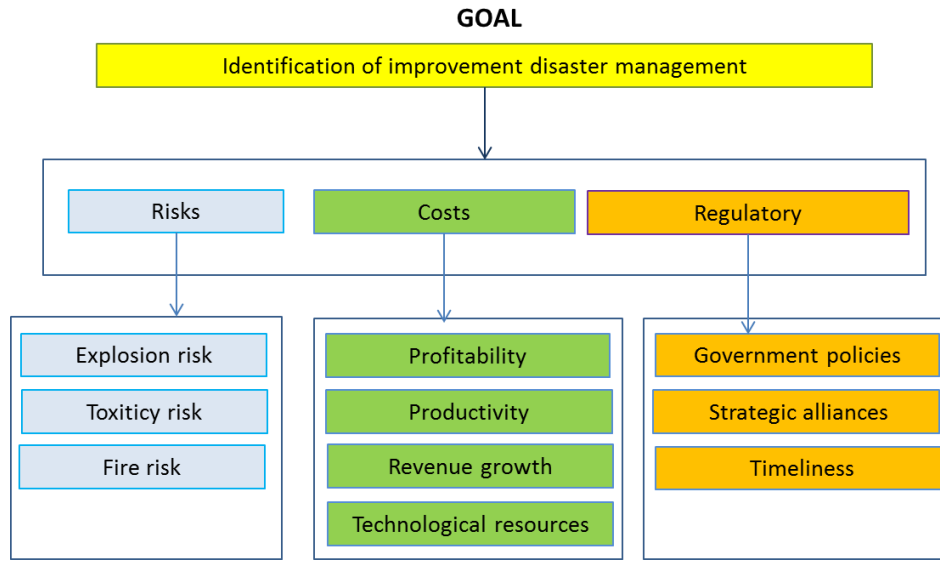
**GOAL**



Figure 1: AHP Disaster Model

## 5. Data/Model Analysis

The judgments of expert team were aggregated using geometric mean. Results are shown in Table 1.

Table 1: Weights of criteria and subcriteria.

| Risks | 0,35 | Costs | 0,45 | Regulatory | 0,2 |
|---|---|---|---|---|---|
| Explosion risk | 0,37 | Profitability | 0,31 | Government policies | 0,35 |
| Toxicity reduction | 0,34 | Productivity | 0,28 | Strategic alliances | 0,2 |
| Fire risk | 0,29 | Revenue growth | 0,22 | Timeliness | 0,45 |
| | | Technological resources | 0,19 | | |

The key identified indicators include:
- Risk Assessment: RA = Number of disaster measures/Number of disaster measures required by regulatory;
- Frequency Index: FI = Number of total of injuries/number of employees;
- Costs: C = Accident annual cost/ annual revenue.

## 6. Limitations

The proposed model provides a qualitative and quantitative assessment of disaster management but it is limited to a particular set of risks characterizing a petrochemical industry. Future research will be focused on an extension of the model including a deeper analysis of risks. Furthermore, will be investigated the use of Analytic Network Process in order to analyze interaction of various factors.

## 7. Conclusions

The potential value of this model is that it provides a decision support system framework for assessing and benchmarking the best "compromise" to select an innovative disaster management system considering both objective and subjective criteria. It is not only a promising methodology to resolve disaster problem of industry system, but also helps managers in decision makers of disaster assessment and decision-making.

## 8. Key References

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