Developing a Resilience-Based Risk Assessment Matrix

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Introduction

As a result of the world's changing socio-political, environmental and technological landscapes, businesses are exposed to hazards and risks more than ever. Updates to conventional risk assessment methods are required to ensure the survivability of businesses. One of the most commonly used risk assessment methods is the risk matrix.[1]

Risk Assessment – the identification of risks that could have an adverse effect on a business' ability to conduct its operations.[2]

Risk Matrix – graphical tool used during risk assessment to define risk as a function of likelihood (probability) and consequence (severity).[3] (Fig.1)

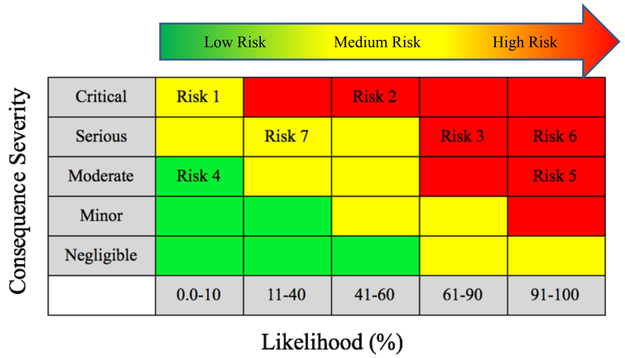

Figure 1. Sample of a Traditional Risk Matrix [4]

Background

Research indicates that since its development in 1995, the risk matrix tool has been applied to risk assessment in many industries to mitigate risk.[5] This methodology ranks risks based on their locations in the matrix. Risk severity increases with colour (green to red) and position (lower-left to upper-right)(Fig. 1).[6] This ranking allows risk managers to make better informed decisions according to which risk events are of greater severity.[7]

Key Issues with Traditional Risk Matrices

Problem 1 – Oversimplification of Risks & Consequences.[8]

Problem 2 – Risk Ties → Several different risks with the same risk rank.[9]

Problem 3 – Limited Consideration for Resilience.

Purpose

The objective of this study was to formulate a resilience-based risk matrix that:

- Improves the traditional risk matrix by adding a factor of resilience.
- Fulfills the need for integration and linkage between resilience and risk assessment of small and medium-sized businesses.
- Addresses the above existing issues.

Methodology

- **A thorough literature review of risk matrices**
  - ~ 60 academic journal articles / reports
- **Questionnaire survey**
  - Data collected from a sample of 60 small and medium-sized businesses (1-100 or more employees) across Ontario.
  - Businesses provided their perceived likelihood, consequence, and resilience levels of 23 major operational risk events within the next 5 years.
  - Several questions collected general information of business.

Results

- The majority of sample businesses **(39)** have between **1-10** full time employees.
- Only **43.33%** of sample have a business continuity plan.
- All businesses felt **moderately resilient to 19/23 risk events.**
- **76.67%** of businesses were **moderately – very significantly effected** by COVID-19.

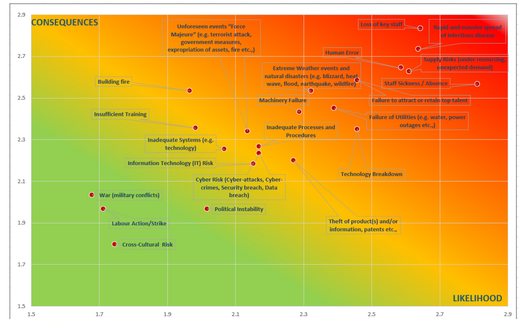

Figure 2. Risk Matrix **Without** Resilience

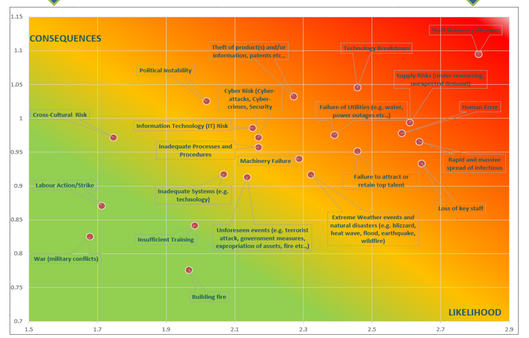

Figure 3. Risk Matrix **With** Resilience

- All 23 risk events moved locations with resilience.
- For example, "Loss of Key Staff" appears in the upper-right without resilience consideration (Fig.2), but with resilience consideration it is no longer in the top cells (Fig.3).
- This proves resilience is an influential factor that should be considered when constructing a risk matrix.

Conclusions

- These preliminary findings of the resilience-based risk assessment matrix help to improve the traditional risk matrix.
- Further investigation is needed to find out more about the impact of the resiliency factor to develop this risk matrix extension.

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