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REGULAR PAPER

A hybrid risk management model: a case study of the textile industry

A hybrid risk
management
model

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Abstract

Purpose – The purpose of this paper is to propose a hybrid risk management model, focusing on identification and evaluation of potential risk scenarios in industry/enterprise level, which assists in preventing negative impacts from adverse risks.

Design/methodology/approach – The proposed hybrid risk management model embraces the concept of hierarchical holographic modelling (HHM), enterprise-wise risk management (ERM) and risk filtering, ranking, and management (RFRM) that could be applied in real commercial settings. A case study is conducted in order to validate this comprehensive theoretical model.

Findings – This study shows the potential risks that may be faced by the textile industry in Hong Kong. Corresponding responses are suggested for the risks in different levels, which provide a systematic approach in managing the risks.

Research limitations/implications – The use of a single case study may limit the generalizability of the findings.

Practical implications – The risks suffered by the textile industry are identified through the case study, which provide an insight for better planning and preparation, so as to gain a better chance of success than that of competitors.

Originality/value – The proposed model does not only provide theoretical merits to the literature but can also be applied to different industries for risk management practices.

Keywords Hong Kong, Textile industry, Risk management, Hierarchical holographic model, Enterprise-wise risk management,

Paper type Case study

1. Introduction

In today's business environment, many uncertainties are affecting the business operational environment of an organisation. Many of them are unpredictable and would occur suddenly, they include financial crisis, terrorist attacks and natural disasters. These risks can have significant impact on both the short- and long-term performances of a business organisation (Tang, 2006) and organisations are likely to suffer loss if they do not actively manage these risks.



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Risk management is a pro-active approach to identify, analyse, and manage all potential risks faced by a company. To sustain a business in today's environment, it is necessary to assess the risks faced by the organisation and develop contingency plans to mitigate consequences and assure continuation of critical processes (Pai *et al.*, 2003). A great variety of tools and techniques were introduced in the past decade to deal with the risk management (Beasley *et al.*, 2005; Jiang *et al.*, 2009). Hierarchical holographic modelling (HHM) is a holistic and comprehensive analytical method the aim of which is to capture and represent the essence of inherent diverse characteristics and attributes of a system. On the other hand, enterprise-wise risk management (ERM) provides a framework that includes methods and processes used by organisations to manage risks that directly related to achievement of their objectives. Risk filtering, ranking, and management (RFRM) assesses all critical risks systematically. To develop a comprehensive and systematic approach in risk management, HHM, ERM and RFRM could be combined to form a hybrid risk management model, which bridges the gap between industrial level risk management and enterprise level risk management. The hybrid model extracts the potential risk scenarios from holographic view and filters them for particular case organisation.

The aims of the hybrid risk management model are:

- (1) to identify potential risk scenarios in the business environment of an industry;
- (2) to filter potential risk scenarios in business operations of a company;
- (3) to rate risk scenarios in risk matrix; and
- (4) to develop and select proactive activities that might minimise, or even prevent any negative impact from adverse risks.

This paper first provides a review on risk management, HHM, and ERM. Second, a hybrid risk management model is illustrated using a case study. The findings are discussed and conclusions are drawn from the application of the proposed methodology.

2. Literature review

2.1 Risk management

Risk can be defined as the likelihood that the outcome from a process will not meet expectations (Knechel, 2002). As a business continually changes, stakeholders increasingly want companies to identify and manage their business risks (Rao, 2007). Risk management becomes an essential aspect for business success. Risk management "refers to planning, monitoring and controlling activities which are based on information produced by risk analysis activity". While the management of risk "describes the overall process by which risks are analysed and managed" (Scarff *et al.*, 1993, p. 2). In the organisation, risk management is an integral part of the decision making and control process that takes into considerations to social, political and engineering factors with relevant risk assessments (Jeynes, 2002; Giannakis *et al.*, 2004). By considering alternative scenarios generated by a risk management process, an organisation can judge their respective merits, select solution and undertake the implementation (Zsidisin and Ritchie, 2008).

Changes in technologies increase the sources of risks within the business environment. Therefore, various risk management approaches have been emerged since 1970s. For example, Ford Motor introduced failure mode effects analysis (FMEA)

to identify potential failure modes for manufacturing operation and its effect on product or process (Ford, 1996). FMEA is extensively used in different industries such as semiconductor and plastics. However, most traditional risk management approaches decompose systems into isolated subsystems for analysis and recombination to create system-level measures (Kaplan *et al.*, 2001). These approaches were no longer effective to identify, assess, and respond to the growing array of risks across a complex enterprise (Rao, 2007). An enterprise-wide approach to risk management was introduced by Haubenstock (1999) which consolidates all the risks into an overall risk portfolio. This portfolio management technique is the core principle of the Enterprise-wide Risk Management (ERM) approach.

2.2 Hierarchical holographic modelling

HHM is a holistic methodology. The aim of HHM is to capture and represent the essence of the inherent diverse characteristics and attributes of a system – its multiple aspects, perspectives, facets, views, dimensions, and hierarchies (Haimes, 2004). HHM has been used for identifying – underlying risks in numerous studies (Kaplan *et al.*, 2001; Lambert *et al.*, 2006). HHM has emerged from a generalisation of hierarchical overlapping coordination (HOC). It considers the decomposition and coordination problems of large-scale, multiple and complex systems that have more than one hierarchical overlapping structure (Haimes, 2004).

Haimes and Horowitz (2004) applied HHM to track terrorists. HHM first sets up the multi-view image of a system hierarchy of terrorist threats in order to generate a large number of scenarios, and then ranks these scenarios by likelihoods and consequences. HHM is introduced to address multiple dimensions and perspectives of risks of, terrorism, cyber and interconnected physical infrastructures, information technology (IT), information assurance (IA), and survivable dependable systems (SDS) (Longstaff and Haimes, 2002).

2.3 Enterprise-wide risk management ERM

ERM is a systematic and integrated approach to the management of the total risks that a company faces (Dickinson, 2001). It is a comprehensive and integrated framework for managing credit risk, market risk, operation risk, economical capital, and risk transfer in an attempt to maximise firm's value (Lam, 2003). ERM helps assessing and addressing the risks from all sources that threaten an organisation's strategic objectives. Additionally, ERM also identifies risks that may represent opportunities that can be exploited for competitive advantage (Miccolis and Shah, 2000).

Traditional management techniques keep the management of risk separate and parallel within individual business functions, departments or subject-matter expertise (Loghry and Veach, 2009). "Enterprise-wide" suggests the elimination of functional, departmental or cultural barriers so that a truly holistic, integrated approach should be taken to manage risk with the intent of creating value (Anderson, 2000). ERM can be affected by an entity's board of directors, management and other personnel. It can be applied in strategy setting across the enterprise. It can be designed to identify potential events that may affect the entity, and to manage risk to keep enterprise within its "risk appetite". ERM can also provide reasonable assurance regarding the achievement of the entity's objectives. Establishing a risk appetite permits a focused strategic planning by the executives that promotes greater business opportunities and potential improved

risk/reward ratios (Drew, 2007). ERM has been used in modelling the risk using data envelopment analysis (DEA), which evaluate relative efficiency in multiple criteria mathematical model (Olson and Wu, 2008). Each ERM specialty has its own methodology. In general, ERM covers the key steps of setting objectives, identifying and assessing key risks, choosing a course of action for each risk event, and continuously monitoring the internal and external environments for changes in different conditions (Abrams *et al.*, 2007; Beasley *et al.*, 2008; Muzzy, 2008).

3. Hybrid risk management model

Years of experience have taught us that problem identification is more important than problem solving (Corbett, 2004). However, risks identification is not an easy task and many risk managers perform their duties at the front-line level. They consult line managers in the design and implementation of risk management programs (Corbett, 2004). Thus, line managers can only identify the risks at the front-line level and raise issues of how to improve risk management practice.

Risk scenarios should be identified with a holistic view. The potential risks can be identified in the industry level with the use of HHM approach. It includes all possible risks that can happen in the entire industry which are relevant to the organisation's business operations and objectives. However, not all the potential risks identified by HHM approach have the same effect on different enterprises in the same industry. Therefore, the ERM approach is applied to identify the risks that are faced by the enterprise. It is always rather abstract to say how important the risk is and thus, it is necessary to convert the level of seriousness of the risks from subjective to quantitative measures. RFRM is presented to assess the risk rating, in terms of the consequence of hazard and likelihood of occurrence. The proposed hybrid risk management model integrates the approaches of HHM, ERM and RFRM is shown in Figure 1.

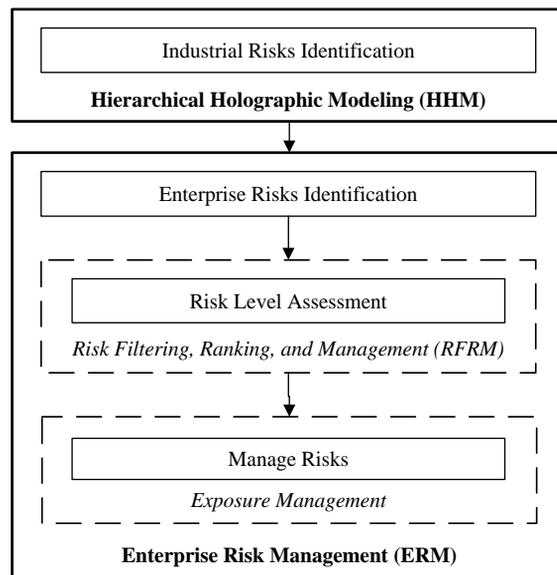


Figure 1.
Hybrid risk
management model

In the proposed methodology, a quantitative definition of risk R, defined by Kaplan and Garrick (1981), is suggested to be used in terms of the ideas of a “set of triples”:

$$R = \{ \langle S_i, L_i, X_i \rangle \} \quad (1)$$

Where S_i denotes the i th “risk scenario” identification, L_i denotes the likelihood of that scenario, and X_i denotes the resulting consequences of the scenario, i.e. the measure of damage. Once the risk scenarios are identified, the likelihood of the risk scenario refers to how likely is that the risk scenario will happen. What the consequence will be if it does happen are then determined and the risk rating is calculated with equation (1). Based on the risk level assessment result, risks are classified into categories and further actions are then determined.

4. Research method

A case study was conducted to show how the hybrid risk management model can be applied in real-life business context settings. Data was collected through semi-structured interviews of four key personnel working in the case company, within a risk management workshop at the beginning of year 2008. Semi-structured interviews with open-ended questions encouraged the interviewee to expand and interviewee is likely to discuss more on their feelings and attitudes as well as facts (Jennerich and Jennerich, 1997). Semi-structured interviews are appropriate to gain in-depth exploration into ideas and relationships not previously considered (Kerlinger, 1986). The research question of the study is “how to apply the hybrid risk management model to identify, analyse, and control the potential risk scenarios in a textile enterprise?”

Based on the industry and company background, the case study objectives are:

- (1) to analyse the applied technique and strategy of risk management in the organisation;
- (2) to identify the main risks and crisis within the entire industry;
- (3) to enable the management and staff in the company to better understanding the risk and to appreciate the importance of risk management; and
- (4) to identify the potential risks and to be aware of where those risks might originate, and to know what action should be taken to prevent them from happening.

5. Case study

ABC (name disguised to protect identity as agreed), a glove manufacturer which belongs to the textile industry, is used to demonstrate how the hybrid risk management model is applied. Through this case, various common risks and particular risks will be identified; risk and crisis will be shown to occur under certain structures; and some reasonable solutions be recommended.

5.1 Industry background

The Hong Kong (HK) textile industry has been developed rapidly since 1950, and become one of the most important manufacturing industries in Hong Kong. With the development of HK society and globalisation, the HK textile industry gradually grew into being the leader of the world’s textile industry in the past decades. Under the pressure of increasing labour cost, most of the HK textile manufacturers decided to relocate their factories into mainland China and only keep their headquarters in HK.

This trend made the textile manufacturers more competitive due to the lower labour cost of China, and the HK headquarters were able to focus their resources on product design and marketing. Since China joined the WTO and signed CEPA with Hong Kong, the mainland textile businesses that are run by HK enterprises have become more competitive in offering lower prices and better quality.

The rapid development of the textile industry and various opportunities that become available poses certain risk and potential crisis. There are two main risks to the HK textile industry:

- (1) A large number of HK textile manufacturers are operating only export business. When it comes to a global economic crisis or disaster such as the crisis in 1997 and SARS in 2003, there would be a serious challenge for such businesses. The overseas orders would decrease sharply and many textile businesses would be closed down.
- (2) A growing number of emerging competitors from places such as Vietnam wish to have an increasing share of the world market.

5.2 Company background

ABC is well known throughout the world as a glove manufacturer. The company has over 45-years of glove production experience. Its target markets are in America and Europe. The main product is glove of both industrial type and sporty type. The industrial type is especially for protecting the hands of workers engaged in dangerous jobs. The sporty type is for keeping warm and offering protection while doing sports such as snowboarding and skiing. ABC receives overseas orders and produces gloves according to customer requirements. Its customers include some of the world's leading brands such as Nike, GAP, TNF, Y3, and Marmon.

The headquarter of ABC is located in HK and it has the responsibility of receiving orders, planning production schedules, planning logistics activities and customer relationship management. All the production plans are sent to the Pan Yu information centre in China. The responsibility of information centre is to launch production information to branch factories. This process is conducted through the internet enterprise resource planning (IERP) which is an ERP system internally developed by ABC's IT department. There are five manufacturing zones in mainland China and zones receive production plans and schedules via the IERP. All the products are shipped overseas after production. Figure 2 shows the organisational structure of case company.

5.3 Hierarchical holographic modelling (HHM)

A risk assessment workshop was conducted in ABC Hong Kong head office with four senior staff in order to identify a set of potential risks which the glove manufacturing industry might have to face. By applying the HHM framework for risk assessment and management, risk scenarios that result from and propagate through the multiple overlapping hierarchies in real-life systems can be identified. This method provides a holographic view of a modelled system and considers different hierarchical structures together, and thus is capable of identifying major sources of risk and uncertainty in a very convenient way. Nine major categories of the model are identified by applying the HHM approach in the industry; they are economic, reputation, resources, operations, environmental, market, policy, managerial and financial risk. The potential risks within each of the categories are shown in Figure 3.

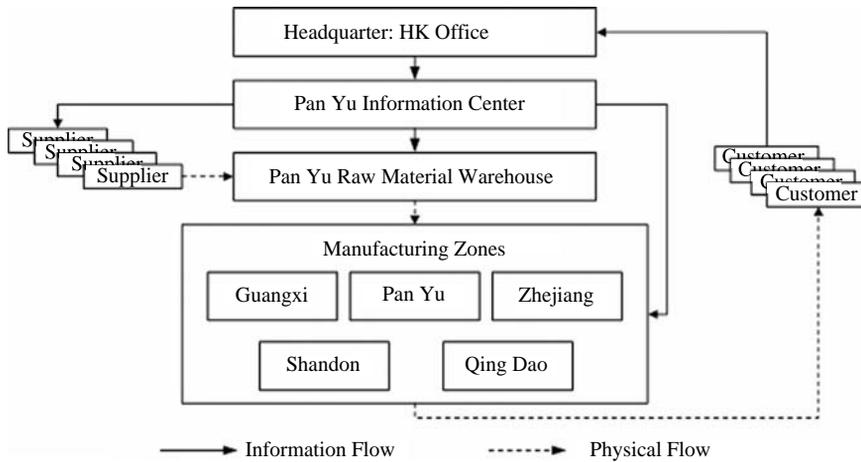


Figure 2. Organisational structure of case company

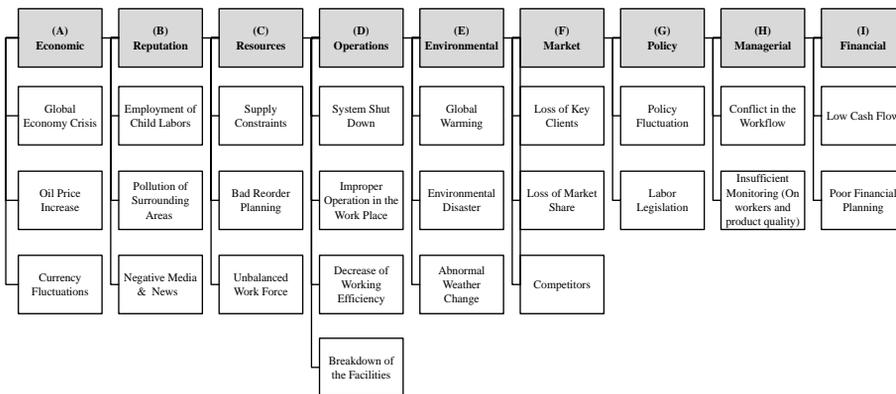


Figure 3. HHM for showing risk issues

Based on the information from the HHM and on the background of the industry, some of the risks are seen as more likely to occur and are especially difficult to cope with. These risks are: reputation, resources, operations, market and managerial risk. Most of them are high level risks and are related to the daily operation of the company. Among these risks, the operation (risk of system shutdown) and market risk are difficult to cope with since these risks are difficult for the company to control. The operational system may suddenly stop because of uncontrollable events such as power cut or faults in the system. Although these events seldom occur, they are classified as high risk because they could halt the entire working process immediately. The market risk is caused by external factors, such as market changes, customers leaving, competitors offering even lower prices to international customers. These issues are uncontrollable and hard to avoid. If they occur they will have a great impact on the industry.

5.4 Enterprise-wise risk management

5.4.1 Risk identification. With the basic structure of the HHM in place, ABC can review the current operations of the company and estimate which risks they may have to face

in the textile industry. The potential risks that may be faced by ABC are identified and shown in Figure 4.

(A) Economic risk

Global economic risk (A1). Most of the HK textile manufacturers are only running export businesses, including ABC which relies completely on export businesses and does not engage in any business related to the domestic market. When it comes to a global economic crisis, ABC would suffer loss directly and immediately.

Oil price (A2). In the past few years, various factors have led to the fluctuation of the oil price. This increases the operating costs of ABC, material distribution, production and shipment.

(B) Reputation risk

Negative media & news (B1). ABC faces a low level of risk in this field as it is not a brand owner who might suffer from more reputation risk when a quality crisis occurs or negative news is broadcast; besides, ABC has a well-developed QC system, which guarantee the high quality of goods; and it strictly obeys all rules in the textile industry, it would not allow any illegal or disreputable operations during the production activities.

(C) Resources risk

Supplier stability (C1). Most suppliers of ABC are domestic raw material manufacturers such as leather, plastic and paper factories, which may not be able to supply materials of the required quality and quantity.

Material delivery (C2). Occasionally, materials are not delivered on time especially during the peak seasons. In some cases, delivery problems have hindered the fulfilment of important orders and led to compensation claims. This problem is caused by suppliers or third party logistics.

Unbalance demand in labour (C3). Usually, during the peak season there is a lack of labour; and an oversupply of labour during off seasonal periods. This prevents ABC from working in the most economic manner, and the company has to face high labour costs throughout the whole year.

(D) Operations risk

System shutdown (D1). ABC uses the IERP system to conduct all the daily operations such as transfer of orders, production planning, picking list establishment and confirmation of shipments. If the system is shutdown, the whole company operations will need to stop immediately and need to wait until the system recovers. This is costly for ABC and this risk may appear in summer as there are power constraints and disruption in many factories China.

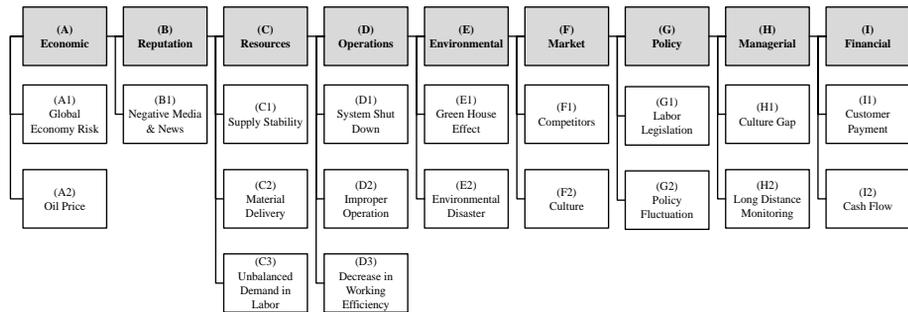


Figure 4.
Risk identification
using ERM

Improper operations (D2). Most of employees are the local residents living in Pan Yu and may not have a good educational background. Hence, inappropriate operations such as applying wrong system controls, or poor machine handling may sometimes affect the product quality.

Decreasing working efficiency (D3). Some members of staff have worked for ABC for over ten years. It can be seen that their working efficiency is decreasing. From observation, some are working without enthusiasm, in a lifeless manner. Compared with new employees, their working efficiency does not meet ABC's requirements.

(E) Environmental risk

Green house effect (E1). It is well known that the green house effect (GHE) has led to increasing temperatures all over the world. Traditionally, the main function of glove is keeping people warm, but with the increased in world temperature may reduce the total demand for gloves gradually.

Environmental disaster (E2). Any disaster such as a typhoon, earthquake or flooding may directly damage the ABC mainland branch factories. For example, a snow storm and a serious earthquake happened in 2008 caused severe damages; some ABC branch factories could not open for four months after the disaster. Normally, in some littoral areas such as Fujian province, typhoon will cause damage to factories every year.

(F) Market risk

Competitors (F1). After joining the WTO, more people in the Mainland China would like to run textile export businesses due to the low labour cost and the relatively high profits. The market share of ABC will decrease due to greater competition from players in Mainland China.

Culture (F2). Culture changes may reduce demand for gloves and the total market for this produce will gradually reduce.

(G) Policy risk

Labour legislation (G1). The government has increased its requirement for HK manufacturers working in Guangdong province. The government now requires higher provisions in employee contracts, a higher quality standard of general facilities and pollution constrains in compliance with the latest Mainland labour legislation.

Policy fluctuation (G2). Any changes made by the Chinese Government would affect ABC's daily operations or even its business strategy. In the past few years, Mainland government has introduced different policies for which ABC had to amend its strategy. For example, energy-saving policies set limitations to output and water emission, which impose pressure on ABC.

(H) Managerial risk

Culture gap (H1). As most of the staff in ABC is Pan Yu local residence, and all department managers are from HK, there are culture gaps in the management of business activities, i.e. conflicts are likely to occur between HK managers and local staff.

Long distance monitoring (H2). As most of the branch factories are in other provinces in the Mainland, the only management methods are IERP and phone calls. It seems that branch factories are insufficiently monitored.

(I) Financial risk

Customer payment (I1). During the economic crisis, some customers may have difficulties in paying their goods. In some cases, customers may forfeiture their goods and ABC will not receive any money.

Cash flow (I2). Investment in an increasing number of Mainland factories from 2006 to 2007 has generated cash flow problems for ABC because of the current global economic crisis. As a result of decreasing orders and revenue, the cash flow is under pressure and the company is finding it difficult to maintain the present business.

5.4.2 Risk filtering, ranking, and management. After the risk identification, the management of each risk using standard likelihood and consequence indicators has been carried out using RFRM. RFRM is a tool that provides a systematic risk score for either screening hazards or prioritising risks. The likelihood and consequence are divided and assessed qualitatively on scales of six levels, from levels 0 to 5. With the measurement methodologies for the two elements, likelihood and consequence, risk ratings for each of the identified risks are calculated with the formula, i.e. Risk Rating = Risk Likelihood (Li) x Risk Consequence (Xi). The qualitative risk assessment matrix with the definition of the corresponding qualitative measures is shown in Figure 5. The likelihood and consequence of the ABC's risk which have been identified with ERM are also measured quantitatively and the ratings are calculated. Details of measurement to each risk are shown in the Table I.

In Table I, all risks have been measured by the likelihood and consequence calculation, their risk ratings are then determined. Based on the risk rating and the classification standard, the above risks are divided into four categories: acceptable/moderate risk, significant risk, severe risk and high risk. The risk classification is shown in Figure 6. Four actions are suggested for each of the categories in corresponding to the degree of the risk involved. They include:

- (1) *Accept.* Accept the level of risk and take no action to minimise it further.
- (2) *Avoid.* Take action to avoid the risk.
- (3) *Transfer.* Transfer the risk to someone else.
- (4) *Mitigate.* Take action to manage the risk; generally through a system of internal control.

5.4.3 Exposure management. The risk classification gives a clear indication of which risk is more significant and which risk should be transferred or mitigated. Combined with ABC's experience for daily risks, actions were identified to deal with the risks. These actions are given in Table II.

6. Discussion

After conducting the case study, it is clear that the textile industry has faced lots of risks. They include economic, reputation, resources, operations, environmental, market, policy, managerial and financial risks. If the company is well-prepared before the risks are materialised, they can turn risks into opportunities. The proposed hybrid risk management model enables the company to have a better planning and gain competitive advantage over its competitors. Once the company faces the potential risks, actions must be taken immediately to reduce potential loss.

Beside the risks identified by the company through the HHM and ERM approach, there are several points the company should be aware of. The company should work out an action plan to transfer or mitigate following risks:

- *Global warming.* It seems that the GHE will continue and it will have an adverse impact on the sales volume of those gloves the major function of which is to keep

Qualitative Measures of Likelihood

Level	Descriptor	Description
0	Impossible	The event will not happen practically under any circumstances
1	Rare	The event may occur in exceptional circumstances.
2	Unlikely	The event could occur at some time.
3	Moderate	The event should occur at some time.
4	Likely	The event will probably occur in most circumstances.
5	Almost Certain	The event is expected to occur.

Qualitative Measures of Consequence / Severity

Level	Descriptor	Description
0	Negligible	No financial loss.
1	Minor	Temporary loss of dignity. Low financial loss. No loss of reputation.
2	Moderate	Moderate financial loss. Moderate loss of reputation. Moderate business interruption
3	Serious	Serious financial loss. Serious loss of reputation. Serious business interruption.
4	Severe	Major financial loss. Major loss of reputation. Major business interruption.
5	Catastrophic	Potential closure of the company



Consequence Severity/impact of hazard being realised	Likelihood of hazard being realised					
	Impossible (0)	Rare (1)	Unlikely (2)	Moderate (3)	Likely (4)	Almost certain (5)
Negligible (0)	0	0	0	0	0	0
Minor (1)	0	1	2	3	4	5
Moderate (2)	0	2	4	6	8	10
Serious (3)	0	3	6	9	12	15
Severe (4)	0	4	8	12	16	20
Catastrophic (5)	0	5	10	15	20	25

No risk (0), Acceptable risk (1-2), Moderate risk (3-4),
Significant risk (5-10), Severe risk (12-16), High risk (20-25)

Figure 5.
Qualitative risk assessment matrix

the hands of the wearer warm. In order to transfer this GHE risk, it is suggested that the company should invest more in R&D. The company can focus on designing gloves with various novel functions.

- *Product safety and quality issues remain a concern in export.* Product recall is a very serious problem in Asia, especially in Mainland China. Products are often rejected because of poor quality and reduced safety standard. ABC can take the advantages of using well-established QC systems for quality control and assurance.

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Risk	Risk category	Likelihood	Consequence	Rating
A1. Global economic risk	Uncontrollable	1	5	5
A2. Oil price	Uncontrollable	3	3	9
B1. Negative media & news	Somewhat controllable	3	2	6
C1. Supplier stability	Uncontrollable	4	2	8
C2. Material delivery	Somewhat controllable	2	3	6
C3. Unbalance demand in labour	Somewhat controllable	5	4	20
D1. System shutdown	Uncontrollable	5	2	10
D2. Improper operation	Controllable	3	2	6
D3. Decreasing working efficiency	Controllable	4	4	16
E1. Green house effect	Uncontrollable	5	5	25
E2. Environment disaster	Uncontrollable	2	5	10
F1. Competitors	Uncontrollable	4	5	20
F2. Culture	Somewhat controllable	4	2	8
G1. Labour legislation	Uncontrollable	1	3	3
G2. Policy fluctuation	Uncontrollable	2	2	4
H1. Culture gap	Somewhat controllable	3	2	6
H2. Long distance monitoring	Controllable	4	3	12
I1. Customer payment	Uncontrollable	2	4	8
I2. Cash flow	Controllable	1	4	4

Table I.
Risk measurement results

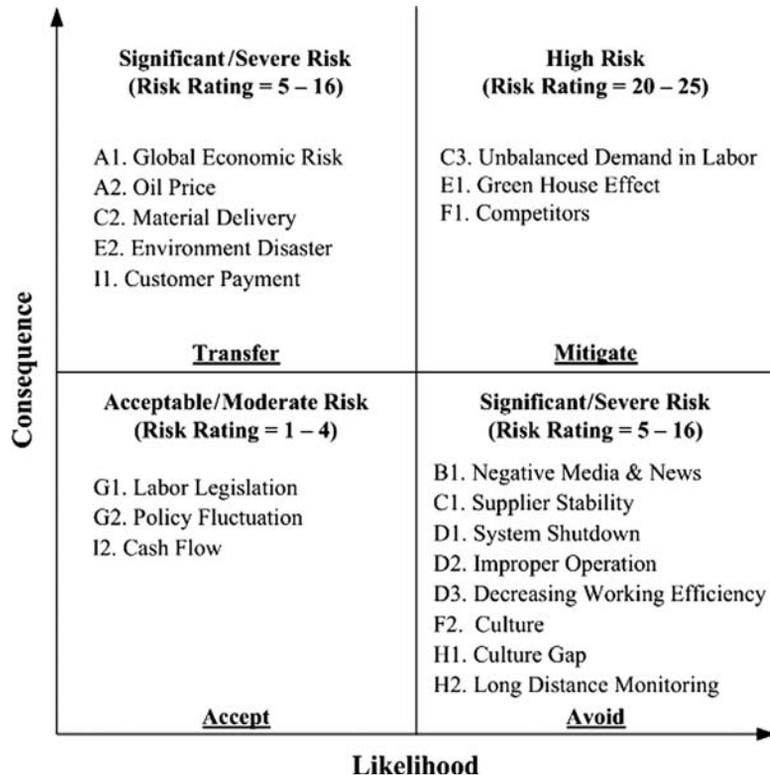


Figure 6.
Risk classification matrix

Risk	Response	Action plans
A1	Transfer	Develop China market
A2	Transfer	Transfer extra costs to customers
B1	Avoid	(1) Prevent defective products reach the market (2) Develop emergence plan in case negative media news is reported
C1	Avoid	Perform supplier development program to help suppliers to improve their product quality
C2	Transfer	Apply vendor managed inventory (VMI) model for core components
C3	Mitigate	Simplify the production process and hire part time staff during peak season
D1	Avoid	(1) Set up backup electricity generator (2) Perform preventive system maintenance frequently
D2	Avoid	Provide sufficient training to the workers
D3	Avoid	Develop employee relationship program such as senior club to inspire those old members of staff
E1	Mitigate	It is impossible to avoid GHE. Hence, ABC should diversify its product line and design products with various novel functions such as fishing glove and bicycle glove
E2	Transfer	Buy disaster insurance
F1	Mitigate	ABC should strength itself by providing better service, offering attractive designs, lowering its costs and developing good company reputation
F2	Avoid	Spend more resources on market research on the fast moving market. When a sudden market change occurs, the market research team and design department can provide a new design to fulfil the latest requirement in a short period of time
G1	Accept	ABC should adjust its strategy in order to fulfil the provisions of the latest labour legislation
G2	Accept	Review and revise company strategy from time to time in order to adapt the policy fluctuation
H1	Avoid	Arrange more social gathering activities to break the gap
H2	Avoid	Establish different monitoring tools such as performance metric to keep track of staff
I1	Transfer	Buy trade credit insurance
I2	Accept	Perform cash flow management

Table II.
Action taken after RFRM analysis

- *Relying so much on exports (focusing only on the US and Europe markets) is risky for the company.* ABC should expand its market and enter other markets to acquire more market share. It is well known that China is a potential market for consumer goods. ABC should work out a business plan to capture opportunities in local market.

Through the case study, the hybrid risk management model has been presented to provide a clear direction and guidelines for risk management. Normally, the risk management model is performed by the top management team. One of the key factors in managing risks and being successful in reducing risks is for the organisation to provide a well-established internal culture of risk management. This requires staff to have an in-depth understanding of the organisation's business environment and the operating situation within the entire supply chain. Another critical issue for the hybrid risk management model is the qualitative assessment method. Since there is a lot of subjectivity in scores given, a different person making the same assessment may come up with a completely different conclusion. The success is a matter of judgment dependent on the expertise of the risk management team. In order to address this issue, appropriate risk management training is important. On the other hand, multiple factors

may be employed to evaluate risks in order to increase the degree of objectivity. Different evaluation criteria such as costs and resources required may be added to facilitate team members to assess the risks. Providing clarifying detail to score can help team members less subjective the scoring. Furthermore, risk management team should standardise its team rules to reach consensus from all team members. However, the presented hybrid risk management model does not consider any strategies to promote the risk management concept to the staff. They may not know what to do when risks come. Thus, the staff should obtain more understanding on the actions planned for the organisation. The management team should promote desired risk culture, frame risks in the context of strategy and activities.

7. Conclusion

The hybrid risk management model provides a comprehensive risk analysis tool using a top-down approach that helps an enterprise to gain a better understanding of its risks and have a better chance of success. By applying the HHM and ERM tools to identify the risks, the company can prioritise risks so that options to mitigate the risk can be appropriate considered and addressed. Most of the uncertainties and risks that the glove manufacturing industry is facing have been identified by HHM, the most likely and high level risks in the industry are identified. ERM method was applied to identify the enterprise's risks, triggers, and current mitigation strategies. Furthermore, some additional outstanding risks are provided for the case company to either avoid or transfer those risks. The proposed model not only provides theoretical merits to the literature, but also applicable to different industries for risk management practices.

Today, customer has higher expectations in terms of speed of delivery and service quality. It is challenging for a company to sustain efficient product flow and on time delivery simultaneously. In order to ensure the flexibility of the supply chain, a company should have internal competencies to manage its external partners. This is important in the areas of customer relationship management and supplier relationship management, where enterprises need to establish a trusting and long term relationship with those external partners. Therefore, further research is required to combine the risk management model with the concept of customer relationship management and supplier relationship management.

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Further reading

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