

SUPPLY CHAIN RISK PERCEPTION: UNDERSTANDING THE GAP BETWEEN THEORY AND PRACTICE

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Abstract: The risks inherent in the supply chain threaten the effectiveness and the output of the chain. It is capable of hampering the growth and performance of organizations whose goods pass through a supply chain. This paper explores the awareness of supply chain risks of employees at different levels in a UK Agri-food industry, and the impact of these awareness on risk mitigation performance. Through literature review, this research identifies the main supply chain risks in the UK Agri-food industry, the sources and drivers of these risks, and the strategies for managing these risks. A case study of UK agri-food business was carried out to evaluate the employees' perceptions of the risks, risk drivers and risk management practices. In order to identify the impacts of these perceptions on supply chain performance, a set of hypothesis were developed and analyzed. The findings of the study carried out shows that supply chain risks are better averted when the parties involved are aware of their attendant nature and consequences. Furthermore, it also shows that the employee's level of experience determines his/her level of supply chain risk awareness and not basically organizational level. The study enunciates the impact of risk management practices on supply chain performance.

Keywords: Supply chain, risk management, uncertainty, Agri-food.

1. INTRODUCTION

From the perspective of supply chain, risk is the possibility and impact of a mismatch between supply and demand leading to disruption of the chain (Tang and Musa 2011). Such disruptions may involve the flow of products, materials and information from the original supplier through delivery to the final consumer (Jüttner, Peck, and Christopher 2003). Several factors make the risk exposure an inevitable reality. These include globalization of market, lifecycles of products, increasing web of international networks of industrial partners, changes in demands, unpredictable supply, cost consideration, reliance on suppliers, and increasing reliance on outsourcing and off-shoring (Juttner et al., 2003). Customer and suppliers related risks, as well as infrastructure and network risks can generate comparable disruption to the supply chain. Increasing devastating consequences of risks highlight the growing importance of supply chain risk management (SCRM) as a topic over the past decade, and the call for managing risks in supply chain.

The UK Agri-food industry is very heterogeneous and comprises of a number of varied activities. The general food chain in the UK consists of farmers, food manufacturers, wholesalers, retailers, catering or food services, which are then delivered to the consumer. Today in the UK, consumers shop for food with high quality expectations. Year-round choice, historically low prices, assured availability, a-seasonality, and unprecedented quality have become the norm. Britain has a large and important agricultural sector of

its own. Nonetheless, it is its access to the 'open', global market that has helped to shape the current food consumption patterns which now provides, as some would argue, the only realistic means of sustaining them. In an arena in which operations driven by commercial considerations are required ultimately to support the public good, the supply chain dynamics is becoming more susceptible to the effects of a range of global influences.

Modern supply rests on a complex network of interrelated socio/politico/economic environments that span countries and continents. The UK's agri-food networks operates in such an environment which is also intensively price-competitive market and have many interdependent components: product, money and information flows; physical infrastructure; distribution and packaging networks; transport networks; processes, control and governance mechanisms, including regulatory frameworks (Chatham House Briefing Paper 2007). There is, therefore, need for efficient management of Agri-food supply chain risk to increase its performance given the economic and competitive changes (Nyamah et al 2014).

Hendicks and Singhal (2005), Wagner and Bode (2008) state that the inborn of risk to modern agri-food supply chain, involves solving individual risks issues in agri-food supply chain management to achieve higher food industry performance, through specifying the type of industry risk to manage and to identify the risks source that lead to the chains' disruptions. Likewise, it involves knowing the risk associated with each participant in the agri-food supply chain to minimize its' total cost including reducing future loss and damage.

2. LITERATURE REVIEW

A general classification of supply chain risks is made by (Faisal, 2009). The author classified supply chain risks into two major categories: endogenous risks and exogenous risks. Endogenous risks are caused by the activities of companies along the supply chain, while exogenous risks results from company’s interaction with the external environment within which it operates. According to Jüttner, Peck, and Christopher (2003), there are four main components of supply chain risk. These are risk drivers, risk sources, risk consequences and risk-mitigation strategies. The authors identify risk drivers as responses to competitive pressures, which have the capacity to either increase or decrease the vulnerability of a supply chain (Wagner and Bode 2006). These trends help to reinforce the competitiveness and distinctiveness of companies toward attaining success. (Pfohl, Köhler, and Thomas 2010).Jüttner et al., (2003) identified sources of risk as any variables which cannot be determined with exactitude but have the capacity to disrupt the supply chain with negative consequences. Different categories of risk exist in literature but Miller (1992)’s classification will suffice here. Milner (2009) identifies organisational (inside the firm) risks, network-related risks or those outside of the firm, industrial and environmental risks. The consequences of risks, according to Juttner, et al (2003), are the primary objectives of supply chain, which may include costs or quality. Hence, they constitute the different forms through which the objectives manifest.

Tang, C.S. (2006a) explains that supply chain participants must address the issues of quality and safety problems in supply networks, and introduce a supply chain risk management (SCRM) framework to reduce the quality risk.

Jaffee et al., (2010) argue that it is most efficient to identify supply chain risk sources such as weather/natural disasters inter-related as well as biological and environmental related issues. Others are market related risks, logistical and infrastructure related risk, political related risk, policy, institutional related risk, financial related risk and operational managerial related risks. Jaffee, et al. (2010), sees failure in logistics as a major impact on agricultural food quality.

Christopher & Lee (2004)’s idea is that managers must understand risks’ sources across the entire supply chain and know what actions to take to mitigate those risks.

Supply chain risk categories and their drivers are further explained below.

Table 1 Risk Drives/ Sources

Categories of Risk	Risk Drivers
Disruptions	Natural disaster Labour dispute Supplier bankruptcy War and Terrorism Dependency on a single source of supply as well as

	the capacity and responsiveness of alternative suppliers
Delays	High capacity utilization at supply source Inflexibility of supply source Poor quality of yield at supply source Excessive handling due to border crossing or to change in transportation mode
Systems	Information infrastructure breakdown System integration or extensive systems networking E-commerce
Forecast	Inaccurate forecast due to short lead-times, seasonality, product variety, short life cycle, small customer base. Bullwhip effect or information distortion due to sales promotion, incentives, lack of supply chain visibility and exaggeration of demand in terms of product shortage.
Intellectual Property	Vertical integration of supply chain Global outsourcing and markets
Procurement	Exchange rate risks Perception of a key component or raw material procured from a single source Industry wide capacity utilization Long term versus short term contract.
Receivables	Number of customers Financial strength of customers
Inventory	Rate of product obsolesce Inventory holding cost Product value Demand and supply uncertainty
Capacity	Cost of capacity
	Capacity flexibility

3. METHODOLOGY

3.1 Research Design

The study used primary data. The data was collected basically through questionnaires administered to employees of an agri-food industry in United Kingdom. The use of this method is likely to give an important insight into the analysis of supply chain risk management (SCRM) from the perspective of agri-food Industry. The purpose of using this method is also to expand the knowledge and understanding of the researcher. This study employed the use of descriptive research design.

The population of the study is made up of the employees of an organisation whose activities are in the agri-food industry. The sales of their products pass through the supply chain process. In this study, 144 employees of the aforementioned company participated in this study. The essence of choosing these 144 employees is because they have sufficient information, acquired over the years in the agri-food industry, that will help in the completion of this study and they have substantial experience in the supply chain. Therefore, they are in a good position to expound on the analysis of supply chain risk management and its impact on the supply chain performance.

The major survey instrument used in this study is the questionnaire and it is divided into two parts. The first part contains the demographics of the respondents which helps determine the suitability of the respondents for the study. The second part contains items that cover various parts of the objectives of the study. This study adopts a structured

undisguised questionnaire because responses got from structured undisguised questionnaires are easily coded and tabulated, and an objective measure of knowledge quickly derived.

The questionnaire survey was targeted at supply chain professionals in a UK agri-food industry. The paper explores the awareness of supply chain risks of employees at different levels in a UK Agri-food industry, and the impact of these awareness on risk mitigation performance.

The survey was a three page closed questionnaire inclusive of a cover letter in form of a consent form. The questionnaire also seeks to measure supply chain performance and it was divided in two sections which explored the different supply chain risks identified from literature. Supply chain professionals and executives opinions were sought and analysed. The first section of the questionnaire sought the demographics of the respondents to enable the analysed data be responses strictly from supply chain professionals and experts. The second part contained information about the various supply chain risks that could hit an organisation and how to identify and solve the proceeding challenges before it escalates. Most managers are not even aware that certain surprises could spring up and disrupt the free flow of the business processes hence awareness was important. A five point Likert scale was used with 5 indicating strongly disagree and 1 indicating strongly agree.

Based on the literature review, the following hypothesis were developed:

Hypothesis 1 – There is a significant relationship between supply chain risk awareness/perception levels and supply chain performance

Hypothesis 2 – Supply chain risk awareness varies across different organizational levels

Hypothesis 3 – Supply chain risk awareness has significant effects on supply chain risk management performance

Hypothesis 4 – Supply chain risk awareness does not depends on management experience

3.2 Sample and Sampling techniques

Executives including Head of supply chain departments, and other managerial level professionals made up the research population. A senior level executive represent the most appropriate respondent for this study (Bhatt & Grover, 2005), given that they are considered the most informed about organizational risk capabilities and its management strategy. This enables us to capture the strategic risk management awareness of the company. The research also captured data from middle level professional focusing more on the tactical aspect of risk perception and lower level professional focusing more on the operational aspect of risk perception in the organization in other to have the opinions of all the parties involved in the entire value chain of the organization.

The online questionnaire distribution method was the major avenue used for data collection. The online questionnaire was designed using Google Forms and sent to respondents.

The collection of data is followed by series of analysis. Data obtained from the field is being processed and put into a form that will be readable and useful for individuals and the society at large. The responses of the respondents obtained via questionnaires will be analysed with the aid of frequency and percentage. These techniques are used to answer questions raised at the commencement of this study and ensures that various hypotheses of the study are confirmed or disproved.

4. RESULTS

This section presents the analysis of data collected for this study. The statistical method used in this study is the Z-Test to test the relationship between the Supply chain risk awareness and other conditions specified in the research hypothesis of this study.

4.1 Test of Hypothesis H1...

Although Z-test is a two tail test used to run analysis for the hypothesis however the first hypothesis (H₁) is used as a one tail test to facilitate the two tail test for the other hypothesis.

There is a significant relationship between supply chain risk awareness/perception levels and supply chain performance

Table 2 z-Test: Two Sample for Means (H1)

	Variable 1	Variable 2
Mean	5.237113	4.907216
Known Variance	1.891108	2.106908
Observations	144	144
Hypothesized Mean Difference	0	
Z	1.624957	
P(Z<=z) one-tail	0.052086	
z Critical one-tail	1.644854	
P(Z<=z) two-tail	0.104172	
z Critical two-tail	1.959964	

Researcher field study (2017)

From the z-test analysis carried out above in Table 2, we examine the hypothesis which states that *there is a significant relationship between supply chain risk awareness/perception levels and supply chain performance*. The result of the analysis shows the value of the Z-test with a probability of 0.052086 which falls within the range of our level of significance at 0.05 (5%) revealing that there is a significant relationship between *supply chain risk awareness/perception levels and supply chain performance*. Therefore we reject the null hypothesis.

4.2 Test of Hypothesis H2...

Table 3 z-Test: Two Sample for Means (H2)

	Variable 1	Variable 2
Mean	5.237113	6.680412
Known Variance	1.891108	2.282216
Observations	144	144
Hypothesized Mean Difference	0	
Z	-6.95827	
P(Z<=z) one-tail	1.72E-12	
z Critical one-tail	1.644854	
P(Z<=z) two-tail	3.44E-12	
z Critical two-tail	1.959964	

Researcher field study (2017)

From the z-test analysis carried out above in Table 3, we examine the hypothesis which states that *Supply chain risk awareness varies across different organizational levels*. The result of the analysis shows the value of the Z-test with a probability of 1.72E-12 which is lesser than the level of significance at 0.05 (5%) revealing that there is a negative significant relationship between supply chain risk awareness and employee’s organisational level. Therefore we accept the null hypothesis.

4.3 Test of Hypothesis H3...

Table 4 z-Test: Two Sample for Means (H3)

	Variable 1	Variable 2
Mean	5.237113	4.907216
Known Variance	1.891108	2.106908
Observations	144	144
Hypothesized Mean Difference	0	
Z	1.624957	
P(Z<=z) one-tail	0.052086	
z Critical one-tail	1.644854	
P(Z<=z) two-tail	0.104172	
z Critical two-tail	1.959964	

Researcher field study (2017)

From the z-test analysis carried out above in Table 4, we examine the hypothesis which states that *Supply chain risk awareness has significant effects on production efficiency*. The result of the analysis shows the value of the Z-test with a probability of 0.052086 which falls within the range of our level of significance at 0.05 (5%) revealing that there is a significant relationship between supply chain risk awareness and management performance. Therefore we reject the null hypothesis.

4.4 Test of Hypothesis H4...

Table 5 Z-Test: Two Sample for Means (H4)

	Variable 1	Variable 2
Mean	5.237113	4.28866
Known Variance	1.891108	1.172697
Observations	144	144
Hypothesized Mean Difference	0	
Z	5.336682	
P(Z<=z) one-tail	4.73E-08	
z Critical one-tail	1.644854	
P(Z<=z) two-tail	9.47E-08	
z Critical two-tail	1.959964	

Researcher field study (2017)

From the z-test analysis carried out above in Table 5, we examine the hypothesis which states that *Supply chain risk awareness does not depend on management experience*. The result of the analysis shows the value of the Z-test with a probability of 4.73E-08 which is lesser than the level of significance at 0.05 (5%) revealing that there is a probability that *Supply chain risk awareness may depend on management experience* as against the hypothesis. Therefore we accept the null hypothesis.

5. DISCUSSIONS

This study was designed to assess the awareness of supply chain risks at different levels in a UK Agri-food industry, and the impact of awareness on risk mitigation performance. However, findings from this study show that pre-informed awareness of supply chain risk is of great advantage to the effective and efficient management of those risks as categorised by Christopher and Lee (2004). To them managers must be aware and understand risks’ sources across the entire supply chain and know what actions to take to mitigate those risks. Therefore, knowing what actions to take at different levels of situations depends largely on the level of awareness the managers have on the variety of risks that may occur at different points. The explanation above proves further the correctness of the findings in hypothesis one which has its P value $P = (0.052086) > 0.05$ a bit greater than the chosen level of significance for the test of hypothesis, it shows that findings are statistically significant @ 5% sampling error, see Table 2. Therefore, accepting that there is a significant relationship between supply chain risk awareness/perception levels and supply chain performance gives a solid foundation for correct empirical finding in other hypothesis.

To add to the aforementioned, the result of test in hypothesis three that Supply chain risk awareness has significant effects on supply chain risk management shows that P value, $P = (0.052086) > 0.05$ is greater than the level of significance see Table 4, meaning findings are statistically significant @ 5% sampling error and are comparable with the assertions of

Wieland and Wallenburg (2013) that the application of preventive and responsive strategies in dealing with unexpected interruptions in supply chain are of great relevance they concluded that the design of the Supply Chain and Supply Chain Risk Management (SCRM) has a substantial influence on the suitability of the different supply chain process. In the light of all the findings investigated and assumptions of different authors, the findings of this study agree with Wieland and Wallenburg's (2013) assumptions.

The findings of the study is further supported by Thun and Hoenig (2014), who says that firms applying preventive methods show higher values in terms of increased flexibility, reduced stocks, faster reactivity, reduced reliance on forecasting visibility, demand forecasting and cost reduction, whereas firms adopting responsive methods show higher average values concerning the lessening of supply chain effect. Therefore, what is fundamental to the responsive and preventive approach is the ability of an agri-food industry to exchange information within and between Supply Chain entities. Information and communication systems sensitize awareness of and allow a firm to implement strategy and planning procedures by making decisions more quickly and increase inter organisational and intra organizational performance levels (Sanders and Premus, 2005).

However, the findings for hypothesis two that *Supply chain risk awareness varies across different organizational levels* gave a negative outcome which resulted to P value, $P = (1.72E-12) < 0.05$ to be lesser than the significant level, the null hypothesis was accepted here and shows that supply chain risk awareness does not really vary across different organisational levels *see Table 3* but while hypothesis four (*Supply chain risk awareness does not depend on management experience*) was tested the P value, $P = (4.73E-08) < 0.05$ was also less than the significant level *see Table 5*, this also resulted to null hypothesis being accepted, both showing that, findings are not statistically significant @ 5% sampling error: the major thing to note from these findings is that management experience rather than organisational level has a major impact on supply chain risk awareness and the management of these risks. This is empirically true to a large extent since to (Sanders and Premus, 2005), information and communication systems sensitize awareness and for SCRM to be effective and efficient preventive steps must be taken at all times by the agri-food industry through the exchange of information within and between Supply Chain entities.

6. CONCLUSION

This study has provided empirical evidence that the level at which supply chain activities are been managed effectively depends largely on the awareness of supply chain risks. For instance it is practically impossible for an organisation to implement a new business idea without proper feasibility studies that provided necessary information about the environment they intend to operate in. Therefore the study carried out shows that supply chain risks are better averted when the managers are aware of their attendant nature and consequences.

Conclusively, the findings gathered from this study will add to existing knowledge and also justify the fact that the effective and efficient management of supply chain risk is better favoured through the awareness of these risks and the application of preventive measures.

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