

INTEGRATED SUPPLY CHAIN RISK MANAGEMENT

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ABSTRACT

Integrated supply chain risk management (ISCRM) has become indispensable to the theory and practice of supply chain management. The economic and political realities of the modern world require not only a different approach to supply chain management, but also bold steps to secure supply chain performance and sustainable wealth creation.

Integrated supply chain risk management provides supply chain organisations with a level of insight into their supply chains yet to be achieved. If correctly applied, this process may optimise management decision-making and assist in the protection and enhancement of shareholder value.

PROBLEM STATEMENT

Globalisation has not only created significant opportunities for countries and organisations around the globe, but also introduced more uncertainties given the increased complexity of the global business environment. Uncertainty is integral to risk. Where there is uncertainty, there is risk; and the degree of uncertainty determines the extent of risk.

Organisations increasingly realise that success in the new economy requires innovative approaches that will enable a swift response to opportunities and threats in the marketplace. The consequences of not achieving business objectives, including supply chain objectives, could be severe as markets have a tendency to punish underperformers ruthlessly.

Supply chains are fundamental to organisations as they are instrumental in the achievement of strategic business objectives. According to Chopra and Meindl (2001: 17) "supply chain decisions play a significant role in the success or failure of a firm". Supply chain decisions become increasingly complex because of an ever-changing competitive environment. Firms

are constantly confronted with complex sourcing, manufacturing, marketing and distribution decisions, because of competitive pressures and shareholder demands for value creation. These complexities are often furthered by extended supply chains crossing regional and international boundaries, involving an increased number of supply chain role players and exposures to political developments, different legal and regulatory frameworks, human rights issues, etc. While the latter poses a major challenge to supply chain organisations, it also remains a key challenge to stay competitive in a global business environment that is characterised by rigorous customer demands in respect of cost, product quality and service delivery.

The breadth and scope of the conventional application of risk management are too narrow to effectively respond to the complexity and extent of the modern supply chain organisation. Traditionally, risk management has been mainly applied as a one-dimensional approach, focusing on the downside or the threat of loss only, and characterised by the following:

- ad hoc, reactive and silo-based activities
- no or limited integration
- no common approach
- no alignment with strategic objectives
- no risk management policy
- no risk tolerance levels
- no reporting structures
- no risk culture.

The complexities, challenges and uncertainties associated with modern supply chain management require a different but essential approach to the management of supply chains.

PURPOSE OF THE STUDY

The objectives of this study are to determine and define (1) a robust ISCRM implementation framework and (2) a robust ISCRM process. Robustness has been a key focus of this study as the successful implementation of ISCRM requires due consideration of **all** relevant tangible and intangible elements that may influence successful implementation. Similarly, robustness is of equal importance in the design of an ISCRM process. A risk management process that lacks fundamental process elements or that is incorrectly sequenced will, in most instances, result in incorrect and/or inadequate risk information.

LITERATURE REVIEW

In recent years, firms have become increasingly aware of the importance of risk management, primarily because of high profile corporate failures and stricter corporate governance

requirements. Globally, a significant number of firms have already adopted a formal risk management approach and begun the journey towards enterprise-wide or integrated risk management (IRM).

In the area of supply chain management, a number of authors have referred to supply chain risks or supply chain risk management over recent years, albeit from different perspectives. These perspectives range from external risks that could threaten supply continuity, for example the impact of wars and terrorism (Anon., 2003) and risks that may result from pursuing supply chain objectives, such as pressure to enhance supply chain performance (Stauffer, 2003).

Numerous authors and supply chain publications have in recent years focused on the issue of supply chain continuity, especially in the aftermath of the terrorist attacks on America on September 11, 2001. Although the continuity of supply chain operations is fundamental to supply chain and business performance, supply chain (business) continuity planning or disaster recovery planning should not be seen as equal to, or a replacement for, an ISCRM framework. It is indeed a very important element thereof.

A business continuity or disaster recovery plan enables a firm to “continue operations in the event of a disaster” (Information Systems Audit and Control Association, 2002: 253). In other words, a contingency plan is intended to reduce the impact of an unexpected disruption and to ensure the continuity of minimum service levels to maintain essential or critical operations.

The inclusion of risk management as a critical supply chain process by Mentzer (2000: 40) is noteworthy. Although Mentzer has not elaborated on the supply chain risk management process per se or on the implementation of an ISCRM approach, the inclusion of risk management as a critical supply chain process certainly has raised the importance of supply chain risk management. In this regard, Minahan (2005: 1) also argued that “years of cost-cutting and lean operating practices have made businesses highly vulnerable to supply disruptions. Pressures for business continuity and regulatory compliance will force companies to adopt procedures, metrics, and systems to make supply (chain) risk management a core business discipline within the next five years”.

The Centre for Logistics and Supply Chain Management of the Cranfield School of Management published a comprehensive research report titled ‘Creating Resilient Supply Chains: A Practical Guide’ (Peck, 2003). This report reflects on various aspects related to supply chain risk management, including the sources of supply chain risk, relevant tools and techniques in managing supply chain risks and the importance of a supply chain risk management culture. Although this report is an excellent contribution to the theory and practice of supply

chain risk management, it does not provide clear guidance in establishing a fully integrated supply chain risk management framework and process. Furthermore, insufficient consideration has been given to the risk management process *per se*. The latter is of significant importance as the successful application of the risk management process depends on the adherence to certain core principles.

A recent publication on supply chain risk (Brindley, 2004) provides contributions by various authors on research in the field of supply chain risk management, including uncertainty and risk management, dimensions of supply chain risk management, risk characteristics of the supply chain and relevant techniques and applications. This is certainly a valuable contribution to the field of supply chain risk management, both from a conceptual and empirical point of view. It is accepted that the primary objective of this book is to combine current research in this field. Therefore, a more fragmented vis-à-vis an integrated approach has been opted for. However, supply chain risk management can only be effective if structured and applied on a fully integrated basis.

Perhaps the most significant comments published to date about supply chain risk management relate to some conditions of an effective ISCRM approach, as advocated by the authors, namely the importance of a holistic, integrated and collaborative approach towards supply chain risk management (Stauffer, 2003: 4; Atkinson, 2003: 43-47).

It should be clear from the above that risk management and in particular supply chain risk management is still an evolving science. Numerous challenges exist in the successful implementation and application of supply chain risk management (SCRM). The current theoretical basis primarily provides an overview of **what** is required and does not necessarily address **how** this philosophy should be implemented and applied.

PROPOSED IMPROVEMENTS

It is imperative to identify potential supply chain threats well in advance and to respond rapidly to relevant opportunities as these may influence the achievement of supply chain and business objectives. This should not be an ad hoc exercise but should be embedded in the culture of the supply chain organisation through a formalised and integrated supply chain risk management framework.

Hence, a robust ISCRM approach is a prerequisite in addressing the uncertainties in the modern supply chain. The lack thereof could destroy shareholder value and the reputation of an organisation.

Implementation of ISCRM

The implementation of ISCRM may be an onerous task for several reasons, such as the risk management maturity of the organisation and the receptiveness of the organisational culture to new initiatives. Past experiences regarding new corporate initiatives will play a significant role in the way in which internal clients perceive the new initiative. In this regard, Primm (as quoted by Barton, Shenkir and Walker, 2002: 30-31) points out that “people don’t want another corporate initiative” and that employees are generally averse to “just another program from corporate”.

Therefore, companies have to consider the implementation of ISCRM carefully. The challenge is to position this framework as a key value driver that could assist the organisation in maximising opportunities and minimising losses. Also, the ISCRM philosophy and process should be entrenched into daily business practice and thinking. Achieving the challenges indicated above is easier said than done. It requires, among others, careful planning, widespread consultation with all the relevant role players and a proper communication strategy.

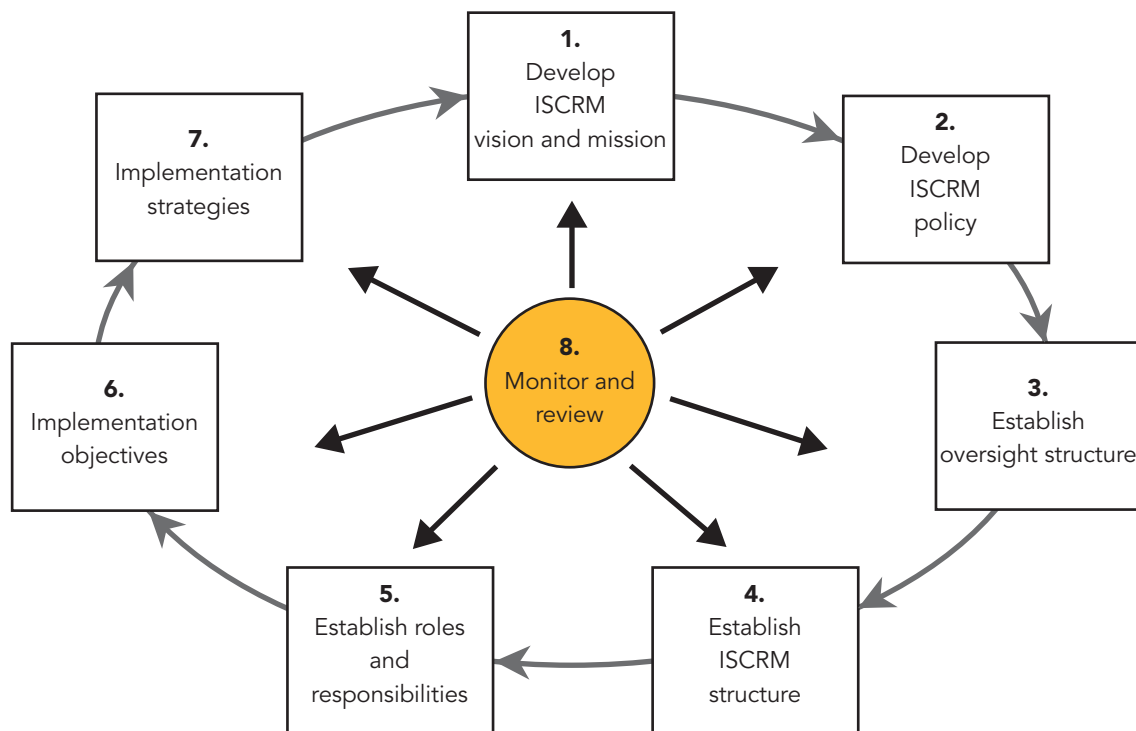


Figure 1: Steps in the implementation of integrated supply chain risk management (ISCRM)
Source: Compiled by the authors for the purposes of the study

Figure 1 illustrates the primary steps in the implementation of ISCRM. Note that this is a dynamic process as the content of each step could evolve or change over time. For example, it may be necessary to change the roles and responsibilities of supply chain professionals in the application of the ISCRM process or the risk management policy of the organisation.

The ISCRM **vision** and **mission** statements should provide a condensed though clear indication of the firm's commitment to this approach; and also indicate **what** it wants to achieve and **how** it is going to be achieved. A well-articulated ISCRM **policy** is essential to the success of this approach. It provides insight, guidance and transparency regarding the nature and extent of SCRM activities. A proper **oversight** or governance structure is essential to ensure that the board and management fulfil their risk management responsibilities. Corporate governance guidelines stipulate that the board of directors is responsible for the "total process of risk management" and that management is "accountable to the board for designing, implementing and monitoring the process of risk management" and integrating it into the "day-to-day activities of the company" (King Committee, 2002: 75). Significant supply chain risks and relevant issues pertaining to ISCRM should be reported to, and discussed at, relevant risk committees on board and management levels. Ideally, supply chain risk management should be integrated with the existing risk management **structure**, where it does exist. In the absence of such a structure, reporting and communication lines between the supply chain risk manager and relevant senior executives should be established. Whether ISCRM has been established as part of an existing risk management structure or on a standalone basis, **roles and responsibilities** for all key role players should be established to ensure an effective and well-governed IRM framework. Clear implementation **objectives** and **strategies** in achieving those objectives are of utmost importance in ensuring a sustainable and value-adding ISCRM approach. In this regard, organisations should, as a first step, consider the receptiveness of the organisational culture to this philosophy. This may require an assessment of the risk management maturity of the organisation and specific strategies to ensure the acceptance of, and commitment to, this philosophy. To achieve this, firms may for instance begin with a pilot project in a business unit that has demonstrated support for, and interest in, the ISCRM concept. The success of this exercise as well as the experience gained and the lessons learned may prove to be extremely valuable in the roll-out of this initiative to the remainder of the organisation. Similarly, the supply chain organisation may wish to obtain a number of 'early or quick wins' that will sensitise management to the philosophy and value of this approach.

The implementation of ISCRM is a challenging and onerous task that could fail if not planned properly. Unfortunately, a recipe for implementing this approach does not exist, nor is it feasible "because so much depends on the culture of the company and the change agents who lead the effort" (Barton *et al.*, 2002: 12). Therefore, it is imperative that implementation strategies consider important factors such as senior management support, the correct positioning of ISCRM in the firm, change management, the improvement of risk management capabilities and a common risk management process and language. These and other key success factors are discussed in the next section.

Key success factors in the implementation of ISCRM

The mere implementation of ISCRM does not assure success. The following factors, among others, are prerequisite to the successful implementation and the sustainability of ISCRM:

Senior management support

Senior management support, at corporate, divisional and functional levels, is a prerequisite to the success of any IRM framework, including ISCRM. This is essential because of the “significant cultural and organisational barriers” to implementing IRM. “Strong and visible support” is vital to overcome some of these barriers (Miccolis, Hively & Merkley, 2001: 132).

Correct positioning of ISCRM

The correct positioning of ISCRM is vital to the success of this initiative. This approach should not be perceived as ‘just another head office initiative’ or as a new or separate process. It should rather be introduced as an “enhancement to already entrenched and well-accepted processes within the organisation” (Miccolis et al., 2001: 133).

Dedicated and skilled supply chain risk manager

Firms with multiple and complex supply chains require a full-time supply chain risk manager, skilled and experienced in the supply chain and risk management disciplines. The latter is a prerequisite to the successful implementation and application of ISCRM. This is of particular importance as it may take years to establish an ISCRM culture. The supply chain risk manager must ensure that this drive maintains momentum and energy until such time as ISCRM has been fully embedded in the culture and practices of the supply chain organisation.

Carefully crafted implementation strategies

Implementation or rollout strategies must be aligned with the size, complexity and culture of the supply chain organisation. Also, the type of organisation plays a significant role in the crafting of relevant strategies. Most firms may find it useful to start with a pilot project. A successful pilot project may prove to be a valuable testimony or case study for ISCRM.

Change management

Most firms have pockets of risk management expertise, such as credit or project risk management. Some may argue that risks are well managed because of a specific risk management focus and the use of relevant systems (e.g. total quality management) and applicable techniques (e.g. SWOT analysis). These are examples of typical misconceptions about risk management, and in particular IRM, which often exist.

The above examples together with other reasons, such as the resistance to ‘head office’ initiatives, indicate the importance of, and need for, a formalised change management

strategy. It is imperative that the supply chain risk manager identifies and considers relevant obstacles and designs appropriate strategies to deal effectively with those issues. Proper planning and appropriate implementation strategies may be effective to resolve potential resistance and misconceptions. A golden rule is to take one small step at a time. This is a collective approach that embraces the supply chain organisation, not an approach that is confined to the supply chain risk manager.

Risk culture

Establishing a risk culture is a challenge, but it is fundamental to the success of ISCRM. Lam (2003: 68) argues that the risk culture of a firm will determine the success of IRM. A risk culture could be defined as the sum of individual risk mindsets that are collectively in common agreement (Culp, 2002: 205; Anderson & Ackerman-Anderson, 2001: 98).

According to Miccolis et al. (2001: 108), it is a major challenge to create an understanding of what 'risk' really means. In this regard, Culp (2001: 221) argues that "knowledge management must ingrain into the culture of the firm that risk is vital for business, innovation, and growth, and that risk management is a source of opportunity as well as a means of maintaining the required internal controls". In addition, Lam (2003: 74) points out that line management needs to realise that "risk and return are both inevitable parts of any business decision". Hence, knowledge about ISCRM and perceptions, both individual and collective, are important components of a desired risk culture.

Integration

ISCRM is a systems or holistic approach to SCRM as opposed to a silo approach. The integration of business processes and related business functions as well as downstream and upstream integration across the supply chain is fundamental to ISCRM. For example, sourcing risk may have tangible (financial) and intangible (reputation) consequences affecting related business functions (such as manufacturing and marketing) and downstream supply chain participants (such as logistics providers and the end consumer). For this reason, the ISCRM philosophy needs to be integrated with all business planning activities as well as routine day-to-day activities, including management decision-making.

Improving risk management capabilities

According to DeLoach (2000: 176) risk management capabilities are the "qualities acquired or developed to systematically identify, source, measure, manage and monitor risks". Supply chain organisations should constantly develop ISCRM skills and competencies as these attributes are essential to effectively deal with the complexities and challenges associated with supply chain management.

Common risk management process and language

One of the early tasks of the supply chain risk manager is to establish a common ISCRM process as well as a common risk language. This is prerequisite to the successful implementation and execution of ISCRM. In this regard, Chown (as quoted by DeLoach, 2000: 108), Group Risk Manager of the British Post Office, points out that “we’ve realised, if we’re all speaking different languages, we’re going to have difficulty communicating”.

Risk communication

The risk management function often consists of several role players, such as the supply chain risk manager, divisional risk managers, compliance officers, project risk managers, et cetera. In addition, assurance providers, such as internal audit, have close links with the risk management function. It is imperative that proper communication channels exist within the risk group and between the risk management function and assurance providers. In addition, communication channels between the risk group, management and relevant risk management forums should be formalised to ensure continuity in terms of informal feedback and formal reporting.

Performance measurement

ISCRM performance must be measured at both strategic and operational levels. At the strategic level, the performance of the supply chain risk manager must be measured. Typical performance measures will focus on the reduction in the ‘cost of risk’, such as insurance premium expenditure, contingency planning expenses and consultant fees (Butterworth, 2001: 24). At the operational level, the progress towards the achievement of implementation objectives must be tracked and measured on a constant basis. To facilitate this process, key performance objectives as well as key performance areas must be identified together with relevant measures and deliverables.

ISCRM process

The risk management process is fundamental to successful risk management – the so-called ‘nuts and bolts’ of making it happen. It is of utmost importance that the risk management process is carefully designed to ensure alignment with generally accepted risk management practice and to meet the objectives of ISCRM.

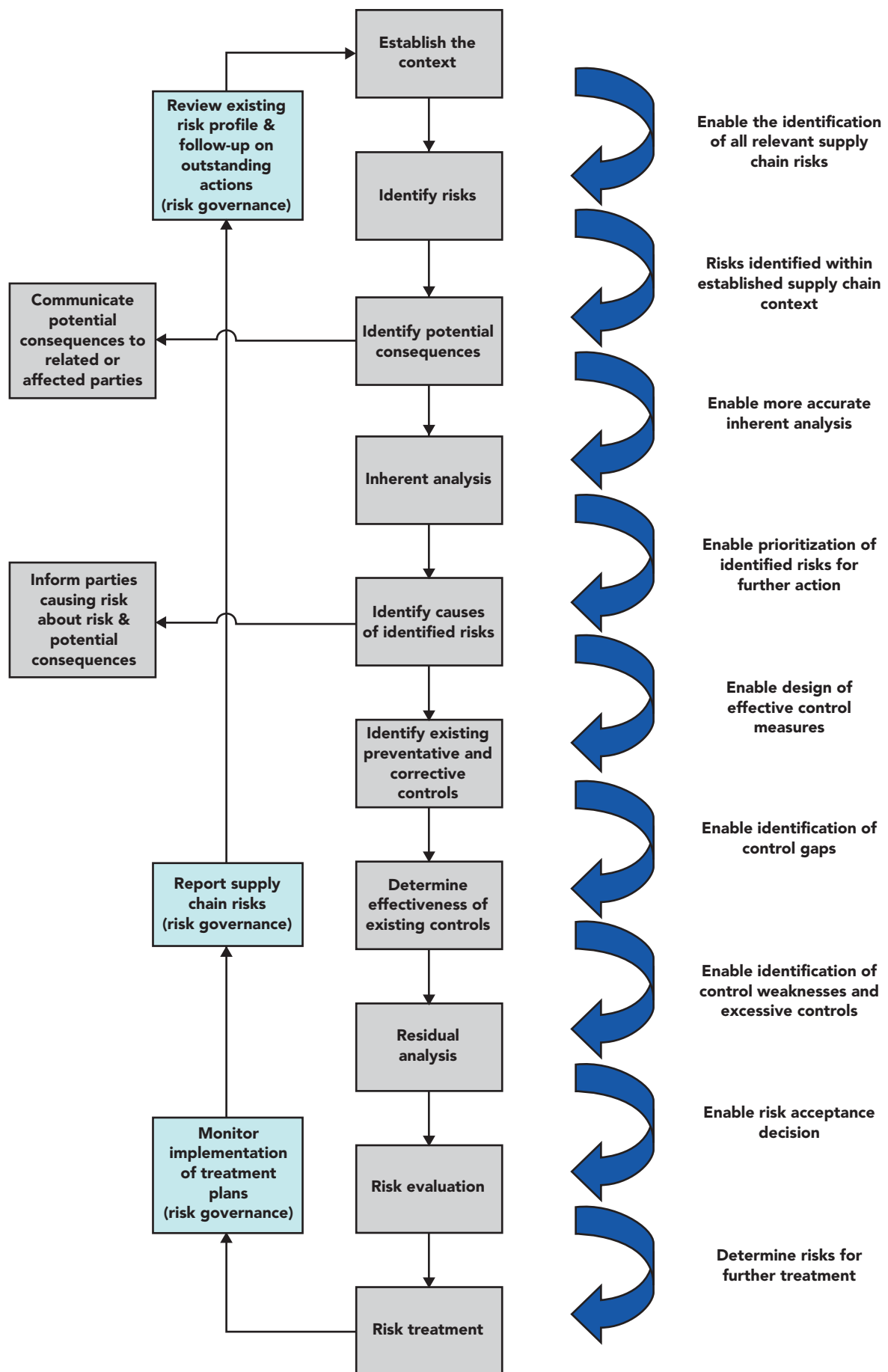


Figure 2: Integrated supply chain risk management process
Source: Compiled by the authors for the purposes of the study

Figure 2 provides an overview of the primary steps in the ISCRM process. This is a continuous process that starts with an understanding of the scope or the context of the risk study. In essence, this is about defining the boundaries within which risks need to be identified. The continuous nature of the ISCRM process provides supply chain organisations with the opportunity to redefine the context as the supply chain environment or strategies change. For example, a firm that expands its operations to a new market will encounter new supply chain risks. Thus, subsequent risk studies should include the new supply chain.

Once the parameters of the risk study have been defined, risks are identified within those boundaries. Thereafter, it is important to explore the potential consequences of each risk if they materialise. This is a prerequisite for the next step in the process: inherent analysis. Inherent analysis is a pre-control analysis of identified risks and is aimed at prioritising risks so that the immediate focus is directed at the higher rated risks.

Once risks have been prioritised, it is necessary to further explore the identified risks. The highest rated risks are first explored as it is important to direct the risk study at those issues that may require immediate attention. This involves the identification of the cause of each risk as well as existing preventative and corrective controls. In addition, it is important to determine the effectiveness of existing controls as this assessment will be instrumental in the residual or post-control risk analysis.

Once the residual analysis has been completed, it is necessary to evaluate the post-control risk levels to predetermined criteria or risk tolerance levels, so as to determine whether risks are acceptable or not. Where risks are unacceptable at current risk levels, they have to be treated, except where risks are beyond the control of the supply chain organisation. However, if possible, corrective controls should be introduced to mitigate the potential impact of risks that are beyond the control of the firm. Note that the selection of the most effective and efficient treatment option depends on an understanding of the risk as well as available treatment options.

Risk governance is an essential component in the ISCRM process and hence the implementation of relevant treatment plans should be monitored carefully. In addition, the dynamic nature of risk and the supply chain environment requires that both the supply chain context and the existing supply chain risk profile be reviewed frequently. Where the supply chain context has changed, new risks may appear and existing risks may be analysed differently.

Furthermore, risk profiles or the components thereof should be communicated to all related or affected parties, such as related business functions or supply chain partners. Supply chain risks should also be reported to, among others, company boards and senior management. Finally, the supply chain organisation should continuously strive to improve the risk management capabilities of the entire supply chain, including the management of supply chain risk.

Proper supply chain risk management requires attention to all the elements indicated in the above figure. According to the Australian/New Zealand Standard (2004: 19), firms should “avoid the temptation of leaving out elements of the risk management process”. It is apparent that organisations often task individuals without the appropriate knowledge of, or experience in, risk management to conduct risk studies. The product of these exercises is often captured in official reports that form the basis of management decision-making. In this regard, the Australian/New Zealand Standard (2004: 19) points out that “managers risk implementing costly, ill-conceived and inadequate ‘quick fixes’” if they do not consider the complete context of the risk study and the application of proper risk identification and assessment techniques.

CONCLUSIONS

ISCRM enables firms, through a structured and disciplined approach, to identify, analyse and treat those uncertain future events that may interrupt supply chain operations. Indeed, these represent events that are both within and beyond the control of the firm. The continuous and integrated, as well as the intuitive and proactive, nature of ISCRM provides firms with the opportunity to identify those events that are likely to impact on the achievement of supply chain and business objectives.

A **continuous** approach to supply chain risk management enables organisations to regularly assess the supply chain environment, to identify new supply chain risks when they arise, and to reassess the potential impact and likelihood of the occurrence of existing supply chain risks.

An **integrated** approach ensures a comprehensive supply chain risk profile, including less obvious supply chain risks, such as risks that are disguised in business function interfaces, for example, risks associated with poorly defined responsibilities. Furthermore, this facilitates the integration of related business functions and supply chain participants on issues important to supply chain performance, such as transportation capacity, delivery delays and new laws and regulations. Thus, an integrated approach improves not only collaboration but also supply chain visibility. Hence, supply chain and business performance may improve, resulting in improved profitability.

ISCRM provides all relevant stakeholders, even on lower or non-managerial levels, with the opportunity to participate and make a difference. It is thus an intuitive approach aimed at the optimisation of supply chain performance.

This approach is by its very nature proactive, designed in accordance with the definition of risk, to identify uncertain future events within a relevant supply chain context. By this means, provided that this approach is well entrenched and governed, it provides senior management

with reasonable assurance about the firm's ability to effectively prevent and respond to risk events in the supply chain environment.

ISCRM is indispensable in the planning and formulation of supply chain and business strategies. It is essential to test the robustness of relevant strategies in relation to supply chain risks that may prevent the achievement of supply chain and business objectives.

ISCRM is not only focused on downside risk or the protection of shareholder value. It also has an upside as far as supply chain opportunities are concerned and may in fact assist in the enhancement of shareholder value. For example, a risk study of a third party logistics provider may indicate that other outsourcing opportunities also exist, which may increase the asset turnover of the firm, free up more cash for other value-adding or growth opportunities and by this means create the opportunity to enhance shareholder value. However, firms have to seize opportunities within well-defined risk parameters or tolerance levels that will allow them to optimise risk taking. Any supply chain opportunity has associated risks. The question is whether to accept the risk or not. According to Burger (2004: 4), the "essence of successful business" is to get the balance right – "to knowingly take risk rather than unwittingly be exposed to it".

ISCRM may also assist in supply chain optimisation. Each supply chain participant is an "independent entity working to (achieve) its own objectives" (Oliver, Chung & Samanich, 2001: 102). Thus, it may be argued that if each entity in a supply chain achieves its own objectives, it is possible that the supply chain may be optimised, provided that individual objectives are aligned with broader supply chain objectives.

Finally, ISCRM may enhance and protect shareholder value. Shareholder value can be measured by internal measures as well as market-based measures. Well-known measures are economic and market value-added respectively (Schary & Skjott-Larsen, 1998: 435). Economic value-added is defined as operating profit less the cost of capital. Evidence of a well-entrenched ISCRM framework may reduce the cost of capital as it may provide more comfort to lenders. As a result, shareholder value will increase. Likewise, market value-added is defined as the total market capitalisation of a company less the total capital invested. In this regard, ISCRM may prevent supply chain disruptions that may have a negative impact on the share price and market capitalisation of the company. Thus, shareholder value will be protected.

RECOMMENDATIONS

Based on the insights obtained during this study, it is firstly recommended that firms seriously consider the implementation of an ISCRM framework. South African companies are exposed to numerous uncertainties, including exchange rate fluctuations, distant export markets and foreign competition. Firms must also contend with high fuel prices, road and rail infrastructure limitations in Southern Africa, public transport inefficiencies, and complex supply chains. These uncertainties pose enormous challenges to organisations, in particular those that are involved in foreign trade. As a result, organisations should be extra cautious in supply chain network design and planning, taking due consideration of all the aspects that may impact on supply chain performance.

It has become imperative for South African companies to evaluate the robustness of established supply chain management philosophies critically within the current context of the South African and global economies. In this regard, it is important to note that organisations are globally bound to strict corporate governance and statutory requirements regarding risk management practices. Although compliance with these requirements is important, the primary reason for a dedicated and integrated approach to supply chain risk management is set in the notion that it may be perceived as a new form of supply chain management best practice.

It is also important to note that if this process is implemented and applied correctly, the potential benefits should far outweigh investments in time and money. In the new economy, a firm cannot afford to be unwittingly exposed to supply chain risk exposures that may influence the competitiveness of its supply chains, impair the reputation of the firm and ultimately destroy shareholder value.

Firms should be cautious in the **implementation** of an ISCRM framework. Note that there is no single implementation approach. The culture and the risk management maturity of the firm will largely dictate the most appropriate implementation strategy. In addition, firms should take care in the **application** of the ISCRM process. It is imperative that the process is correctly applied. Failure to comply with the essential principles of the methodology may result in risk information with less integrity.

Secondly, it is recommended that the supply chain organisation establishes a culture that is aware of risks and embedded in the minds and conduct of supply chain professionals. This will only be achieved through strong leadership and senior management support as well as the constant development of supply chain risk management capabilities.

Thirdly, it is recommended that firms with multiple and complex supply chains appoint a supply chain risk manager to facilitate the implementation of the ISCRM framework and the

application of the ISCRM process. This position also has an important integration (internal and external to the organisation) and governance role to fulfil. This is a senior position with strategic, tactical and operational involvement.

Fourthly, it is recommended that ISCRM be introduced as a core aspect of undergraduate and postgraduate studies in supply chain management. Exposure to this philosophy at tertiary level will certainly assist students to be better prepared for the challenges of an unpredictable new economy. In addition, graduates who have been exposed to ISCRM should be able to make a valuable contribution to those organisations yet to adopt this philosophy.

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