A REVIEW OF OPERATIONAL RISK MANAGEMENT DECISION SUPPORT TOOL

Hood Atan
Lead Auditor/Principal Consultant
Exergy Management Consultant PLT, Malaysia
hood.atan@yahoo.com

Edly F. Ramly
Certification Director
EFR Certification Sdn Bhd, Malaysia
e.ramly@efrcertification

Musli Mohammad, Mohd Shahir Yahya
Department of Manufacturing and Industrial Engineering,
Faculty of Mechanical and Manufacturing Engineering,
Universiti Tun Hussein Onn Malaysia (UTHM), Batu Pahat, Johor
mmusli@uthm.edu.my , shahir@uthm.edu.my

Abstract

The new requirements of ISO 9001: 2015 quality management system standard clause 0.3.3 required the organization to implement a risk based thinking for achieving an affective quality management system. The definition of risk as stated in the standard is "the effect of uncertainty' which could be positive or negative. Thus, ISO 9001 certified organization requires to demonstrate objective evidence of the implementation of risk based thinking such risk analysis and risk mitigation plan not only to satisfy the need of ISO 9001:2015 standard, but also widely accepted that organization requires risk management activities to stay competitive. However, there many initiative, tools and approach for the operational risk management activities have been subjected to little research and are not well understood. This paper reviewed and discussed the available literatures on operational risk management decision support tools. Based on an extensive literature review, the issues relevant to operational risk management support tools are examined, and discussed the several issues to identify the decision support tools to satisfy the intended requirements of the ISO 9001:2015 standard.

Keywords: ISO 9001:2015, Risk Management, Risk Assessment, Risk Analysis, Decision support tools,

1. INTRODUCTION

The latest updates to the ISO 9001: 2015 (Technical Committee ISO/TC176, 2015a) Quality management system standard are not all about the requirements. Although they establish the framework to enable the organization to map their business process, the standard outlines a different approach in how such organization should satisfy requirements. ISO 9001:2015 includes a component of risk-based thinking, and it involves the people and leaders within the organization. The standard does not include a specific requirement for a quality management representative, or even a quality manual. Instead, ISO 9001:2015 focuses on a companywide commitment to quality that is championed and brought about by leaders. (Wilson & Campbell, 2016)

Managing risks is a strategic challenge for organizations, which must face threats increasingly complex and diverse. Introduced in 2009, the ISO 31000 standard is intended to help organizations to manage in a systematic and comprehensive manner diverse types of risk by offering a universal framework 'to assist the organization to

integrate risk management into its overall management system' (ISO Technical Management Board Working Group, 2009). Although the ISO 31000 standard has effectively integrated the principles and practices considered most effective by many experts and researchers in the field, the experience feedback from examples of organizational crises in various sectors should lead managers to question how they will integrate it in their organizational strategy.

The objective of this paper is to explore the common practices and framework on the operational risk management decision support tools and discuss the prowess and limitations of each risk management process. The literature on operational risk management decision support tools was collected from the ProQuest, Scopus, Google Scholar, Elsevier Science Direct and Emerald-insight library. The procedure to conduct the search as followed: 1) Boolean search of exact phrase i.e. "Risk management", "Operational risk management", "risk assessment", and "risk analysis"; 2) Filter by year; 3) Filter by relevant. The most appropriate papers dealing with operation risk management decision support tools practice and its closely related topics were excavated. Finally, the gaps of current initiatives are identified and recommend the future focus in the operational risk management decision support tools. Finally, the gaps of current research study are identified and recommend the future focus in operational risk management decision support tools.

2. LITERATURE REVIEW

Operational risk is not well defined concept.in the context of a manufacturing industries, it refers to a range of possible failures in the operation of the firm that are not related directly to financial risk. Operational risk is "the risk of a change in value caused by the fact that actual losses, incurred for inadequate or failed internal processes, people and systems, or from external events (including legal risk), differ from the expected losses". This definition, adopted by the European union Solvency II Directive for insurers, is a variation from that adopted in the Basel II regulations for banks.(Basel Committee on Banking Supervision, 2001). Operational risk remains a fuzzy concept because it is hard to make a clear cut distinction between operational risk and the "normal uncertainties faced by the organization in its daily operations.(Reim, Parida, & Sjödin, 2016). Operational failure risk arises from the potential for failure in the course of operating the business. A firm uses people, processes and technology to achieve business plans, and any one of these operational failure risk can be defined as the risk that there will be a failure of people, processes, or technology within the business unit. A proportion of the failures may be anticipated, and these risks should be built into the business plan. But it is the unanticipated, and therefore uncertain, failures that give rise to the key operational risks. These failures can be expected to occur periodically, although both their impact and their frequency may be uncertain (Ostrowska & Mazur, 2015).

Operational strategic risk arises from environmental factors, such as a new competitor that changes the business paradigm, a major political and regulatory regime change, and earthquakes and other such factors that are outside the control of the firm. It also arises from major new strategic initiatives, such as developing a new line of business or re engineering an existing business line. All businesses rely on people, processes, and technology outside their business unit, and the potential for failure exists.(Frost, Allen, Porter, & Bloodworth, 2001)

The scope of operational risk management at the highest level can be broken down into two main components as shown in figure 1 and the summary as below:

- Operational integrity - the adequacy of operational controls and corporate governance ,and
- Service delivery - the organization ability to perform business process on an ongoing basis.

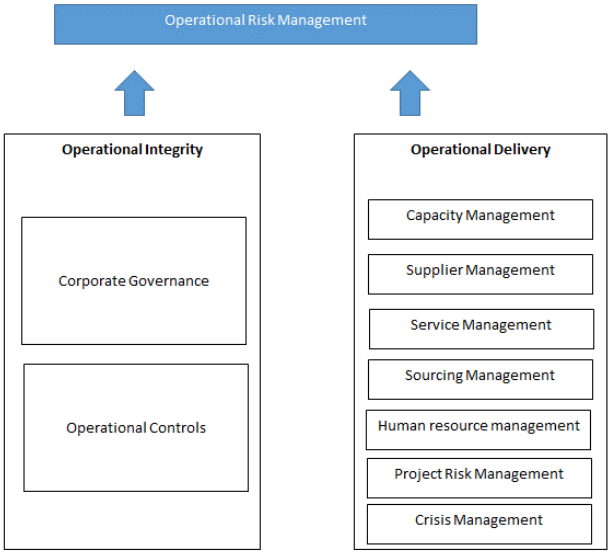

Figure 1. Components of operational risk management. (Frost et al., 2001)

2.1 ISO9001:2015

ISO 9001 Standard has achieved great international visibility with more than 1 million organization with ISO 9001 certified Management system (MS) all over the world (ISO survey 2012, accessible at www.iso.org). The committee responsible for this document is Technical Committee ISO/TC 176, Quality management and quality assurance, Subcommittee SC 2, Quality systems. The latest edition, ISO 9001:2015 Quality management systems Requirements has been released to public on 15 Sept 2015. This fifth edition cancels and replaces the fourth edition (ISO 9001:2008), which has been technically revised, through the adoption of a revised clause, sequence and the adaptation of the revised quality management principles and of new concepts.

The latest updates to the ISO 9001: 2015 Quality management system standard are not all about the requirements. Although they establish the framework to enable the organization to map their business process, the standard outlines a different approach in how such organization should satisfy requirements. The new requirements of ISO 9001: 2015 quality management system standard clause 0.3.3 required the organization to implement a risk based thinking for achieving an affective quality management system. ISO 9001:2015 includes a component of risk-based thinking, and it involves the people and leaders within the organization. The standard doesn't include a specific requirement for a quality management representative, or even a quality manual. Instead, ISO 9001:2015 focuses on a companywide commitment to quality that is championed and brought about by leaders.

There are two sections where risk appears in the ISO 9001:2015 standard: leadership directives and planning.

i. Leadership directives (Clause 5 of ISO 9001:2015).

ISO 9001:2015 is designed to create a companywide approach to quality, and leaders need to be directly involved. Although some leaders might not "speak quality," they definitely can speak risk. That's why the standard encourages the concept of "risk-based thinking." This refers to a coordinated set of activities and methods that organizations use to manage and control the many risks that affect their ability to achieve objectives. Risk-based thinking replaces what earlier version of the standard called preventive action.

ii. Planning (Clause 6 of ISO9001:2015).

This section is where preventive action used to be and is now replaced with managing risks and opportunities. It's important to note that ISO 9001:2015's take on risk is simple. This is not a directive to go out and build an enterprise risk management program, or change all of your processes to comply with the requirements. The standard directs companies to "promote" risk-based-thinking, which is fairly broad and open to interpretation. Every company should evaluate its own processes in light of the risks specific to their business or industry. The planning

section can be breakdown into these salient facts: Risk management is an objective process that can be repeated and standardized. The first goal is to identify the risks in the operations, then determine how they're going to measure those risks. After that, need to figure out treatment options for those risks, and eventually implement actions and controls to address each risk. Risk management is a tool that helps companies evaluate risks in processes and content. It evaluates event data in order to measure levels of risk in an operational context. Risk assessment is repeatable and objective; it allows such organization to replace an otherwise subjective "gut sense" with a more guided decision-making approach. Furthermore, it's easy to understand for people who aren't directly involved in the process.

Risk assessment helps drive change. It enables such organization to build alerts for critical events and develop guidelines and solutions for risk levels that are unacceptable. These solutions are systematic and repeatable, and can be implemented for high risks in a more automatic and consistent manner. However, it's important to note that risk assessment is a tool, not the solution. Internal and external context is important in risk assessment (Myšková & Doupalová, 2015), and for that, the company need resources. For example, someone on the shop floor might consider something a critical risk, whereas from the top floor, that risk might not look as bad in the larger context of operations. So it's a good idea to have a team in place to conduct the risk assessment process to ensure achieving the right results. As the company operations change or as more data accumulate, the established risk levels need to be adjusted.

2.2 Process Approach

ISO 9001 2015 section 0.3 expects organizations to adopt a process approach and section 5.1.1 asks top management to exercise leadership by promoting an awareness of this approach. The process approach is a management strategy. When managers use a process approach, it means that they manage and control the processes that make up their organizations, the interactions between these processes, and the inputs and outputs that tie these processes together. It also means that they manage these process interactions as a system. (Manders, Vries, & Blind, 2016) The model of a process based QMS shown in figure 2 is form ISO 9001:2015 standard and represents the interaction of the clauses of ISO 9001.

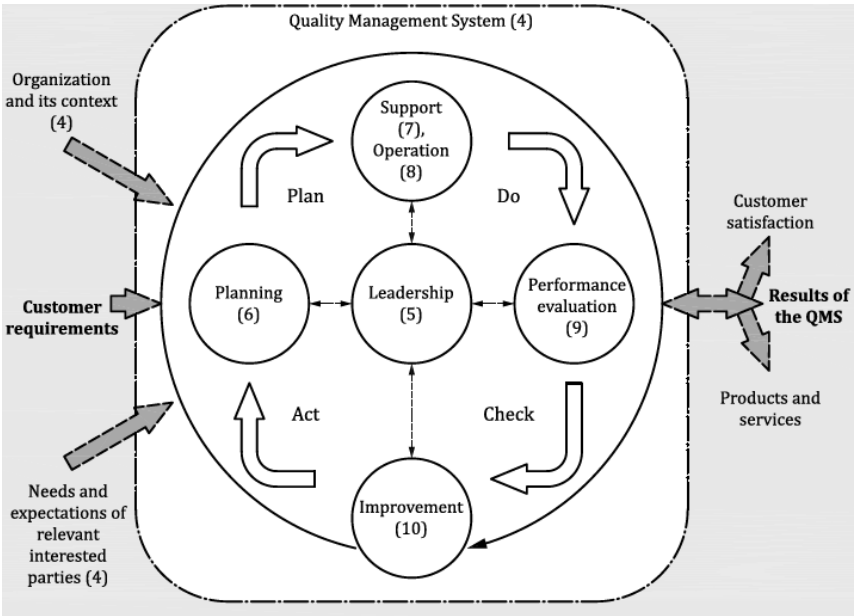

Figure 2: The structure of this International Standard in the PDCA cycle
(Technical Committee ISO/TC176, 2015b)

When this approach is applied to quality management, it means that they manage processes and process interactions as a coherent process-based quality management system. Likewise, the generic manufacturing chart shown in figure 3 is often used and could be the typical flow chart for any manufacturing process.

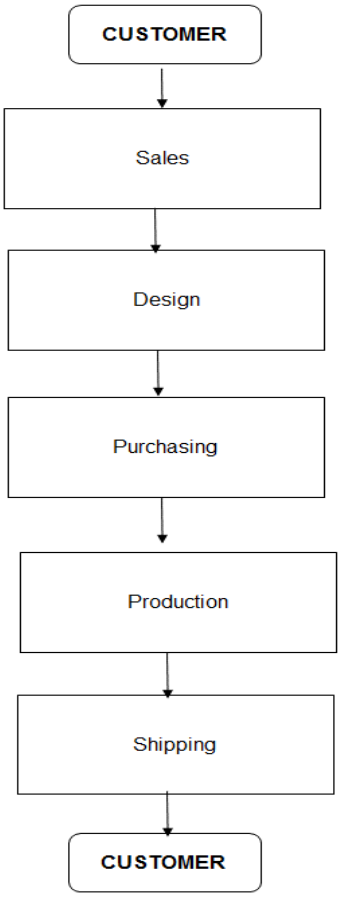

Figure 3: Generic Manufacturing process

A process is a set of activities that are interrelated or that interact with one another. Processes use resources to transform inputs into outputs as shown in figure 4.They are interconnected because the output from one process often becomes the input for another process.

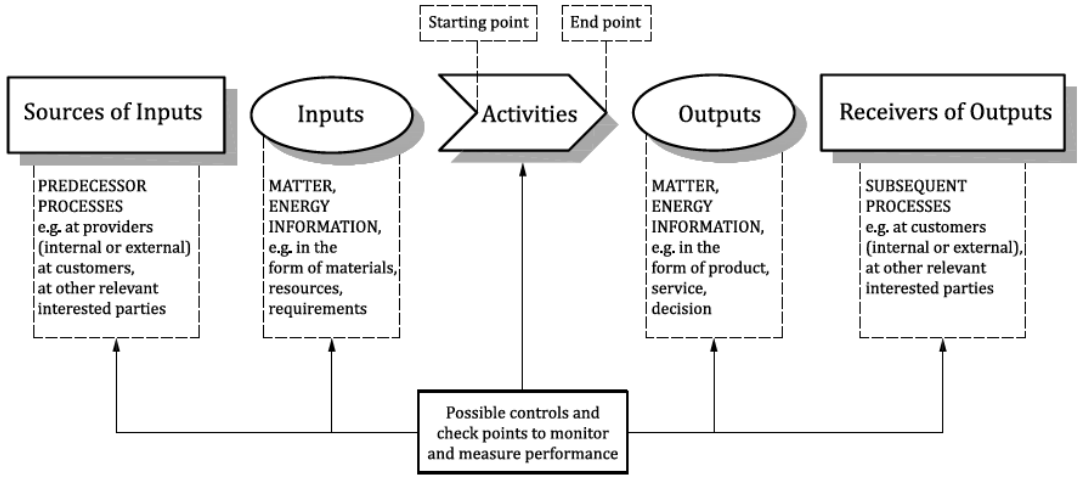

Figure 4: Schematic representation of the elements of a single process
(Technical Committee ISO/TC176, 2015b)

2.3 ISO 31000:2009

In November 2009 the International Organization for standardization (ISO) published ISO 31000:2009 Risk management- principles and guidelines (ISO Technical Management Board Working Group, 2009). Although ISO standards in the area of risk management have been produced before, this is the first that claims to be a standard for managing all risk everywhere.

The consequence of this is that certain ideas about risk and its management have got a boost in credibility and prominence while others have lost out. ISO 31000 will be quoted endlessly and will be influence the concepts and language used by important people such as company board members and organization. The relationship between the principles for managing risk, the framework in which it occurs and the risk management process described in this International Standard are shown in Figure 5.

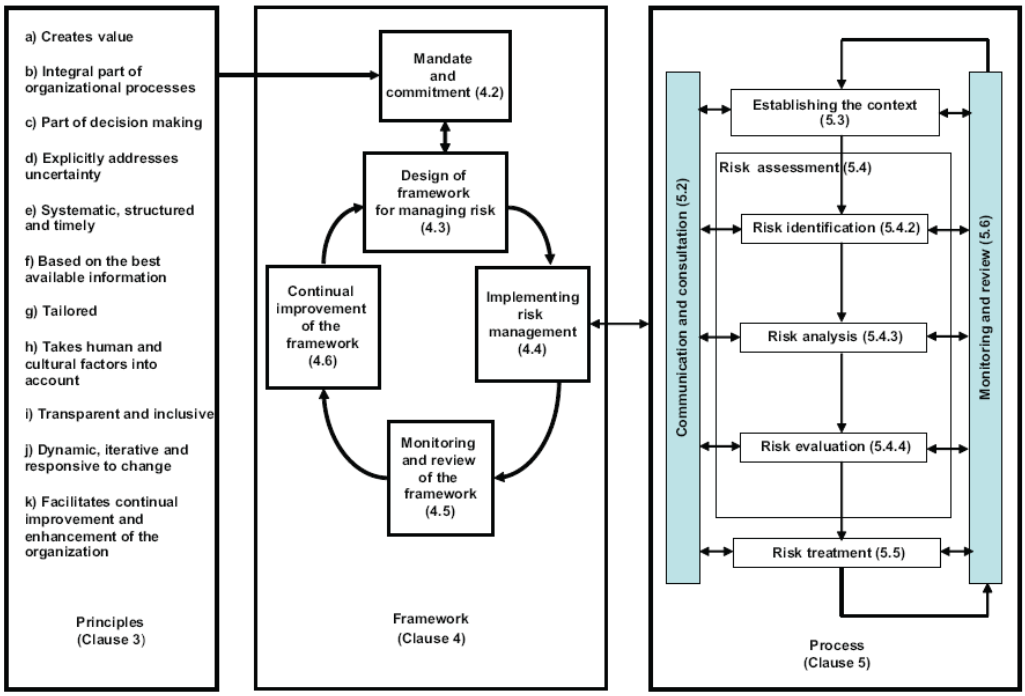

Figure 5: Relationships between the risk management principles, framework and process
(ISO Technical Management Board Working Group, 2009)

As stipulated in the ISO31000:2009 standard, the risk management should be embedded in all the organization's practices and processes in a way that it is relevant, effective and efficient. The risk management process should become part of, and not separate from, those organizational processes. In particular, risk management should be embedded into the policy development, business and strategic planning and review, and change management processes.

2.4 Risk Assessment Tools

Managing risks is a strategic challenge for organizations, which must face threats increasingly complex and diverse. Introduced in 2009, the ISO 31000 standard is intended to help organizations to manage in a systematic and comprehensive manner diverse types of risk by offering a universal framework 'to assist the organization to integrate risk management into its overall management system'. Although the ISO 31000 standard has effectively integrated the principles and practices considered most effective by many experts and researchers in the field, the experience feedback from examples of organizational crises in various sectors should lead managers to question how they will integrate it in their organizational strategy. The conclusion suggests that risk management should be seen as a practice-based approach, a strategy that managers do and not a strategy that managers have. In this regard, managers must question their own assumptions in the implementation of such a standard, take into account the specificities of their internal and external organizational environment and remain vigilant in its monitoring.(Olechowski, Oehmen, Seering, & Ben-daya, 2016)

The framework of risk management will also include methods for risk analysis as the complement for the risk management. The following figure 6 is the brief review of the most common of existing risk analysis methods.

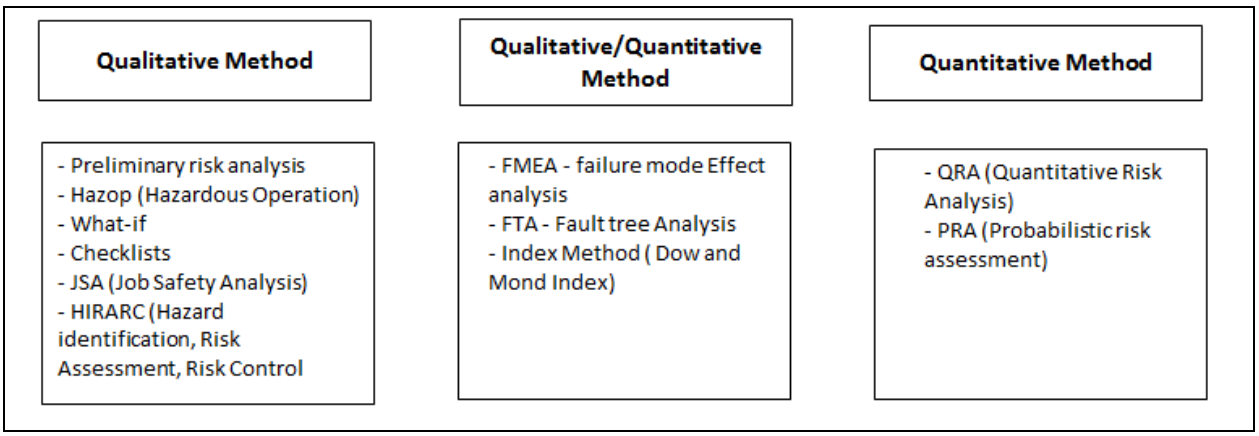

Figure 6: Summary for Categorization of risk management analysis methods

3.0 RESULT AND DISCUSSION

3.1 Existing Studies related to Operational Risk Management Decision Support tools.

In 1980s and 1990s, much of the focus in risk management circles revolved around designing and implementing control frameworks, managing insurance portfolio and meeting corporate governance standards following the increased attention focused on corporate governance. (Frost et al., 2001). Peter Masingham from University of Wollongong, Australia introduce the Knowledge risk management framework.(Peter Massingham, 2004). The approach takes the form of building on an empirical study of the Australian Department of Defense. Recent study in the operational risk management related to supply chain management where operational risk is one of the process within the supply chain. (Zsidisin, Petkova, Saunders, & Bisseling, 2016)(Badurdeen et al., 2014)(Muchfirodin, Guritno, & Yuliando, 2015)(Qazi, Quigley, & Dickson, 2015)(Wiengarten, Humphreys, Gimenez, & Mcivor, 2016)(Heckmann, Comes, & Nickel, 2015).

The most relevance literature related to researcher interest is case study of ISO 31000:2009 enterprise risk management framework in a high tech organization using six sigma approach (Choo, B.S.; Goh, 2015), a risk management framework designed for automotive manufacturing company.(Gustavsson, 2006) and diversified risk management by Ostrowska and Mazur (Ostrowska & Mazur, 2015). There is a notable paucity of studies in the field of operational risk management decision support tools specifically relating to meet the intention of the latest ISO9001:2015 standard requirements. Overall, these efforts resulted in several studies which are listed in Table 1 as below.

Table 1: Summary of the study on "Operational Risk Management Decision Support tools"

Author(s) and Year	Aim-Scope/ Method	Strength and Limitation
Peter Massingham (2016)	**Aim-Scope:** knowledge risk management (KRM), which applies KM tools and techniques to the management of organisational risk **Method:** Qualitative and model develop based on SAW decision matrix	**Strength :** The model provides managers with a way to differentiate amongst risks and prioritise for action. **Limitation** : Base on single case study in the Australian Department of Defence
Wiengarten, Frank Humphreys, Paul Gimenez, Cristina Mcivor, Ronan (2016)	**Aim-Scope:** explore the role of risk and risk management practices in the success of supply chain integration in terms of their impact on cost and innovation performance **Method:** hypotheses development and correlation matrix on th operational performance and law affect the impact of SCI	**Strength** : explore differences in supply chain integration efficacy based on the risk of conducting business and the mitigating effect of supply chain risk management practices **Limitation :** practices in the supply chain environment
Choo, B.S.; Goh, J.C.L. (2015)	**Aim-Scope:** to present a viable solution to how organizations can adapt and customize the ISO 31000:2009 enterprise risk management framework to suits its needs and requirements **Method**: Development of conceptual model on risk management using Six Sigma DMAIC Methodology	**Strength** : Risk management conceptual frameworks and model integrated with all supporting process, tools and resources. **Limitation :** Organization need to customize the frame works
Aven, Terje (2016)	**Aim-Scope:** to perform a review of recent advances made in the risk field, having a special focus on the fun- damental ideas and thinking that form the generic risk research **Method:** Literature Review and theoretical framework development	**Strength :** A model for linking the various stages in the risk informed decision-making **Limitation :** need for development of risk field and obtaining as strong unifying scientific platform

Helena Gustavsson (2006)	**Aim-Scope:** design a framework for risk management for Trelleborg AB **Method:** Literature Review, case study and development of conceptual framework	**Strength :** Risk management framework that can facilitate risk management **Limitation :** single case study at Telleborg AB
Henrik Berglund (2007)	**Aim-Scope:** explores the risk conceptions of innovators in two large corporations and identifies three themes that illuminate the relationship between risk and innovation in the corporate setting. **Method:** Literature Review, case study and conceptual framework development	**Strength :** Risk conceptions to elaborate the link between risk and corporate innovation **Limitation :**theorising about risk conceptions in corporate innovation
Ana Fenandes-Laviada (2007)	**Aim-Scope:** to provide a global perspective of the operational risk (OR) management framework from an internal audit viewpoint **Method:** Case study of new role of the internal audit function in the operational risk conceptual framework	**Strength :** the bank's approach to identifying, assessing, monitoring and controlling/mitigating the risk **Limitation :** Operational Risk management in the financial sector
D.rios Insua, C.Alfaro, J, Gomez, P. Hernandez-Coronado, F.Bethal (2016)	**Aim-Scope:** framework for risk management decisions in aviation safety at state level **Method**: Simplistic methods based on risk matrices	**Strength** : risk management framework, risk matrix with its potential pitfallas analysis. **Limitation** : Specific study in the aviation safety
Hamdu Kedir Mohammed, Adriana Knapkova (2016)	**Aim-Scope:** investigates the relationship between total risk management and company's performance **Method:** hypothesis the study used hierarchical linear regression model.Total risk management measured interims of the standard deviation of average sales over the standard deviation of economic returns in terms of ROE and ROA	**Strength :** the relation of holistic risk management and firm's performance **Limitation** : a case study evaluate the impact of total risk management on the performance of company's listed in Prague stock Exchange
Wiebke Reim (2016)	**Aim-Scope:** to propose a product-service systems (PSS) risk management decision-making framework for PSS operation **Method:** Exploratory and single case study with a Swedish manufacturing company	**Strength :** A risk management decision support framework and categorization of operational risks into technical, behavioural, and delivery competence risks structures **Limitation :** case study in which a company is actively working to develop its PSS offers and not address the risks that affect the development of PSS offers.
Richard Murnane, Alanna Simpson, Brenden Jongman (2016)	**Aim-Scope:** Successful risk assessment from the activities of the world bank global facility for disaster reduction **Method:** Review technical approaches and the institutional, social and political considerations.	**Strength :** technical components of a risk assessment as well as the institutional, social and political considerations that should be considered to maximize the probability of successfully reducing the risk defined by a risk assessment. **Limitation :**specific study of world bank disaster prevention
Nusaibah Mansor, Siti Norbaya Yahaya, Kazuhiro Okazaki (2016)	**Aim-Scope:** Risk Factors affecting new product development performance in SME **Method:** Literature Review and theoretical framework	**Strength :** Necesity of SMEs ability to assess, diagnose and manage risk in the NPD process **Limitation :** Limited to the new product development

4.0 CONCLUSION

With more than millions organization certified to ISO9001 and need to sustain their ISO certification, the operational risk management decision support tools will assist such organization to identify the risk mitigation plan and prioritize the opportunities for improvement. The operational risk management decision support tools explore in this paper expands the scope of risk assessment and risk analysis activities. The focus should develop an operational risk management decision support tool that include the risk assessment and management plan to imply the risk based thinking as stipulated in the latest ISO 9001 quality management system standard requirements.

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Biography

Hood Atan is a full time project consultant and qualified auditor in the fields of Quality, Health & Safety and Environmental Management system. Mr. Hood Atan holds a Bachelor of Engineering in Mechanical (Industrial) degree and a Master in Engineering (Industrial Engineering) degree from Universiti Teknologi Malaysia. Having worked as a Quality Engineer, Quality Manager, Quality and Environmental Management Representative for numerous years from bottom, middle and to top management. His industrial experience was in the manufacturing industry. During his stayed with the TRW Automotive, he was tasked with the responsibility of promoting and implementing VDA 6.3, QS-9000, ISO TS 16949, ISO14001, ISO 13485, ISO50001, OSHAS 18001 management system and Lean Six Sigma initiatives within the organization. Besides, he also responsible for supplier audit either local or oversea such as Thailand, Singapore, Vietnam, Indonesia, China and India. With his more than 16 years of working experience in the management system standard, he has conducted various trainings and workshop in the area of workplace improvement, QS-9000, ISO/TS 16949 standard, variation and waste reduction, and practical problem solving techniques including statistical tools.

Edly F. Ramly is an Certification Director for EFR Certification. He is renowned coach, auditor, consultant and trainer. With his excellent technical expert and interpersonal skills, he has conducted various high impact trainings and workshop in the area of operation management, industrial engineering, management system including quality, environment and occupational health and safety, workplace improvement, variation and waste reduction, and practical problem solving techniques including statistical tools. Apart from being trained as Lead Auditor in various management system, he is also qualified auditor for Automotive Industry ISO/TS 16949. During his service with Pera Neville Clarke, he is also tutor for QMS lead auditor course. His industrial experience was in the automotive industry. During his stayed with the TRW Automotive, he was tasked with the responsibility of promoting and implementing Lean and Six-Sigma within the Organization. Due to his extensive exposure in Lean and Six-Sigma Management System, he was invited by Malaysia Productivity Corporation (MPC) and Asia Productivity Organization (APO) to conduct public training in the area of Six-Sigma implementation and Lean Implementation. In 2014, he been awarded as one of Malaysia Productivity Specialist by Malaysia Ministry of International Trade and Industry.

Dr. Musli Mohammad is a Senior Lecturer in Industrial Engineering at the Department of Manufacturing and Industrial Engineering, Universiti Tun Hussein Onn Malaysia (UTHM). Before joining UTHM in 2003, he worked as a Total Quality Management Executive at the UMW Toyota Motor Sdn. Bhd. Musli graduated with a Bachelor of Engineering in Mechanical (Industrial), a Master of Science in Industrial and Systems Engineering, and a Doctor of Philosophy in Engineering and Industrial Management. He has served as an Expert for Asian Productivity Organization project to develop a toolkit on Business Excellence for Asian SMEs. He has also involved as a researcher in a global study on quality / business excellence awards, which was commissioned by the Baldrige Performance Excellence Program, National Institute of Standards and Technology (NIST), USA. His research interests include Total Quality Management, Lean Production and Operations Management.

Mr. Mohd Shahir Yahya is currently a PhD student at Faculty of Mechanical and Manufacturing Engineering. Mr. Shahir holds a Bachelor of Engineering in Mechanical (Industrial) degree from Universiti Teknologi Malaysia and a Master of Manufacturing System Engineering degree from Universiti Putra Malaysia. He had also served as lecturer in Industrial Engineering at the Department of Manufacturing and Industrial Engineering, Universiti Tun Hussein Onn Malaysia (UTHM). He has taught courses in industrial engineering, production planning and control and entrepreneurship. His research interests include ergonomics product design, lean production, and production planning and control.