The Influence of the Antecedents of SCQRM Implementation on Organizational Performance with the Moderating Role of Organizational Culture in the Indonesian Navy

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ABSTRACT

This study aims to determine the effect of the antecedents of Supply chain quality risk management (SCQRM) implementation on organizational performance with the moderating role of organizational culture in the Indonesian Navy. Based on data from questionnaire survey data totaling 260 Indonesian Navy officers, the SCQRM theory model is proposed and the structural equation model is used to test the proposed hypothesis. The results show that strategic leadership, information, and control mechanisms are significant antecedents of SCQRM implementation. Furthermore, strategic leadership and information significantly contribute to organizational performance. An interesting finding is that control mechanisms do not have a direct impact on organizational performance, but they do contribute indirectly to organizational performance mediated by SCQRM implementation. Also, SCQRM implementation significantly contributes to organizational performance and the moderating effect of organizational culture strengthens the relationship between SCQRM implementation and organizational performance. This study focuses on the concept and implementation of SCQRM in Indonesian Navy logistics with the role of strategic leadership, information, control mechanisms, and organizational culture to improve organizational performance using single respondents and expert perceptions, namely Indonesian Navy Officers. The managerial implications suggest that complementary benefits arise from the adoption of a more holistic approach to the management of supply chain quality risk at the organizational level with supported the role of strategic leadership, information, control mechanisms, and organizational culture will improve organizational performance. Three contributions to science in the development of SCQRM theory. First, this study develops an SCQRM theoretical model with three unique dimensions (supplier development, risk management integration, and proactive product recall). Second, this study provides a new perfection of how the complementarity system of SCQRM is operated to improve organizational performance. Moreover, the findings imply that a successful SCQRM implementation is built on a complementarity power in risk management resources and routines. The multiple manifestations of the three SCQRM dimensions are all driven by a cohesive, yet unobserved synergy, which also forms one of the competencies of the organization. Third, this study also provides a new perfection on the role of strategic leadership, information and control mechanisms as antecedents of SCQRM implementation, and the moderating role of organizational culture that strengthens the relationship between SCQRM implementation and organizational performance.
**INTRODUCTION**

The development of the world that is getting faster with its changes demands that every organization including the Indonesian Navy must be able to adapt so as not to be left behind in realizing its vision, mission, and objectives. Moreover, it is realized that one of what is needed in achieving organizational goals is an increase in organizational performance. The Indonesian Navy must design the right strategy to face the challenges as well as be able to provide solutions to the problems at hand. This strategy must be developed by dynamizing Indonesia’s geographical conditions as a resource in formulating strategies. Resources and capabilities will influence the success or failure of the Indonesian Navy in achieving organizational goals. Increasing threats that are increasingly complex and multidimensional, faced with the decreasing combat readiness of the Integrated Fleet Weapon System (SSAT) consisting of Warships, Aircraft, Marines, and Naval Bases who are consumers in the Indonesian Navy’s logistical supply chain system, is a crucial problem faced by the Indonesian Navy as the main component of national defense. Departing from this crucial condition requires thought about the concept and implementation of SCQRM. This concept is in line with the motto in military logistics "logistics cannot win the war, without the logistics of war it is impossible to win.".

Figure 1 illustrates a situation of uncertainty or quality risk that accumulates along the Indonesian Navy’s logistical supply chain. If more members join the supply chain, more uncertainty will arise regarding the quality of the final product. The supply chain network is so complex that managers may fail to anticipate the effects of risk that occur routinely throughout supply chain operations (Lamarre and Goer 2009). It is not easy to anticipate the quality risks flowing through the supply chain network. Knowing how to deal with quality risk through risk management practices is essential for organizations looking to improve performance and achieve competitive advantage (Mariam and Ramli, 2019a). What matters is how to manage and control quality risks or prevent low-quality or unsafe products from reaching consumers. So, organizations and
policymakers face very challenging questions. What systems are suitable for managing and controlling quality risk in complex supply chain networks in both the short and long term?

The implementation of SCQRM in the Indonesian Navy's logistics is a strategy to win the war in a military context. This is the same as the competitive advantage strategy in a business context. How an organization with existing resources can respond to changes that occur to improve its performance, so it needs alignment between internal factors, namely resources and capabilities supported by the role of strategic leadership (Mariam et al., 2020), information, control mechanisms as antecedents of SCQRM implementation and the role of organizational culture in responding to external factors. This is a consideration for the Resource-Based View (RBV) as a grand theory in this study. RBV views that the organization must have the resources and capabilities in managing supply chain quality risks and developing strategies that take advantage of opportunities to improve organizational performance.

**Figure 1:** Quality risk management practices adopted in the Indonesian Navy's logistics supply chain.

According to Wernerflet (1984), the firm is a collection of resources and capabilities. This identifies that companies today must have a system that ensures competitive advantage remains and is sustainable in the future (Peteraf, 1993). Barney (1991), states that organizational resources and capabilities are the main sources of competitive advantage. Broadening the viewpoint of RBV, SCQRM implementation is a resource and capability development strategy that is not easily imitated and acquired by competitors. From the RBV, it can be seen that the importance of SCQRM
implementation in Indonesian Navy logistics as an integrated risk management approach to reduce quality risks and mitigate the consequences of risks in the supply chain network.

The impact of quality risk is felt in various industries, including the Indonesian Navy. However, not all product recalls originate from poor manufacturing processes; rather, they are associated with irresponsible purchases on the part of the buyer (Chandra et al., 2019; Takaya et al., 2019). In other words, the quality risk is inherent in the supply network (Tse and Zhang, 2017). Knowing how to deal with quality risks through SCQRM implementation is essential for organizations if they want to achieve competitive advantage and in particular, to prevent defective or unsafe products from reaching consumers (Chavez and Seow, 2012). Because of this, researchers and practitioners today face challenging questions. "What antecedents, systems, and culture are appropriate in managing supply chain quality risks to improve organizational performance?" Conceptually, several theoretical perspectives are available to inform researchers and practitioners on how to manage supply chain quality risks effectively. However, the existing literature only provides a limited understanding of the SCQRM system that can help mitigate the negative consequences of quality risk and improve firm performance (Tse and Tan, 2011). What oriented culture can impact strengthens the relationship between SCQRM implementation and organizational performance (Pilbeam et al., 2012; Ghazmahadi et al., 2020; Armanda et al., 2020). What kind of leadership characteristics can drive the successful implementation of SCQRM and improve organizational performance (Soares et al., 2017). What information can have an impact on quality risk management practices and organizational performance (Parast, 2020), and what mechanisms which can have an impact on quality risk management practices, and organizational performance (Hora et al., 2011; Tse et al., 2019). So, more research is needed to provide a broader understanding for researchers and practitioners. The new findings will help researchers, practitioners and managers determine the right strategy to leverage their resources and capabilities in addressing supply chain quality risk (SCQR). The increasing number of cases of product acceptance that do not meet technical specifications in recent years indicates that there is a quality risk in the Indonesian Navy's logistics supply chain network which is quite crucial. So, the Navy needs to understand how to manage SCQR and reduce potential risks, as well
as minimize negative impacts on organizational performance so that it will create short-term and long-term benefits.

This study extends previous research using a three-practice quality risk management approach in the SCQRM theoretical model developed, namely Supplier Development (SD), Risk Management Integration (RMI), and Proactive Product Recall (PPR). This is because this study wants to provide a new perspective by looking at organizational strategy and does not want to ignore the complementary nature of the three SCQRM practices. The complementarity strategies of the three SCQRM practices mutually reinforce and influence each other's organizational performance results, where complementary SCQRM practices will have a greater impact than individual practices because the synergistic effect is present in the integration frame (Choi et al., 2008). PPR is a proactive risk management practice for managing quality risk. If PPR is used appropriately, it can reduce the negative impact on the organization. This is a corrective action, namely when the risk occurs, and after the risk occurs on the downstream side of the supply chain (Thun and Hoenig, 2011). However, the quality risk must also be adjusted, namely how to prevent products that do not meet technical specifications from entering the Indonesian Navy organization and being accepted by SSAT elements. To reduce negative impacts in the short and long-term effects, an SD approach is needed because product quality assurance from suppliers is an agency problem (Zu and Kaynak, 2012). SD can be viewed as a preventive risk management practice to prevent quality risks from the upstream supply chain network by minimizing the possibility of products that do not meet technical specifications being accepted by consumers. Moreover, SD has developed widely and is considered an important practice that encourages quality performance (Salimian, et al., 2017), and fosters a norm of trust in collaboration between members of the supply chain (Parrast, 2020). RMI is an integrated risk management approach to manage supply chain quality risks from the internal side of the process. According to Dellana, et al., (2019) RMI aims to identify potential risks, estimate how likely it is to occur, assess the severity of their impact on the supply chain network if these risks do occur, and ensure that remedial action is taken immediately can improve organizational performance and customer satisfaction.
Moreover, the effects of risk management practices on firm performance may represent a very complex pattern and require a contingent perspective for investigation (Ritchie and Brindley, 2007). This study adds to the existing literature by analyzing the role of organizational culture in the context of SCQRM because quality and competitiveness risk-oriented organizational culture plays an important role in the effectiveness of organizational performance. According to Autry and Bobbitt (2008), creating a risk-oriented culture in the supply chain can maintain continuity and operational performance. Hult et al., (2002) stated that the development of a culture of competitiveness as a strategic resource will affect the effectiveness of the supply chain, because the influence of culture on supply chain operations, strategies, and objectives is significant. The suitability of organizational culture and strategy factors is believed to improve organizational performance (Alvesson, 2002; Mulyadi et al, 2020). Many previous studies discussed the moderating role of organizational culture, but not in the context of SCQRM (Yunus and Tadisina, 2016; Kurniawan et al., 2017; Li et al., 2020).

Considerable attention has been dedicated to controlling mechanisms by previous studies, such as Liu et al., (2017) arguing that the implementation of control mechanisms brings both benefits and limitations to the organization. Formal Control (FC) is a control mechanism that focuses on the use of contracts to explain the responsibilities and obligations of each party (Rhee et al., 2014), but contracts are not always complete and raise debate that FC hinders strategic flexibility (Lumineau, 2015). In contrast, relying on shared norms and beliefs with business partners in the supply chain is a matter of resource dependence (Handfield, 1993). In this case, Social Control (SC) provides more flexibility to organizations to reduce transactional costs (Dong et al., 2017), so this study will expand previous research by investigating the different roles of control mechanisms in the context of SCQRM.

Also, information plays an important role in integrating upstream, internal processes, and downstream practices (Inderfurth et al., 2013; Qrunfleh and Tarafdar, 2014; Zhou et al., 2014; Wu et al., 2014; Ding et al., 2014), lack of information or distorted information from upstream to downstream causes significant problems in excessive inventory investment, poor customer service, incorrect capacity plans, ineffective transportation, and late production and procurement schedules. Distorted
information along the supply chain results in a bullwhip effect (Handfield and Nichols, 2002). Therefore, information is very important in guiding the integration of quality risks across the supply chain network so that information should be fully considered in the SCQRM study.

A consistent strategic leadership commitment plays a major role in driving the successful implementation of SCQRM and the achievement of organizational performance. Many previous studies have discussed the role of strategic leadership, but not in the context of SCQRM. For example, the influence of strategic leadership on TQM implementation (Das et al., 2011). Directive leadership leads to strategic leadership abilities towards the effectiveness of SCM coordination (Akhtar et al., 2016). Furthermore, the role of leadership in the implementation of SCQM (Soares et al., 2017), this study will expand previous research with a different investigation of the role of strategic leadership as an antecedent of SCQRM implementation.

**Picture 2:** A Theoretical model of SCQRM

Refer to the research gap above, this study develops an SCQRM theoretical model to build an empirically validated theoretical framework for Indonesian Navy logistics, by considering strategic leadership, information, and control mechanisms as antecedents of SCQRM implementation which are critical factors determining the successful implementation of SCQRM to improve organization performance and the moderating role of organizational culture that strengthens the relationship between SCQRM implementation and organizational performance, where SCQRM is more widely
implemented in the manufacturing and food industries. Meanwhile, this study aims to analyze the effect of the antecedents of SCQRM implementation on organizational performance with the moderating role of organizational culture in the Indonesian Navy.

**Literature review and theoretical development**

Central to the proposed model is the notion that SCQRM implementation impacts organizational performance with the role of strategic leadership, information, control mechanisms, and organizational culture. This study conceptualizes the implementation of SCQRM including preventive and reactive practices that aim to mitigate potential quality risks in the upstream supply chain and reduce the negative consequences of product withdrawals in the downstream network, and integrative practices to manage supply chain quality risks from the internal processes. So, to encourage the successful implementation of SCQRM requires the presence of a strategic leader who has a strong commitment to quality risk management practices. Also, to coordinate quality risk management activities, it requires a SIM capability that can provide quality information that is not distorted and up to date at every supply chain node and the implementation of control mechanisms. To understand the model, we also investigate the moderating role of organizational culture in the relationship between SCQRM implementation and organizational performance. The conceptual model is presented in Figure 3.

**Picture 3: Conceptual framework**
Strategic leadership and SCQRM implementation

Strategic leadership plays an important role in the successful implementation of SCQRM and ensures that the necessary resources and capabilities are available to determine consumer needs (Kaynak, 2003). Many previous studies have discussed the role of strategic leadership, not in the context of SCQRM. For example, Das et al., (2011) stated that strategic leadership has a significant impact on TQM implementation. This shows that consistent strategic leadership will accelerate the TQM implementation process. Strategic leadership that drives the successful implementation of TQM is also supported by the findings of Young and Joo (2014). This is in line with Uluskan et al., (2016) that leadership plays a major role in the successful implementation of TQM. Akhtar et al., (2016) stated that directive leadership which leads to strategic leadership abilities has a significant impact on the effectiveness of SCM coordination. This finding supports Bititci et al., (2004); Akhtar et al., (2012b); and Dubey et al., (2015) stated that strategic leadership has a significant impact on SCM implementation. In contrast, Mehta et al., (2003) stated that participatory leadership has a stronger effect on the effectiveness of SCM coordination because directive leadership will complicate coordination and cooperation with partners so that it can influence SCM. Furthermore, Phan et al., (2019) stated that leadership has a positive and significant correlation with SCQM implementation. According to Soares et al., (2017) the excellence of the role of quality leadership has a significant impact on SCQM implementation. The implementation of SCQRM is very dependent on the expertise and skills of the leader. The successful implementation of SCQRM in a sustainable manner requires the presence of a leader who has a strong commitment to quality risk management practices. This becomes an in-depth study of how strategic leadership can be consistent in supporting the implementation of SCQRM. Therefore, the following hypotheses are proposed:

H1: Strategic leadership has a positive and significant effect on the implementation of SCQRM.

Information and SCQRM implementation

Competitive dynamics lead to very diverse consumer demands, ranging from better quality, higher reliability, and faster delivery. Strader et al., (1999) show that sharing supply and demand information in a supply chain helps reduce inventory costs and
order cycle times. This suggests that coordination and sharing of information will enhance the supply chain's ability to react to rapid changes in a fluctuating demand environment. Many other studies have shown cooperative information sharing among supply chain members increases the competitiveness and effectiveness of SCM (Sahin and Robinson, 2005; Zhou and Benton, 2007; Sezen, 2008; Bayraktar et al., 2009). Also, a management information system (MIS) can coordinate and integrate the flow of information into the supply chain network consisting of suppliers, internal processes, and consumers, resulting in fast access to important information, better services, and can reduce quality risks (Prajogo et al., 2012). In line with the statement of Qasim and Zafar (2016) that SIM has an important role in supporting the successful implementation of TQM. Zakaria et al., (2012) stated that SIM has a significant positive impact on TQM implementation. Because SIM can modify work processes to improve product quality and operational productivity. The key to a successful SCM implementation is to provide undistorted and up-to-date information at each node of the supply chain. Moreover, information is shared on time, which will reduce the negative impact of the bullwhip effect. Parast (2020) states that information plays an important role in the implementation of SCQM because management and information flow are increasingly being extended beyond organizational boundaries to involve upstream and downstream activities (Zhao et al., 2014). Innovation in the use of information is very important in coordinating and supporting the success of supply chain integration (Qrunfleh and Tarafdar, 2014). Various previous studies have discussed the role of information, but not in the context of SCQRM. Therefore, the following hypotheses are proposed:

**H2**: Information has a positive and significant effect on the implementation of SCQRM.

**Control mechanisms and SCQRM implementation**

The success of resource search activities is highly dependent on the effectiveness of control mechanisms (Li et al., 2008). The task of programmability in SD is an important element to monitor the manufacturing process of products from suppliers and ensure product quality and safety (Madhusudan, 2005). With FC, the buying company can monitor the operation and behavior of the supplier by tracking documents or statistical process control data from each manufacturing task which is one aspect of FC (Lyles, et
However, inter-company coordination activities carried out under SD practice are difficult to program and measure (Das and Teng, 2001). So, the quality improvement and risk mitigation targets are ambiguous, so SC is needed to set the values, beliefs, and goals of SD actions. Also, Dawar and Pillutla, (2000) stated that FC can ensure that supply chain partners will carry out the PPR process appropriately. However, PPR also has ambiguous goals that are difficult to achieve (Das and Teng, 2001). For example, if the quality threat is limited or will not harm consumers, then the company may not advise consumers to return the product. Conversely, managers might consider PPR measures so that SC is useful for controlling supplier behavior through product recall management beliefs and objectives, to motivate partner firms to perform well in an intercompany product recall. According to Liu et al., (2017), the application of control mechanisms brings benefits as well as limitations for the organization. FC is a control mechanism that focuses on the use of contracts to enumerate the responsibilities and obligations of each party (Rhee et al., 2014), but contracts are not always complete and raise debate that FC might hinder strategic flexibility (Lumineau, 2015). In contrast, relying on shared norms and beliefs with business partners in the supply chain is a matter of resource dependence (Handfield, 1993). In this case, SC provides more flexibility to the organization to reduce transactional costs (Dong et al., 2017). Furthermore, Tse et al., (2019) found empirical evidence that control mechanisms have a significant impact on quality risk management practices, where FC and SC are significant antecedents of SD and PPR which are quality risk management practices. However, this study has not considered RMI as a critical factor in determining the success of SCQRM implementation. Therefore, the following hypotheses are proposed:

**H3**: Control mechanisms have a positive and significant effect on the implementation of SCQRM.

**Strategic leadership and organizational performance**

The leader becomes a figure that should be considered in organizational success. Previous research has provided empirical evidence that supports leadership has a significant impact on organizational performance (Ahire and O'Shaughnessy, 1998). According to Rowe (2001), strategic leadership is a combination of visionary leadership
skills and managerial leadership. Visionary leadership believes that the decisions taken will make a difference in the organization and the environment (Ramli and Mariam, 2020). Meanwhile, managerial leadership is very important for running an effective organization with more emphasis on operational issues and a focus on innovation from creativity for organizational goals (Mariam and Ramli, 2019b). Elenkov et al., (2005) stated that strategic leadership is the process of creating a vision, motivating employees, forming strategies at the level of individuals and organizations. In contrast to Elenkov et al., (2005), Burgelman and Grove (2007), identified strategic leadership as a process of developing a strategy that ensures company sustainability. Thus, strategic leadership has different abilities from other types of leadership. Furthermore, Quong and Walker (2010) stated that strategic leadership is more than just having a vision of an ideal future. It is about developing strategies for preparing for the unexpected and not just for planning for the already known. Redmond (2013) states that there is a significant positive relationship between strategic leadership abilities and organizational performance. Also, Akhtar et. al., (2016) stated that directive leadership that leads to the adoption of strategic leadership has a significant correlation with company performance. These findings support previous research by Das et al., (2011), Redmond (2013), Arikan and Didem (2016), that strategic leadership has a positive and significant effect on organizational performance. Therefore, the following hypotheses are proposed:

**H4:** Strategic leadership has a positive and significant effect on organizational performance.

**Information and organizational performance**

Information sharing and organizational performance have become a major concern of many empirical studies in recent years (Huo et al., 2016; Wiengarten et al., 2014; Flynn et al., 2010). However, the empirical results in the existing literature are largely ambiguous. Several studies have found that information sharing is positively related to company performance (Qi et al., 2017; Garridomoreno et al., 2015; Flynn et al., 2010). Other studies have found a negative relationship (Huo et al., 2016; Wiengarten et al., 2014; Devaraj et al., 2007), even indirectly (Ralston et al., 2015; Finger et al, 2014; Martinkenaite, 2011). Information technology is a valuable strategic resource to reduce
uncertainty in supply chain networks and improve organizational performance. This is in line with Kamdjoug and Tewamba, (2019) finding empirical evidence that information technology (IT) capabilities have a positive and significant direct impact on company performance. This study suggests managing IT management with planning, design, standardization, and control in support of reliable MIS capabilities. These findings support the research of Bharadwaj, (2000); Liang et al., (2010); Liu et al., (2017) stated that IT capabilities can directly have a significant impact on company performance so that companies can benefit from IT capabilities in different ways. SIM in a high level positively and significantly affects the success of systems in organizations (Redmond, 2013). Organizations with a high level of ability and understanding of MIS (infrastructure, skills, and ability to utilize) can have superior organizational performance (Santhanam and Hartono, 2003; Ravinchandran and Lertwongsatien, 2005; Sunil et al., 2011). Therefore, the following hypotheses are proposed:

**H5**: Information has a positive and significant effect on organizational performance.

**Control mechanisms and organizational performance**

The PPR process requires close collaboration within the supply chain network, organizations need to define ways to enhance this collaboration. Control mechanisms are useful for maintaining cooperation between organizations (Li et al., 2010). In other words, FC helps organizations to increase the positive impact of PPR and company performance (Tse et al., 2019). The application of control mechanisms can directly affect transaction costs, operational costs, and partners' willingness to engage in risk management activities (Das and Teng, 2001; Li et al., 2008). Companies with a good SC mechanism may be motivated to implement and exert more efforts in utilizing PPR to mitigate quality risks and improve organizational performance. Therefore, organizations are seen as driving PPRs through the SC mechanism to improve organizational performance. SD’s goal is to improve supplier performance (Carr and Kaynak, 2007), and improve product quality and financial performance. The implementation of SD does not guarantee better performance, due to various obstacles related to a lack of trust and commitment from suppliers (Handfield et al., 2009). The role of SC can increase supplier recognition of the benefits of SD, as fulfilling promises is one of the most important forms of SC (Fryxell et al., 2002; Luo, 2002). When suppliers
find that the SD benefits described by buyers are more reliable, SC can create informal pressures to maintain the supply chain (Kaufmann and Carter, 2006). This informal pressure urges suppliers to share the benefits of SD. In other words, SC ensures buyers get SD benefits to drive organizational performance, and FC puts formal pressure on suppliers, such as agreeing to share benefits before implementing SD. Also, FC makes it easy for buyers to clarify the objectives and responsibilities of each party. Thus, SD can be more focused and conveyed in an explicit contract as an effort to improve organizational performance. According to Wacker et al., (2016) the application of FC can facilitate a company's ability to utilize resources in driving organizational performance. Gulati and Sytch, (2007) stated that relational governance as an aspect of SC can provide additional relational to drive organizational performance. Therefore, the following hypotheses are proposed:

**H6**: Control mechanisms have a positive and significant effect on organizational performance.

**SCQR M implementation and organizational performance**

To properly manage the quality risk, the organization needs to consider both the upstream, internal processes, and downstream supply chain. In the upstream supply chain, the organization needs to create a responsible purchasing approach to block the source of the defective material. This involves preventive actions to stop the risk from happening (ex-ante action). In the downstream supply chain, the firm needs to take prompt and responsive action when they discover a potential product harm crisis (ex-post action). Thun and Hoenig (2011) state that a comprehensive SCRM plan should include both preventive and reactive action. Similarly, Lewis (2003) categorizes the ex-ante, in-process, and ex-post mechanisms as important elements in operational risk management control. The ex-ante activities are viewed as a preventive action that is similar to the quality management notion of ‘right first time’ and error-proofing. The in-process mechanism involves the mitigation action if the risk is unavoidable. The ex-post mechanism addresses the management of negative consequences, just as service quality actively considers recovery from quality failure. In this research, we investigate SD as the ex-ante action, RMI as in-process action, and PPR as the ex-post action. Figure 1 illustrates how three quality risk management practices are adopted to manage and
mitigate the quality risk in the upstream, internal processes, and downstream supply chain.

Within the operations management literature, there is extensive research about the adoption of management practices to deal with risk. Most of the researchers in this field discuss how their proposed frameworks can reduce the probability and the impact of risk (Ho et al., 2010; Ho et al., 2009; Ritchie and Brindley, 2007; Thun and Müller, 2010). However, these studies do not focus on quality risk in the supply chain and are limited to investigating the impact of product recall management on brand equity (Dawar and Pillutla, 2000). Gray et al., (2011) investigate the quality risk in offshore manufacturing plants and find that the effect of plant location, geographic distance, and the skill level of workers can affect supply chain quality risk. Hora et al., (2011) robustly examine the product recall pattern in a case when quality risk triggered a destructive product recall in the toy industry. Their study enhances the understanding of the nature of different recall strategies and the best time to trigger the recall. But this research is still limited to product recall management.

SD, which can be regarded as a preventive risk management approach, refers to the efforts made by the focal company to build up suppliers’ capability and performance (Krause, 1999). Krause and Ellram (1996) argue that firms should ensure their suppliers’ performance in terms of quality, cost, delivery, and financial health improvement. In SD, the firm wishes to maintain a long-term relationship with reliable and capable suppliers to ensure the provision of quality components. Both the buyer firm and the suppliers contribute to the overall quality of the products and collaborate in several activities to improve product quality (Salimian et al., 2017). Therefore, the buyer firm’s managers need to make decisions about investing in suppliers’ facilities to improve the product quality. Furthermore, the buyer firm needs to invest in education and training to build the suppliers’ abilities to ensure product quality and safety (Krause et al., 2007). These activities are instigated by the purchasing firm to help SD regarding quality performance and capability (Zsidisin and Ellram, 2003).

From the perspective of agency theory, SD is a behavior-based practice. Such practice is concerned with processes, tasks, and activities that lead to risk reduction (Harland et al., 2003), and represents a suitable strategy when the supplier’s uncertainty factor becomes significant (Zsidisin and Ellram, 2003). Task programmability refers to the degree to which appropriate behavior by the agent can be
specified in advance, and provides an easy way to measure behaviors (Eisenhardt, 1989). When a firm engages in SD, helping a supplier to develop their capability in quality and closely monitoring their operation, a template of activities can be defined and approved by both buyer and seller firms (Zirpoli and Caputo, 2002; Zsidisin and Smith, 2005). In other words, the activities of SD could engender high task programmability for the supplier. Generally, the more programmable the supplier's task, the easier it becomes for the buyer firm to control the supplier's behavior. One of the aims of creating task programmability is to reduce the target cost (Zsidisin and Ellram, 2003; Zsidisin and Smith, 2005). To do this, the process begins with a breakdown of allowable supplier costs. The buyer firm can provide a target cost for the supplier to aim at, while the supplier can suggest possible changes in the task or even in the design to reach the predetermined target cost. When the buyer firm creates task programmability by implementing SD, the target cost saving is shared with the supplier. Therefore, SD can contribute to achieving a lower price and thus help the firm to remain competitive in the industry.

Moreover, the SD actions have the benefit of consolidating the idiosyncratic interaction routines that help supply chain partners to realize each other's strengths and weaknesses. Such consensus between the organization and suppliers can contribute to improving the capability to respond to uncertainties, and help the organization to remain competitive. Li et al., (2012) indicate that supplier development plans that focusing on close collaboration relationships with the suppliers can significantly improve the quality performance and consequently enhance the competitive advantage of the buying firm. Also, Pulles et al., (2014) suggest that the SD program can significantly lead suppliers to contribute to buyer's innovation. Previous empirical studies provide significant evidence to demonstrate the positive effect of SD on both a buyer's product quality (Al-Tit, 2017; Carr and Kaynak, 2007). For example, when the buyer firm helps the supplier to build up its quality capability, the buyer gains a better understanding of the supplier's weaknesses in the production line; hence the waste generated in each procedure and the quality variance in each task is more likely to be investigated. Also, Wagner and Johnson (2004) indicate that as a critical element of the strategic supplier portfolios, SD enables organizational to create competitive advantage.
A mature risk management process is characterized by coordinated and organizational actions taken to avoid the occurrence of a risk event and mitigate risk events that are difficult to prevent to minimize their negative impact on supply chain service and cost (Friday et al., 2018). Organizations characterized by agility and flexibility, in addition to systematic contingency planning, are better able to manage risks in general (Ramli, 2020). It would also be expected that organizations demonstrating risk-based thinking, particularly ISO 9001-certified firms, could have advantages over organizations that do not have an ISO 9001 structured focus that engenders risk-based thinking. Hence, ISO 9001 certification may be able to signal RMI capabilities because of the attention the standard brings to improving process management through the principles of TQM (Lakhal, 2014). This added emphasis on risk-based thinking recognizes that disruptions due to realized risk events impact negatively on customer satisfaction and must be proactively managed. Risk management maturity is also associated with better integration of supply chain members because it facilitates more rapid identification and better mitigation of risk events. Zhao et al. (2013) report that supply chain integration is an important driver for schedule attainment, competitive performance, and customer satisfaction; supply chain risk decreases as supply chain integration increases. By extension, organizations that exhibit a greater level of supply chain risk integration are likely to be more focused on risks in general.

It is clear from the literature that supply chain risks can be presented in different ways and are costly to supply chain organizations when they occur. Therefore, effective mitigation of such risks is critical to the bottom line. The simplest generic approach for risk management described in the literature involves several steps, including identification of potential risks, estimating their likelihood of occurrence, assessing the severity of impact on the supply chain should they occur, engaging a real-time response when the risk event occurs, and then monitoring the effectiveness of the mitigation action (Ho et al., 2015; Kouvelis et al., 2011). However, this simplification does not capture the complexity of risk mitigation in a supply chain setting, where collaborative relationships among supply chain partners are key to success. Consequently, we theorize that SCQRM performance is strongly related to the integration of supply chain partners toward managing risk (i.e. RMI) and that risk-based thinking plays an
important role in this relationship. This suggests that RMI facilitates supply chain collaboration to improve organizational performance.

Proactively recalling the defective product, an effective procedure for returning the product, and replacing the product are claimed as the most appropriate steps to manage a quality crisis when it has already occurred. Liu et al., (2016) indicate companies should emphasize a more proactive product recall to obtain the long-term benefit of customer satisfaction and trust. Researchers who hold an opposite view argue that the more proactive product recall adopts by the company will lead to worse firm value because the investor might treat the proactive product recall as a signal that the crisis is very serving. However, this study focuses on how an organization prepares for the recall instead of the immediate action during the crisis. PPR aims to diminish the effect of the incident by ensuring that the buyer will not deliver defective or unsafe products to downstream partners. If the focal firm is alerted to the problem early enough, it will be spared a massive recall. For example, if the defective products get only as far as the distributor, the firm needs only to withdraw the batch of problematic products. In contrast, in the case that the defective products have already been parcellled out and delivered to various retailers or end-customers, massive resources must be allocated for this product withdrawal. The buyer firm will suffer the high operations costs of a product recall, which include the costs of contacting customers, logistics, compensation, penalties, and even lawsuits (Kumar and Schmitz, 2011).

From a quality management perspective, PPR can be viewed as corrective action. When defects are detected, appropriate measures must be taken to stop them further affecting the companies involved. The firm must determine the source of the defect and investigate other suspect products that might trigger another withdrawal and recall. If the defect originates from sourced material, the defective component may be included in more than one batch of products. Moreover, the firms need to scrutinize the origin of the quality risk to prevent the same incident from happening again. It is inefficient for a firm to correct the same quality problems more than once (Williams et al., 2006). Also, through thorough planning of remedial action, managers can gain a better understanding of which types of quality problems are most costly and difficult to resolve; that is, the problems that require multiple ex-post actions when the buyer delivers the faulty products to downstream parties. For example, if a product is contaminated by a toxic substance that contaminated product must not be reworked,
nor broken down to sub-components for use in another product. Indeed, the firm might need to employ special resources for its disposal. If managers have prepared in advance for such an eventuality, they can set up an appropriate remedial plan, and the firm can pay extra attention to preventing contamination in the materials and final products. Thus, the related quality and safety assurance can be enhanced by the better planning of risk remedies. Moreover, the implementation of PPR may also enhance a firm's willingness to learn which in turn can improve the firm’s performance (Hu and Flynn, 2014).

Poor implementation of SCQRM in the organization will paralyze the supply chain network. Some researchers argue that the implementation of SCRM can reduce the impact arising from various sources of risk, thus leading to organizational performance. Supply chain networks are increasingly complex, making supply chains more vulnerable to risks and uncertainties that affect firm performance. Moreover, unexpected risk events have a severe effect on the supply chain that causes a decline in company performance. Previous empirical studies provide significant evidence to demonstrate the positive effect of SCRM on a firm’s performance. For example, Tse et al., (2019) conducted research to analyze management activities to minimize the quality risk generated by the product recall. This study analyzes the impact of SCRM implementation with SD and PPR practices on company performance. The findings of this study are SD and PPR significantly contribute to financial performance and quality performance. Saglam et al., (2020) stated that the effective implementation of SCRM has a positive and significant impact on firm performance. This is due to the interconnection of companies, the failure of a firm not only affects its performance but also affects the performance of partner companies, and makes supply chain members very vulnerable to risk. So, the organization must take appropriate action to improve SCQRM implementation. Therefore, the following hypotheses are proposed:

**H7**: *SCQRM implementation has a positive and significant effect on organizational performance.*

**The moderating roles of organizational culture**

Many sociological and anthropological researchers have attempted to define and conceptualize the notion of organizational culture, resulting in more than 150
definitions of culture provided in the literature (Detert et al., 2000). Barney’s (1986) definition of culture is considered to be one of the most appropriate and widely accepted. Barney (1986), defines organizational culture as a very complex set of values, beliefs, assumptions, and symbols to determine how companies manage their business processes. Highly reliable organizations are characterized by a strong culture and norms to reinforce strategic objectives that focus on policies and procedures in strategic decision-making to reduce internal and external risks (Grabowski and Roberts, 1997). Pilbeam et al., (2012) found that shared values, schemes, and culture in the supply network improve performance, control, and feasibility. Lack of adoption of a risk management culture is an explanation for poor handling of supply chain disruptions (Dowty and Wallace, 2009). Organizations that proactively build a risk management culture can absorb and respond to exogenous shocks effectively so that organizations will be better able to react and recover quickly from supply chain quality risks (Argenti, 2002; Worthington et al., 2009). Li et al., (2020) found empirical evidence that the contingent effects of organizational culture (risk management culture, control-flexible orientation, and internal focus) moderate positively and significantly in the relationship between SCM implementation and organizational performance. Besides that, another finding of this study is the effect of external focus does not moderate the relationship between SCM implementation and organizational performance. This supports the research of Dubey et al., (2019); Kurniawan et al., (2017); Wiengarten et al., (2019), stated that a risk management culture strengthens the relationship between SCM implementation and organizational performance. Hult et al., (2002) introduced the concept of a culture of competitiveness as a reflection of innovation, entrepreneurial orientation, and learning. Referring to RBV, Hult et al., (2002) suggested that a culture of competitiveness is an unobservable or intangible strategic resource that affects the effectiveness of supply chain internal processes. A culture of competitiveness is an intangible asset that facilitates competition through learning, creating, and taking action aimed at customer satisfaction and organizational performance. Fantazy and Ahmad, (2019) found empirical evidence that the contingent effect of a culture of competitiveness strengthens the relationship between SCM implementation and organizational performance. These findings provide empirical support for previous research (Brouwers, 2010; Pagell and Wu, 2009; Loikanen and Hyttinen, 2011; Cheng et al., 2008; Walker and Jones, 2012) that culture of competitiveness moderates a
positive and significant relationship between SCM implementation and organizational performance. Therefore, the following hypotheses are proposed:

**H8:** Organizational culture strengthens the effect of SCQRM implementation on organizational performance.

**METHODS**

The study follows a deductive and inductive approach to develop and validate the theoretical model of SCQRM on the Indonesian Navy logistics as it provides enough ground for conducting such type of research. Quantitative data is gathered via a survey instrument. The model constructs for the study are unobservable or latent variables (SL, INFO, CM, OC, SCQRM, and OP) which are indirectly described by a series of a block of observable variables, known as manifest variables or indicators. The following subsections present various aspects of the methodology.

**Measurements**

To establish an appropriate measurement instrument, we undertook a thorough literature review to identify and modify the scales used in previous research. Additionally, some question items were newly created based on the literature review and the related theoretical foundations presented in the previous section.

Compared to the single-item approach, the accuracy of the estimate can be increased by considering multiple items (questions). In congruence with Churchill et al., (1979), multiple items scale for each construct was developed. Each of the constructs was measured using five-point Likert scale items adapted from previously used multi-item scales. The strategic leadership was adapted from Rowe (2001); Talib et al., (2010); Bon dan Mustafa (2013); Zeng et al., (2013); Talib et al., (2014); Quang et al., (2016); Soares et al., (2017); Phan et al., (2019) studies. The item for information was adopted by Tanriverdi (2005), Li et al., (2005); Li and Lin, (2006), Prajogo et al., (2012), and Quang et al., (2016). The items for control mechanisms were adopted by Li et al., (2008), Li, Xie, et al., (2010), and Tse et al., (2019). Moreover, the RM culture was adopted by Li et al., (2015), Kurniawan et al., (2017), and Fan et al. (2017), Saglam et al., (2020), and Li et al., (2020), and the Culture of Competitiveness was adopted Hult et al.,
(2002), Fantazy dan Ahmad, (2019). The SCQRM implementation was adopted by Tse et al., (2019) and the items for organizational performance were adopted by Quang et al., (2016), Soares et al., (2017), Phan et al., (2019), and Tse et al., (2019).

The questionnaire for the study was developed through a detailed examination of the literature on risk management, quality management, and supply chain operations management, as well as in consultation with experts. Before the data collection, the questionnaire was reviewed by the experts for structure, readability, clarity, and completeness. To finalize the survey, we also pre-test the survey instrument to ensure its content validity by mailing it to practitioners and managers. Their feedback was used to access the appropriateness and content validity of the survey instrument. A pilot study with a small sample was made for measuring the reliability of the constructs and eliminated those constructs in a questionnaire whose values were less than 0.7 for a reliable questionnaire (Hair et al., 2014). Respondents were requested to provide their responses based on their current organizational experience but not on their personal opinions to minimize the social-desirability bias (Rudelius and Buchholz, 1979). A five-point Likert scale was adopted to indicate the extent to which respondents agree or disagree with each question item, where 1=strongly disagree and 5=strongly agree.

**Data collection**

This research unit of analysis focuses on the relationship between the Indonesian Navy and business partners in the supply chain. The target respondents are Navy Officers, amounting to 260. Data was collected through a survey of nine Indonesian Navy’s work units spread throughout Indonesia. The impact of quality risk is felt in various industries, including the Indonesian Navy. Due to this, there has been a significant increase in the acceptance of products of low quality and unsuitable requirements for SSAT elements in recent years. This means that there is a quality risk in the Indonesian Navy’s logistical supply chain network which is quite crucial. Given the above reasons, our proposed model is tested and validated by a sample of TNI AL work units.

The data collection process took place during a period of six months from January to June 2020. Respondents in this study were 3 High Officers as top-level managers, 135 Middle Officers as mid-level managers, and 122 First Officers as entry-level managers.
The number of respondents in this study was 260 officers, which are dispersed throughout Indonesia. The nine work units of the Indonesian Navy which are the objects of research consist of the Naval Headquarters in Jakarta, Fleet Command I in Jakarta, Fleet Command II in Surabaya, Fleet Command III in Sorong, Marine Corps in Jakarta, Naval Hydro-Oceanography Center in Jakarta, Naval Aviation Center in Surabaya, Main Naval Base and Naval Base spread throughout Indonesia. Data were collected by distributing questionnaires via email and submitting them in person. Of the 260 sets of questionnaires submitted to respondents, 260 were returned with all of them filled in completely according to the questionnaire instructions. Then this study establishes a saturated sample size that includes the entire population (Hair et al., 1998). Respondent demographics provide some basic information about those who take the survey. A good representation of the individual most qualified to answer the survey questions is obtained. The profiles of respondents in this study include age, service period, rank, and corps by the applicable regulations within the Indonesian Navy. From the characteristics of the respondents, several simple information about the respondent’s profile is obtained which is useful as a reference in data analysis and discussions related to the research variables to be tested using descriptive statistical analysis and SEM analysis techniques. Table I contains a detailed breakdown of the Indonesian Navy work units.

Table 1: Survey demographics

| No | Indonesian navy work unit                              | Sample |
|----|--------------------------------------------------------|--------|
| 1  | Naval Headquarters                                     | 60     |
| 2  | Fleet Command I                                        | 30     |
| 3  | Fleet Command II                                       | 30     |
| 4  | Fleet Command III                                      | 30     |
| 5  | Marine Corps                                           | 20     |
| 6  | Naval Hydro-Oceanography Center                        | 30     |
| 7  | Naval Aviation Center                                  | 20     |
| 8  | Main Naval Base                                        | 20     |
| 9  | Naval Base                                             | 20     |
|    | Total                                                  | 260    |

Nonresponse bias and common method bias

Early vs late respondents were compared to evaluate non-response bias (Armstrong and Overton, 1977). The first and last quartiles of survey responses were tested for differences in construct means. The resulting p-values were 0.716 for the SL
construct, 0.465 for INFO, 0.138 for CM, 0.314 for SCQRM, 0.437 for OC and 0.568 for the OP construct. The test results indicated that there were no significant differences between the mean construct responses obtained from the first and last quartiles across all six constructs, suggesting that non-response bias was not a threat to the integrity of the survey data. Harman’s single-factor test was used to assess the potential for CMB (Harman, 1976; Podsakoff et al., 2003). For examining the potential threat of common method variance bias, Podsakoff and Organ (1986) recommended the one-factor test was performed. The relevant factor analysis revealed that neither a single factor emerged, nor was a general factor identified in the unrotated factor structure. A factor analysis was performed using all the different survey items included in the study to determine if most of the variance in the model was accounted for by one general factor. Since the percentage of variance explained by a single factor was less than 50 percent (the maximum percentage of variability explained by a single factor was equal to 34.7 percent), CMB was not deemed an issue. Additionally, in this study, to examine common method bias, the correlation relationships between the constructs were investigated. Tehseen et al. (2017) stated that when the correlation between constructs is lower than 0.90, common method bias would not be a problem. As seen in Table 3, the correlations among the constructs in this study are lower than 0.90. These findings eliminated the possibility of any serious common method variance bias.

Table 2: Survey scale items descriptive statistics

| Construct                | Item                                                                 | Mean | SD  |
|--------------------------|----------------------------------------------------------------------|------|-----|
| Strategic Leadership (SL)| SL1 We encourage consumer and supplier interactions in SCQRM programs and risk prevention activities | 3.82 | 0.90|
|                          | SL2 We empower consumers and suppliers to solve supply chain quality risk issues | 3.88 | 0.76|
|                          | SL3 We continue to study and analyze quality risk issues             | 3.93 | 0.84|
|                          | SL4 We always participate actively in supporting the successful implementation of SCQRM and risk prevention | 3.81 | 0.88|
|                          | SL5 We promote innovation and quality risk prevention in product and service design for continuous improvement and competitive advantage | 3.89 | 0.87|
|                          | SL6 We create and communicate a vision, mission, and goals to improve organizational performance | 3.93 | 0.85|
| Information (INFO)       | INFO1 Information sharing is very important to know changes in demand, capacity, inventory, and product design | 3.52 | 0.86|
|                          | INFO2 Information sharing assists organizations in implementing      | 3.55 | 0.87|
integrated preventive strategies and reactive strategies for managing quality risks

INFO3 Our network connection is always connected directly from computer-to-computer with suppliers and consumers to share information every day 3.56 0.88

Control Mechanisms (CM)
CM1 Contracts are the most appropriate way to ensure success in cooperation, collaboration, and controlling the behavior of all parties 3.91 0.78
CM2 All partners must respect and follow all procedures and rules in the contract 3.92 0.82
CM3 Rely on partners to keep their promises, because partners are always honest and honest in cooperation and collaboration with us 3.82 0.83
CM4 Without supervision, partners will fulfill all their obligations 3.70 0.80

SCQRM Implementation (SCQRM)
SCQRM1 We are involved in managing the duties and production procedures of suppliers with the rules outlined in the contract agreement 3.73 0.76
SCQRM2 We ask suppliers to provide process control documents or statistics so we can track production quality 3.74 0.76
SCQRM3 We proactively withdraw products from consumers if they are defective, and will investigate the cause to prevent them from happening again 3.42 0.91
SCQRM4 If the product has quality problems, we will ask the supplier to replace the defective product with a new product for consumers 3.74 0.80
SCQRM5 A checklist is provided detailing each managerial action when withdrawing products that do not meet technical specifications 3.75 0.79
SCQRM6 We engage suppliers and consumers in the process of identifying and mitigating quality risks 3.63 0.82
SCQRM7 We encourage suppliers to always use standard risk management processes (e.g. ISO 31000 and ISO 9001) 3.58 0.80

Organizational Culture (OC)
OC1 We are always involved in developing a quality risk-oriented culture 3.77 0.81
OC2 We always create a quality risk-focused mindset among all Indonesian Navy personnel 3.83 0.81
OC3 We are dedicated to creating a supply chain that is oriented towards quality risks 3.70 0.85
OC4 We will make supply chain quality risk a common norm 3.64 0.85
OC5 We are actively looking for new ideas related to the development of an innovative SCQRM system, and Indonesian Navy personnel will not be punished for providing new ideas that will not necessarily be successful 3.75 0.82
OC6 We always encourage the development of SCQRM innovations based on research results for continuous improvement 3.62 0.84

Organizational Performance (OP)
OP1 We always provide products that have high reliability and high- 3.57 0.76
Consumer requests are always delivered on time, on quality, in the right quantity, and the place desired by the consumer.

Quality is the most important criterion for us in selecting suppliers.

Descriptive Statistics

Descriptive statistics for all constructs and survey items are presented in Table 2. Survey responses are used to determine respondents’ responses to the statements raised in the questionnaire. To assess the proposed theoretical model, internal consistency, convergent validity and discriminant validity of the constructs and the reliability of individual indicators will be analyzed.

Validity and reliability tests were carried out to determine whether the research instrument associated with statement items reflects the latent variables in this study. A questionnaire is said to be valid and reliable if the questions on the questionnaire can reveal something that is measured, and the respondent's answer to the statement is consistent. Table 3 shows that all items or indicators are declared valid and reliable, because they have a correlation coefficient greater than 0.116 at the 0.01 significance level, and a Cronbach's alpha value greater than 0.07.

Table 3: Construct loading and reliability index

| Construct | Indicator | Correlation | Item loading | T-value | Cronbach's alpha | Composite reliability | AVE   |
|-----------|-----------|-------------|--------------|---------|------------------|-----------------------|-------|
| SL        | SL1       | 0.821       | 0.651        | 0.841   | 17.380           | 0.947                 | 0.995 | 0.739 |
|           | SL2       | 0.676       | 0.782        | 0.816   | 16.330           | 0.941                 |       |       |
|           | SL3       | 0.782       | 0.756        | 0.819   | 20.192           | 0.939                 |       |       |
|           | SL4       | 0.756       | 0.729        | 0.923   | 20.915           | 0.932                 |       |       |
|           | SL5       | 0.729       | 0.729        | 0.906   | 19.853           | 0.930                 |       |       |
|           | SL6 b     | 0.716       | 0.716        | 0.846   | -                | 0.936                 |       |       |
| INFO      | INFO1     | 0.817       | 0.749        | 0.904   | 17.506           | 0.946                 | 0.988 | 0.742 |
|           | INFO2     | 0.679       | 0.679        | 0.824   | 15.949           | 0.871                 |       |       |
|           | INFO3 b   | 0.732       | 0.732        | 0.855   | -                | 0.856                 |       |       |
| CM        | CM1       | 0.830       | 0.788        | 0.911   | 19.947           | 0.947                 | 0.993 | 0.728 |
|           | CM2       | 0.872       | 0.672        | 0.826   | 17.330           | 0.941                 |       |       |
|           | CM3       | 0.738       | 0.738        | 0.864   | 18.664           | 0.939                 |       |       |
|           | CM4 b     | 0.664       | 0.664        | 0.815   | -                | 0.903                 |       |       |
| SCQRM     | 0.805     | 0.947       | 0.817        | 0.904   | 17.506           | 0.946                 | 0.988 | 0.742 |
Construct reliability and convergent validity

The model was also checked for multicollinearity problems. Variance inflation factor (VIF) values were calculated for all combinations of exogenous (or predictor) constructs and endogenous constructs. Collinearity has not been deemed an issue since all the resulting collinearity estimates were below the threshold of five recommended by Hair et al. (2016). The resulting VIF estimates were 1.519 for the SL construct, 1.236 for INFO, 1.573 for CM, 2.164 for SCQRM, and 1.209 for the OC construct. With the standard error of the beta coefficient for all constructs < 1, tolerance values > 0.1, and eigenvalue > 0.01, there is no multicollinearity in the model.

The assessment of the model includes an analysis of the reliability of the individual survey items, as well as the internal consistency, convergent validity, and discriminant validity of the constructs. Outer loadings were analyzed to evaluate the reliability of the individual indicators. All indicators had loadings above the suggested cutoff of 0.50, indicating adequate reliability levels for the different survey items (Hair et al., 2016).

The internal consistency of the research constructs was evaluated using Cronbach’s α (Dijkstra and Henseler, 2015) and composite reliability estimates. As shown in Table 3, all estimates were above the 0.70 cutoffs recommended by Hair et al. (2016), suggesting acceptable internal consistency for the six model constructs. The average
variance extracted (AVE) estimates were calculated to establish convergent validity (refer to Table 3). An average variance extracted (AVE) of 0.50 or higher is usually suggested in the literature (Chin, 1998). The AVE values range from 0.616 to 0.769. Thus, this value indicated that all constructs explained over half of the variance of their indicators. The estimates thus suggest satisfactory convergent validity across all constructs.

**Results**

In this section, we use the structural equations modeling (SEM) method to test all the direct relationships in the baseline model (i.e. H1–H7) and adopt the *moderating structural equation modeling* method to obtain the moderation results (H8).

**Structural model**

Fig. 4 shows the overall results for the structural model. There is a good model fit, with acceptable values of absolute fit indices (CMIN/DF=1.115, GFI=0.907, RMR=0.041, SRMR=0.000, RMSEA=0.021, NCP=2.370, ECVI=2.326, AGFI=0.883), incremental fit indices (NFI=0.946, NNFI=0.937, CFI=0.994, IFI=0.994, RFI=0.937, TLI=0.993), and parsimonious fit indices (PGFI=0.722, PNFI=0.805, PCFI=0.846). This means that there is a match between the empirical data obtained and the research model being developed. This is by Hair et al., (2016), that the use of the five goodness of fit criteria is considered sufficient to assess the feasibility of a model, provided that each group of the goodness of fit is represented.
 Especially, the structural path between SL and SCQRM was positive and significant (0.453, p = 0.000). So, the higher the SL, the higher the SCQRM level, so that H1 is accepted. Likewise, the path coefficient of INFO to SCQRM is also significant (0.295, p = 0.000), this supports the idea that INFO has a positive impact on SCQRM. Hence, H2 was accepted. Because the relationship between CM and SCQRM was positive and significant (0.441, p <0.000), H3 was confirmed. The positive and significant path coefficient (0.258, p = 0.000) supports the claim that SL has a direct impact on OP. Hence, H4 was accepted. The path coefficient of INFO to OP is also positive and significant (0.166, p = 0.006), this supports the idea that INFO has a positive impact on OP. Hence, H5 was accepted. Especially for relationships between CM and OP had a positive and insignificant path coefficient (0.063, p = 0.373> 0.05). Therefore, H6 was rejected. This suggests that CM does not have a direct impact on organizational performance, but significantly contributes indirectly to SCQRM-mediated OP. Likewise, the effect of SCQRM on OP is also positive and significant (0.403, p = 0.000), H7 is accepted. Finally, the moderating effect of OC strengthens the relationship between SCQRM and OP in a positive and significant (0.215; p = 0.001).

Discussion

Strategic leadership has the most dominant influence on SCQRM implementation and organizational performance. This proves that the strategic leadership role is very
dominant over information and control mechanisms in supporting the successful implementation of SCQRM and improving organizational performance in the Indonesian Navy. The results of this study further strengthen the strategic leadership theory put forward by Rowe (2001), that strategic leadership is a combination of visionary leadership skills and managerial leadership. The combination of these two dimensions is in line with the leadership pattern in the Indonesian Navy. The results show that a strategic leader must be sensitive to invaluable, scarce, and difficult to replace resources because this allows the organization to gain a competitive advantage and achieve organizational goals. The results of this study expand on the results of previous research on the effect of strategic leadership on organizational performance (Serfontein and Hough, 2011; Das et al., 2011; Sarwat et al., 2011; Redmond, 2013; Pazireh et al., 2014; Arikan and Didem, 2016; Soares et al., 2017; Phan et al., 2019 and Prestiadi et al., 2020) in the context of SCQRM. The findings of this study also develop the strategic leadership theory proposed by Ireland and Hitt (2005); Elenkov et al., (2005); Crossan et al., (2008), and Quong and Walker (2010) stated that the suitability between the environment, strategy, and resources and organizational capabilities is very important to encourage increased organizational performance and leaders are not only passive recipients of change but become dominant forces in influencing change.

A sustainable SCQRM implementation requires the presence of a strategic leader with a combination of visionary leadership skills and managerial leadership skills who has a strong commitment to quality risk management practices to improve the combat readiness of SSAT elements. The successful implementation of SCQRM is very dependent on the skills of a strategic leader, so ineffective leadership will be an obstacle to the successful implementation of SCQRM. These findings expand on previous research on the role of leadership in the context of SCM (Mehta et al., 2003; Bititci et al., 2004; Akhtar et al., 2012b; Dubey et al., 2015, and Akhtar et al., 2016), QM context (Deming, 1986; Gonzalez and Guilen, 2002; Juran, 2003; Rahman, 2006; Soltani and Wilkinson, 2010; Das et al., 2011; Abolarin et al., 2013; Young and Joo, 2014, and Ulurkan et al., 2016), the context of SCQM (Soltani, 2005; Soares et al., 2017; Phan et al., 2019). However, the results of this study do not support previous research by Soltani, (2005); Soares et al., (2017) stated that the role of leadership is less important in SCQM implementation. Due to the limitations of previous research in building the conceptualization of the integration of SCM, TQM, and RM.
Information has a significant direct effect in a positive direction on SCQRM implementation and organizational performance. Thus, it can be said that the large role of information will have a major influence on the implementation of SCQRM and organizational performance in the Indonesian Navy. The results of the research further strengthen the information theory put forward by Galbraith, (1974); Tushman and Nadler, (1978); Bensaou and Venkatraman (1996), that organization as an information processing system to overcome various types of uncertainty by building MIS and sharing information in collaboration and cooperation. The combination of these two dimensions is in line with the pattern of information security in the Indonesian Navy, where SIM plays an important role in integrating upstream, internal and downstream processes. The results of the study also expand on previous studies such as Shapiro et al., (1993); Handfield, (1994); Grover and Malhotra (1997); Lamming et al., (2000); Lee et al., (2000); Roth et al., (2008); Narayanan et al., (2011); Rai et al., (2012); Liu et al., (2013b); Zhao et al., (2013); Wang et al., (2014), and Chen et al., (2014) stated that information can increase transparency and traceability by systematically monitoring and controlling the flow of material and information along the supply chain, thereby enabling organizations to achieve competitive advantage and organizational performance. Therefore, the Indonesian Navy as an organization needs to design information processing systems and procedures, such as information allocation, collection, and sharing of information with partners or suppliers, because the information is useful for overcoming various types of uncertainty in the supply chain, due to the suitability of product and service design quality for SSAT elements as consumers in the TNI AL logistics SCQRM system are determined by the capabilities and requirements in processing information. So the Indonesian Navy needs to organize and develop information systems and build cooperative relationships with partners based on trust. In a supply chain environment, partnership uncertainty is a significant problem, it is necessary to integrate information between companies in the supply chain to enhance collaborative decision making to support SCQRM implementation.

MIS and information sharing play an important role in supporting the sustainable implementation of SCQRM because MIS plays an important role in managing collaborative and cooperative relationships between organizations. In the supply chain, supplier and consumer relationships have asymmetric information about the quality of products and services, so consumers need to receive and analyze information about
supplier capabilities and performance. This can provide information regarding a supplier's ability to meet quality requirements. Successful implementation of SCQRM depends on reliable MIS and information sharing, lack of information flow creates supply chain risks and opens up loopholes for vulnerability and opportunistic behavior. These findings expand on previous research on the role of information in the context of SCM (Sahin and Robinson, 2005; Zhou, 2007; Sezen, 2008; Bayraktar et al., 2009; Li et al., 2009; Perez et al., 2009; Le HoaVo and Thiel, 2011; Hall et al., 2012; Prajogo et al., 2012; Mohan et al., 2013; Ganbold et al., 2020; Kumar et al., 2020), TQM context (Sunil, 2011; Zakaria et al., 2012; Qasim and Zafar, 2016), and the SCQM context (Parast, 2020). However, the findings of this study do not support previous studies by Tippins and Sohi, (2003); Wu et al., (2006); Rai et al., (2006); Mithas et al., (2011) stated that the role of information is less important in supporting supply chain collaboration. These findings confirm the importance of the role of information to bridge the research gap between information and SCQRM implementation so that it will expand previous research with a different investigation of the role of information as an antecedent of SCQRM implementation which is a new concept.

Control mechanisms have a significant direct effect in a positive direction on SCQRM implementation. Also, those control mechanisms do not have a direct impact on organizational performance, but the control mechanisms significantly contribute indirectly to organizational performance mediated by SCQRM implementation. This finding further strengthens the control mechanism theory put forward by Das and Teng, (2001) that there are two types of control mechanisms, namely FC and SC to reduce opportunistic behavior and prove a competitive advantage, where the combination of these two dimensions is in line with the procurement system in the Indonesian Navy. The role of a strong control mechanism will encourage the successful implementation of SCQRM which in turn will improve organizational performance in the Indonesian Navy. Thus, developing the capability of the SCQRM system requires the Indonesian Navy to share knowledge, information, and assets with partners protected by control mechanisms. This mechanism creates a conducive environment for the Indonesian Navy and partners collaborating in the supply chain based on trust. Trust between companies is seen as a unique supply chain network capability and cannot be replicated by competitors. This study supports previous research by Lyles et al., (2008); Madhusudan, (2005); Dawar and Pillutla, (2000) stated that SC is needed to regulate the values,
beliefs, and goals of SD actions and control the behavior of downstream partners, as the existence of belief in PPR goals to motivate partner companies to perform well in the inter-company PPR process. FC makes it easy for the buying company to clarify the objectives and responsibilities of each party. Also, the implementation of FC and SC integration will encourage high RMI practices, so that organizations that have a stronger orientation towards the risk of counterfeiting, will be better able to manage and mitigate quality risks.

The sustainable implementation of SCQRM to improve SSAT combat readiness can be achieved by implementing control mechanisms, namely FC (structure, contract, and process) and SC (trust, information, and culture). FC emphasizes the use of predetermined rules and procedures such as contracts, while SC emphasizes interdependence and beneficial relationships based on trust. The success of resource search activities is highly dependent on the effectiveness of control mechanisms. This mechanism can reduce the opportunistic behavior of both buyers and suppliers in an uncertain environment. The formal mechanism uses contracts in determining the responsibilities and obligations of each party to reduce opportunistic behavior and maintain relationships between companies. On the other hand, coordination between companies has a social side such as shared values, beliefs, and goals. The control mechanism plays an important role as a driver for the organization to achieve effective SCQRM implementation. Successful implementation of SCQRM will mediate the relationship of control mechanisms on organizational performance. The findings of this study also confirm and expand on the research of Tse et al., (2019) which states that the control mechanisms for both FC and SC have a positive and significant effect on the SD and PPR which is a quality risk management practice.

In the context of RBV, the implementation of SCQRM is seen as a strategic resource that is the main key to improving organizational performance which is utilized to achieve a competitive advantage, because the strength of RBV lies in a competitive advantage based on the alignment between internal and external factors (Wernerfelt 1984; Barney, 1991). SCQRM implementation has a significant effect on organizational performance in the Indonesian Navy. The results of this study provide a new perspective for organizations that the implementation of SCQRM is a resource and capability development strategy that is not easily imitated and acquired by competitors. This strategy is an integrated quality risk management approach to reduce risks and
mitigate the consequences of supply chain quality risks. These findings further explain that effective SCQRM implementation can be viewed as a strategic resource that is operated as a system, so the combination of SD, RMI, and PPR practice will have a greater impact on organizational performance than individual practices because SCQRM implementation has the characteristics of The complementarity of each quality risk management practice that reinforces and influences one another on the results of achieving sustainable organizational performance. In RBV, each process of the SCQRM system can create unique values for the firm, and these strategic resources are simultaneously valuable, very rare, irreplaceable, and difficult to imitate by competitors and can form one of the firm’s competencies. The findings of this study also further strengthen the complementarity theory put forward by Davis and Thomas (1993); Milgrom and Roberts, (1995); Taniverdi and Vendkatraman, (2005); Choi et al., (2008); Mishra and Shah (2009) stated that the synergy effect can be studied through examining the relationship between resource linkages and firm performance if resources can increase firm value. In SCQRM, the practice of SD, RMI, and PPR share some of the same resources when companies will operate SCQRM activities together so that the combined SCQRM practices have a greater impact on organizational performance. In the agency context, three SCQRM practices are to reduce the opportunistic behavior of buyers and suppliers (Eisenhardt, 1989). From the supplier side, it will improve the quality of products and services, and the buyer side can increase responsible purchasing.

In SCQRM, cultural factors are seen as a set of values, shared perceptions, belief patterns, the main distinguishing features that function as a single unit that keeps the organization together and harmonizes the integration of the internal environment, and can adapt to the external environment to achieve organizational goals (Schein, 1990; Hofstede, 1994); Cameron dan Quinn, 2006). Organizational culture strengthens the relationship between SCQRM implementation and organizational performance in the Indonesian Navy, where the findings of this study further explain that organizational culture plays an important role in the effectiveness of SCQRM implementation and the achievement of organizational performance. This shows that the quality and competitiveness risk-oriented culture proclaimed by the Indonesian Navy leaders is in line with the core values of the organization, namely the role, duties, and functions of the Indonesian Navy so that it can improve the combat readiness of SSAT elements.
The development of a quality and competitiveness risk-oriented culture is a cultural transformation (Hult et al., 2002), and cultural transformation must be carried out because of the increasing changes in organizational goals and the challenges of the development of the strategic environment. It is hoped that the SSAT procurement and maintenance process will refer to the standardization of the needs plan document and a feasibility study in the form of a life cycle cost document, so that it can eliminate the cannibal culture that has been occurring in the SSAT procurement and maintenance process, and will increase the responsible purchasing that must be made by the Navy. Thus, the findings of this study provide theoretical implications that the quality and competitiveness risk-oriented culture factors can comprehensively describe the essence of organizational culture as a strategic resource that has a contingent effect on strengthening the effectiveness of SCQRM implementation and organizational performance. This study confirms and extends the results of previous studies in the context of SCQRM, such as Pilbeam et al., (2012) stated that shared values, schemes, and culture in the supply network will improve organizational performance. In the context of SCQRM, cultural factors are seen as a set of values, shared perceptions, patterns of belief, the main distinguishing characteristics that function as a unit that keeps the organization together and harmonizes the integration of the internal environment, and can adapt to the external environment to achieve organizational goals.

**Conclusions**

The impact of quality risk is deeply felt in various industrial sectors including the Indonesian Navy. In many cases, the source of risk or insecurity of a product may not be entirely the manufacturer or supplier, instead, there may be problems inherent in the supply chain network consisting of upstream, internal processes, and downstream. This study builds a conceptualization of supply chain quality risk based on RBV as a grand theory, and agency theory can be selected as a middle theory to provide a dynamic view of cooperation between companies in risk management, and complementarity theory can be chosen as a middle theory that provides new perspectives for researchers to find out organizational strategy and does not ignore the complementary nature of the three SCQRM practices. So knowing how to manage and control the quality risks that accumulate along with the supply chain network through the implementation of SCQRM
is important for the Indonesian Navy who wants to achieve competitive advantage and improve organizational performance, especially preventing low-quality products, is not according to technical specifications and it is not safe to reach SSAT elements.

This study has proposed and tested an SCQRM theoretical model with three quality risk management practices (SD, RMI, PPR) as a new concept supported by the role of strategic leadership, information, and control mechanisms as antecedents of SCQRM implementation, and the role of organizational culture as a moderator. The results show that strategic leadership, information, and control mechanisms are significant antecedents of SCQRM implementation. Furthermore, strategic leadership and information significantly contribute to organizational performance. An interesting finding is that control mechanisms do not have a direct impact on organizational performance, but the control mechanisms significantly contribute indirectly to organizational performance mediated by SCQRM implementation. This finding further explains that the control mechanism can reduce the opportunistic behavior of suppliers and buyers which will indirectly encourage increased organizational performance. This shows that FC helps organizations to improve organizational performance through effective PPR practices, and SC helps organizations to improve organizational performance through PPR practices based on shared goals and trust. On the other hand, SC will ensure the buyer's company gets the benefits of SD which in turn improves organizational performance, and FC makes it easier for the buyer's company to clarify the objectives and responsibilities of each party to improve organizational performance. The integrated implementation of FC and SC can encourage relationship governance that has an impact on improving organizational performance through the practice of RMI to manage quality risk in an integrated. Also, SCQRM implementation significantly contributes to organizational performance. These findings provide a new perfection of how the complementarity SCQRM system is operated to improve organizational performance. Moreover, the findings imply that successful SCQRM implementations are built on the strength of complementarity of risk management resources and routines. The multiple manifestations of the three SCQRM dimensions are all driven by a cohesive, yet unobserved synergy, which also forms one of the competencies of the organization. However, the moderating role of organizational culture is somewhat surprising. This study finds that quality risk management culture and culture of
competitiveness strengthen the relationship between SCQRM implementation and organizational performance in the Indonesian Navy.

**Theoretical implications**

The literature has recently seen an increase in interest among scholars toward understanding the impact of quality risk and how to better manage quality risk in the supply chain (Ho et al., 2015; Kumar et al., 2018; Chen, 2018; Tse et al., 2019; Dellana, et al., 2019; Kros et al., 2019; Ganguly 2019; Prashar and Aggarwal, 2019; Quang and Hara, 2019; Ramesh and Sarmah, 2020; Ahmed and Rashdi, 2020; Saglam et al., 2020; Huma et al., 2020). Our study considers quality risk management efforts about risk-based thinking and therefore contributes to the extant literature on quality risk management in the supply chain. From an academic point of view, this study makes four contributions to science in the development of the SCQRM theory as follows. **First**, this study develops an SCQRM theoretical model with three unique dimensions (SD, RMI, PPR). Therefore, this research contributes to the literature by exploring the SCQRM implementation to promote risk-based thinking and risk management practices in the supply chain. **Second**, this study provides a new perfection of how the complementarity system of SCQRM is operated to improve organizational performance. Moreover, the findings imply that a successful SCQRM implementation is built on a complementarity power in risk management resources and routines. The multiple manifestations of the three SCQRM dimensions are all driven by a cohesive, yet unobserved synergy, which also forms one of the competencies of the organization. **Third**, this study provides a new perfection on the role of strategic leadership, information, and control mechanisms as antecedents of SCQRM implementation. **Fourth**, this study also provides a new perfection on the moderating role of organizational culture that strengthens the relationship between SCQRM implementation and organizational performance.

**Managerial Implications**

The findings of this study provide an interesting insight into the implementation of SCQRM to practitioners or managers. Managers are advised to be able to adopt SD, RMI, and PPR simultaneously to manage the impact of quality risk in the supply chain to
achieve competitive advantage and sustainable organizational performance. The ability to practice good risk management can only be obtained if the efforts made can align the capabilities of the three SCQRM practices, because each practice is treated as a complementary resource that is interdependent and supportive of one another. So, the combined practice of SD, RMI, and PPR will have a greater impact on organizational performance than individual practice. Thus, managers must continue to focus on efficiency at the operational level of the three SCQRM practices, as this is a major step towards improving product quality and firm performance. In the context of RBV, each process of the SCQRM system can create unique values for the company, and these strategic resources are simultaneously valuable, very rare, irreplaceable, and difficult to imitate by competitors and can form one of the firm’s competencies.

The effect of strategic leadership on SCQRM implementation and organizational performance is the most dominant of the other antecedents. These findings provide interesting insights into the role of strategic leadership with a strong commitment to quality risk management practices. This study suggests that managers are advised to adopt a combination of visionary leadership skills and managerial leadership. Because strategic leadership is sensitive and able to exploit invaluable strategic resources, rare, unique, difficult to replace and imitate by competitors. This is because each SCQRM practice can be viewed as a complementary resource that reinforces and influences one another. Thus, the combination of visionary leadership skills and managerial leadership becomes a point of change with more emphasis on operational issues and a focus on innovation to drive successful SCQRM implementation and improve organizational performance.

Also, information contributes significantly to SCQRM implementation and organizational performance. These findings suggest that information is useful for dealing with various types of uncertainty in supply chains. This is because MIS plays an important role in integrating supply chain networks and sharing information will improve collaborative decision making in supporting the implementation of SCQRM because the suitability of product design quality is largely determined by the ability of the organization to process information. Managers are advised to build and develop MIS capabilities that are capable of providing quality data and information that, easily accessible, accurate, and relevant. This is because the quality of information can measure the extent to which information sharing between organizations and their
business partners can have a significant direct impact on SCQRM implementation and increase organizational performance.

The SCQRM system capability development strategy requires an organization to share knowledge, information, and assets with business partners that are protected by control mechanisms. This mechanism creates a conducive environment for organizations and business partners to collaborate in the supply chain based on values, beliefs, norms, and trust that have a significant impact on the implementation of SCQRM. It provides managers with insights into how an organization operates in its supply chain network to reduce the uncertainty and opportunistic behavior of buyers and suppliers in uncertain environments. The implementation of control mechanisms encourages an organization to take advantage by limiting dependence on business partners so that it can reduce the level of quality risk which will indirectly improve organizational performance through successful SCQRM implementation.

Another managerial implication of the study is to recognize that organizational culture strengthens the relationship between SCQRM implementation and organizational performance. These findings further explain that organizational culture plays an important role in the effectiveness of SCQRM implementation and the achievement of organizational performance. Managers are advised to create and develop a combination of a quality risk management culture and a culture of competitiveness. Cultural transformation must be carried out because of changes in organizational goals to manage the challenges of environmental change which are full of uncertainty so that it will encourage the successful implementation of SCQRM and improve organizational performance.

**Limitations and Future Research**

This study makes a significant contribution to both academic theory and industrial practice, several limitations must be considered when interpreting the research findings. First, the research uses only a single key respondent from each firm to collect the data. The use of a single respondent to rate diverse supply chain quality risk management-related question items may generate some inaccuracy and more than the usual amount of random error. Future research should seek to utilize multiple respondents in each participating organization to improve the accuracy and to reduce
the random error. **Second**, a successful SCQRM results from building complementarity power in a bundle of risk management resources and routines. Although the three-correlated factor model indicates the three SCQRM dimensions are significantly associated with each other, little is known about the sequence to implement them. In future research, the researcher should investigate the implementation sequence and examine the strength between any two SCQRM dimensions and investigate which pairs of dimensions should be better to implement together to achieve the desired outcomes. **Third**, this study focuses exclusively on the conceptualization of SCQRM implementation in the Indonesian Navy’s logistics with the role of strategic leadership, information, and control mechanisms as antecedents of SCQRM implementation and the role of organizational culture to improve organizational performance. Based on the synthesis between the research findings and the new insights from this study, academics and practitioners can refer to this research to develop their SCQRM system framework. As an alternative, further researchers can investigate how trust and organizational commitment factors as antecedents of SCQRM implementation to better understand how organizations or companies interact with business partners in an uncertain environment to provide new insights for organizations and will influence SCQRM practices in different operational contexts. Thus, the SCQRM theoretical model can provide a basis for further development in both quantitative and qualitative empirical research relating to supply chain quality risks.

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