

Relationship of supplier development and proactive product recall with quality performance

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ABSTRACT

A few manufacturers outsource their productions, making the assurance of the health and well-being of manufactured items more difficult. The limited capacity of existing regulatory bodies, the constant increase in bulk imports, and the complexity of global sourcing have caused severe quality performance problems in the supply chain. Therefore, the relationship between supplier development and proactive product recall with quality performance was examined. Quantitative variables were used in this research because of the nature of the topic. This study is explanatory and assumed based on established hypotheses. Supplier development and quality performance were analyzed using regression. The findings found that the two sorts of quality management practices that we studied in this research are proactive product recall and supplier development. Proactive product recall, if utilized appropriately, may alleviate the company's harmful effects as it is a cure activity that happens once a quality problem has occurred, or, in other words, it is a reactive approach.

Keywords: Quality performance, Proactive product recall, Supplier development, Business performance, SPSS, Quantitative research

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1. Introduction

1.1 Background of the Study

The Samsung Galaxy Note 7 crisis was the most significant product recall crisis in the mobile phone industry, which shed light on the quality issue. The recall crisis raised questions about how manufacturers could prevent quality problems from happening and how they would tackle the situation if they did (Tse et al., 2019; Rashid, 2016). General Motors and Toyota are also examples of severe quality performance errors that cause company losses (Gunasekaran et al., 2019). Toyota faced a significant crisis due to a manufacturing defect in their product, putting many consumers' lives in danger. Toyota has recalled almost 8 million vehicles and faced severe sales suspensions (Kumar & Schmitz, 2011). Such quality problems are the biggest challenge for firms, as they can hurt the company financially and harm the goodwill of well-reputed companies worldwide. The product quality issue is familiar to manufacturing firms. Many firms have faced the same challenge and are also looking forward to tackling it in the future. The product quality failure rate is increasing day by day. Product recall cases increased speedily by 203% in the European Union between 2006 and 2015 (Tse et al., 2019). The reason behind this rapid increase in product recalls is global sourcing and subcontracting of goods, as claimed by scholars (Roth et al., 2008; Tse et al., 2019). The companies outsource their production to focus on their core business and reduce costs (Kang et al., 2012; Li et al., 2017; Rashid & Rasheed, 2024), but it has the potential to backfire and bring losses or other challenges to the purchaser (Li et al., 2017).

1.2 Problem Statement

Most manufacturers outsource their productions, making the health and well-being assurance of manufactured items more difficult (Tse et al., 2011; Tse et al., 2019; Rashid et al., 2024). The limited capacity of existing regulatory bodies, the constant increase in bulk imports, and the complexity of global sourcing have caused severe quality performance problems in the supply chain. Suppose the firms want to survive in the market. In that case, they need to understand proper handling of quality performance in production and sourcing by following procedures and ensuring that the right product reaches the end consumer without any quality problems (Chavez & Seow, 2012; Tse et al., 2019). A product-harm situation refers to an event in which a product does not fulfil a compulsory quality standard, contains a flaw that can cause significant damage to customers, generates an unavoidable threat of death or severe harm, or does not comply with the industry's accepted standards (Dawar & Pillutla, 2000; Luo et al., 2018). Firms must brainstorm and have some procedures to ensure that faulty goods are rapidly withdrawn from the upstream and downstream supply chain networks. The whole supply chain is interrupted due to product recalls because it is a big challenge for firms as it involves a significant amount of money, which harms the company's financial position and also affects the reputation of the firm, resulting in a loss of future sales and credibility of the brand (Tse et al., 2019). A product recall is a major corporate disaster that can genuinely harm the company's trustworthiness, organizational image, and competitiveness (Cheah et al., 2007; Magno, 2012). The company involved should take corrective measures to stop more consumer damage during a crisis. The product quality problem often leads to a product recall in which the organization ceases selling the product and, with the help of a supervisory government agency, informs customers about the risk and assists them in properly handling the product. The manufacturer must make sure defective items are no longer traded in the market and that pieces that have been purchased are replaced or eliminated (Luo et al., 2018). A quality flaw may put a consumer's life at risk. The effect of the threat to quality is felt in various sectors. Although poor manufacturing processes are not the only reason for product recalls, irresponsible procurement by suppliers on the part of the firm may become the reason for product quality flaws. Quality performance risk is always present in the supply chain (Tse et al., 2011, 2019; Rashid et al., 2023). Hence, quality management is compulsory for every firm to stay competitive. The firm should also focus on supplier development, as a product quality crisis may

occur from the raw materials provided by the supplier. To tackle such an issue, the firm should do supplier development. Supplier development typically includes supplier staff training, performance evaluation, rewards, and direct monetary investment in suppliers' capacities by buying firms (Cole & Aitken, 2019; Li et al., 2017). The buying firm should enhance the supplier's capability through a supplier development program, as it will help the buying firm in the long term (Cole & Aitken, 2019; Hahn et al., 1990). This exploration contributes to writing by analyzing the formal control's moderating function (Zhao et al., 2017; Tse et al., 2019). Using a quantitative research approach, we can better understand the conceptions and misconceptions regarding quality performance in the supply chain. The research questions are as follows:

1. *What is the relationship between supplier development and quality performance?*
2. *What is the relationship between proactive product recall and quality performance?*

1.3 Purpose of the Study

This study aims to evaluate the relationship between a model based on supplier development and proactive product recall based on quality performance.

This study will be conducted to:

1. *To determine the relationship between supplier development and quality performance.*
2. *To determine the relationship between proactive product recall and quality performance.*

1.5 Significance of the Study

The two sorts of quality management practices that were studied in this research are proactive product recall and supplier development. Proactive product recall, if utilized appropriately, may alleviate the company's harmful effects as it is a cure activity that happens once a quality problem has occurred, or, in other words, it is a reactive approach (Thun & Hoenig, 2011; Tse et al., 2019). Nonetheless, the quality risk should be managed to prevent unsound products from reaching the manufacturing company. That is why supplier development practices may have been proper because quality affirmation of provider items is an agency problem (Tse et al., 2019; Zu & Kaynak, 2012; Rasheed & Rashid, 2023). Supplier development is a proactive strategy to protect against threats by reducing the probability of unsound products reaching the buyer's factory. In addition, the approach that advances quality performance is broadly viewed as supplier development (Salimian et al., 2017; Tse et al., 2019).

2. Literature Review

2.1 Underpinning and Supporting Theories

The researcher will use agency theory as the leading theory to understand inter-company quality management collaboration comprehensively. This theory has been established by Alchian and Demsetz (1972), Eisenhardt (1989), and Jensen and Mekling (1976). It analyzed the main reasons for agency issues, such as contradictory objectives between purchaser and provider. Supplier development practice includes procedures, roles, and practices leading to quality problem reduction (Harland et al., 2003; Tse et al., 2019), and it is an effective technique when the risk factor of the supplier is important (Tse et al., 2019; Zsidisin & Ellram, 2003). From an agency theory perspective, we expand the current literature by examining a theoretical framework that comprises the historical roots and results of supply chain risk management exercises. Furthermore, though numerous studies have suggested different supply chain quality management exercises and tactics (Finch, 2004; Tang, 2006; Tse et al., 2019; Tummala & Schoenherr, 2011), only a few have provided logical proof to validate these quality management practices (Colicchia & Strozzi, 2012; Fan et al., 2017; Hendricks et

al., 2008; Tse et al., 2019). Further, ex-ante action is an avoidance measure that helps stop risk occurrence. To use ex-ante action, the organization must make a capable purchasing approach to hinder the wellspring of flawed items. When a potential item-related emergency is found in the downstream network, the organization needs to make a brief and responsive move (ex-post action) (Tse et al., 2019). Prevention and corrective steps should be included in a supply chain quality management strategy (Thun & Hoenig, 2011). This research examined supplier development as an ex-ante action and proactive product recall as an ex-post action (Tse et al., 2019). Gray et al. (2011) stated that the quality hazard can be explored by considering the performance threat of overseas manufacturing facilities, the impacts of factory venues, geographical proximity, and worker competence on the supply chain.

Suppliers selected by the organization based on strategic selection, long-term analysis of their past performance, and partnership with the organization provide a clearer picture and enable the company to improve its performance (Carr & Pearson, 1999; Salimian et al., 2017). Belief and devotion are essential in the purchaser-provider relationship. Suppose no trust gap exists between an organization and its providers. In that case, it will help the organization to display a large amount of willingness to discuss its data, benefits, and threats with the supplier (Kim et al., 2010; Narayanan et al., 2014; Hashmi & Mohd, 2020). Contrary to this, organizations with trust gaps with their providers may fail to implement supplier development programs effectively and manage quality (Baloch & Rashid, 2022). Purchasers and vendors cooperate to build material quality and participate in multiple practices to increase the quality of the products by working together (Salimian et al., 2017; Tse et al., 2019). Therefore, the managers of the purchasing firm should settle on choices about putting resources into the suppliers' offices to eliminate product flaws. In addition, the purchaser organization needs to put resources into training and education to build the suppliers' capacity to guarantee product quality and well-being (Krause et al., 2006; Tse et al., 2019). Purchaser firms can improve their design and compliance quality because of the positive effect of supplier development (Curkovic et al., 2000; Salimian et al., 2017). Past research studies offer substantial evidence of the strong effect of provider development on the quality of a purchaser's product (Al-Tit, 2017; Carr & Kaynak, 2007; Tse et al., 2019). Once the quality problem occurs, the firm should immediately withdraw the defective product, offer a successful refund policy, and provide substitute commodities to customers, which are believed to be the best suitable moves to handle the quality problem (Kumar & Budin, 2006; Rashid & Rasheed, 2022). From the viewpoint of quality management, proactive product recall can be seen as a remedial activity. Once you have distinguished imperfections, taking suitable measures to prevent them from affecting the organizations involved is essential. In addition, the execution of a proactive product recall may likewise upgrade a company's eagerness to realize this, which thus may boost the company's efficiency (Haunschild & Rhee, 2004; Tse et al., 2019).

2.2 Empirical Review

In this research, the researcher will work on three variables: supplier development, proactive product recall, and quality performance. Theoretically, some concepts are available for quality assurance people to understand quality management, but there needs to be more research on how supplier development and proactive product recall facilitate quality performance. Previously, researchers have researched the impact of risk management practices on firms' performance under the moderating impact of control mechanisms (Tse et al., 2019). Figure 1 shows the research framework of this research.

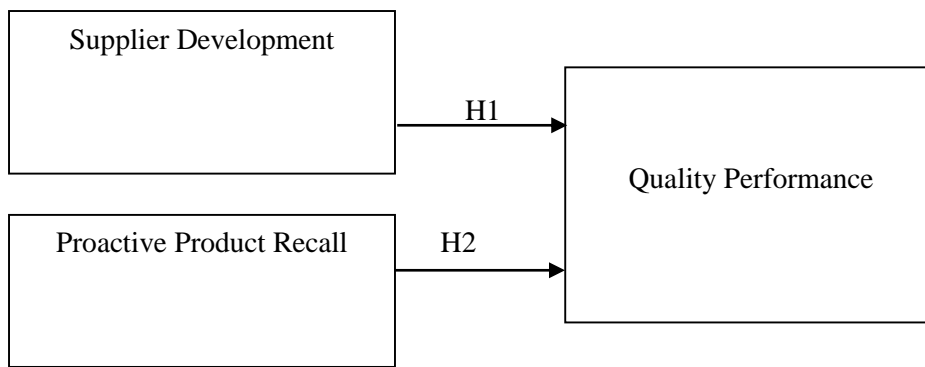


Figure 1: Research Framework
 Source: Author's creation

2.3 Hypothesis Development

Suppliers selected by the organization based on strategic selection, long-term analysis of their past performance, and partnership with the organization provide a clearer picture and enable the company to improve its performance (Carr & Pearson, 1999; Salimian et al., 2017). Belief and devotion are essential in the purchaser-provider relationship. Suppose no trust gap exists between an organization and its providers. In that case, it will help the organization be willing to discuss its data, benefits, and threats with the supplier (Kim et al., 2010; Narayanan et al., 2014). Contrary to this, organizations with trust gaps with their providers may fail to implement supplier development programs effectively and manage quality. Purchasers and vendors cooperate to build material quality and participate in multiple practices to increase the quality of the products by working together (Salimian et al., 2017; Tse et al., 2019). Therefore, the managers of the purchaser firm should settle on choices about putting resources into the suppliers' offices to eliminate product flaws. In addition, the purchaser organization needs to put resources into training and education in order to build the capacity of the suppliers to guarantee product quality and well-being (Krause et al., 2006; Tse et al., 2019). Purchaser firms can improve their design and compliance quality because of the positive effect of supplier development (Curkovic et al., 2000; Salimian et al., 2017). Past research studies offer substantial evidence of the strong effect of provider development on the quality of a purchaser's product (Al-Tit, 2017; Carr & Kaynak, 2007; Tse et al., 2019). Therefore, we proposed the below hypothesis:

Hypothesis 1: Supplier development is positively related to quality performance.

Once the quality problem occurs, the firm should immediately withdraw the defective product, offer a successful refund policy, and provide substitute commodities to customers, which are believed to be the most suitable moves to handle the quality problem (Kumar & Budin, 2006). From the viewpoint of quality management, proactive product recall can be seen as a remedial activity. Once you have distinguished imperfections, taking suitable measures to prevent them from affecting the organizations involved is essential. In addition, the execution of a proactive product recall may likewise upgrade a company's eagerness to realize this, which thus may boost the company's efficiency (Haunschild & Rhee, 2004; Tse et al., 2019). Therefore, we proposed the below hypothesis:

Hypothesis 2: Proactive product recall is positively related to quality performance.

3. Research Method

Because of the nature of the topic, we used quantitative variables in this research (Das et al., 2021; Haque et al., 2021). Therefore, we used a quantitative approach. This study is explanatory and assumed to be based on already established hypotheses, so we used a deductive approach (Hashmi,

2022). Supplier development and quality performance were analyzed using regression and correlation to determine the relationship between independent and dependent variables. The justification of a study can advance theory, offer application to critical product problems, or open new ways of thinking about an area of investigation, such as proactive product recall.

3.1 Sampling Design

The target respondents were employees working at manufacturing firms with experience in quality assurance. The sample size we used for this study is directly destructive, with approximately 200 participants from different quality assurance professionals serving quality assurance. A questionnaire would be made to have questions regarding the factors and eventually help find the effects (Hashmi, 2023). The convenience sampling technique of non-probability sampling was used in this research. Questionnaires were used as an instrument for data collection. This instrument was constructed on a Likert scale and used to collect data having the following values: 1=Strongly Disagree 2=Disagree 3= Neutral 4= Agree 5= Strongly Agree to take data from respondents. This research used pre-existing data and the data collected from the questionnaires. Primary data was gathered from different quality assurance professionals. The regression technique is used in this research to analyze the relationship between dependent and independent variables.

4. Results and Findings

4.1 Descriptive Profile of the Data

A questionnaire was adopted from previous research to collect data for my research. I have validated my questionnaire with respectable academicians, and made minor adjustments as per their recommendations. After that, a request to different industry and research experts for questionnaire's face validity and content validity was made. After face and content validity, the data was collection process was stated from people serving in the supply chain field (Khan et al., 2023a; Khan et al., 2022). Pilot testing has been conducted upon receipt of 50 responses using SPSS. A 5-point Likert scale was used to test my questionnaire's reliability (Cronbach's alpha). Table 1 illustrates the reliability results.

4.2 Validation of the Model

The table 1 shows the results of reliability analyses. Reliability analysis is conducted for the scales using Cronbach's alpha. The results of Cronbach's alpha indicate that SD (0.907), PPR (0.923), and QP (0.893) lie on a good scale. These results are satisfactory. Hence, these variables satisfy the requirements of the research.

Table 1: Validation of the Model

S. No.	Variable Name	No. of Items	Alpha
1	Supplier Development (SD)	5	0.907
2	Proactive Product Recall (PPR)	4	0.923
3	Quality Performance (QP)	4	0.893

Source: SPSS output

4.3 Hypotheses Testing

Hypotheses are tested by the linear regression method at a sig value of 0.000. H1 states that supplier development is positively related to quality performance. This hypothesis path for H1 is negative and insignificant, as the t-value is -0.529 and the p-value is 0.598. Thus, hypothesis H1 is disapproved. H2 states that proactive product recall is positively related to quality performance. The above hypothesis path for H2 was positive and significant, as the t-value was 24.763 and the p-value was 0.000. Thus, hypothesis H2 is approved.

More explicitly, the first research objective was to evaluate the impact of supplier development on quality performance. The results reveal that the relationship between quality performance and supplier development is rejected because the structural path between SD and QP is negative and insignificant ($p > .000$) (Khan et al., 2021). Thus, H2 is not supported at the 95% confidence level. Since PPR is a complicated process, concentrating on structured and detailed contracts will allow the company to manage the complications it generates consistently. Appropriate quality performance is necessary to implement proactive product recall on schedule. Because deferred intervention will result in product recalls that harm the firm. Quality performance may enhance proactive product recalls. Therefore, in the dynamic global supply chain setting, creating clear controlling laws for core stakeholders will help to manage quality performance successfully. The second specific research objective was to evaluate the relationship between proactive product recall and quality performance. The research findings suggest that proactive product recall positively impacts a firm's quality performance. H2 is verified since the relationship between PPR and QP is positive and significant ($p < .000$). Thus, H2 was supported.

In reaction to a product defect, activating a PPR will minimize the expense of the replacement and, in the long term, have an outstanding customer connection. In addition, research outcomes show that proactive product recall is indeed a good predictor of quality performance. Companies that are prepared to efficiently and effectively remove each faulty product are more conscious of the quality problems of every part of their goods (Kaynak, 2003; Tse et al., 2019). Also, precise knowledge of the possible withdrawal hazard should promote the detection and execution of flaws in their goods. Such companies will then plan a modelling procedure for the material recall of sensitive products, and they will most certainly explore the underlying reasons for every product flaw.

5. Conclusion, Discussion, Implications, Limitations, and Recommendations

This study suggested and evaluated methods in risk assessment, i.e., PPR, and their connection to the company's overall output. The results stated that proactive product recall positively affects firms' quality performance. Similarly, quality performance does not impact supplier development. This study discussed proactive product recall practices to control and mitigate product quality flaws. We also discussed and proved that with the help of quality performance, the firm can set up rules and procedures to proactively recall defective products before they create chaos and harm the consumer. Our study will help supply chain professionals understand the importance of performance management practices in managing firms' quality performance. It also helps them to understand the critical role of quality performance in performance management practice. Testing hypotheses with linear regression analysis yields essential insights into the studied relationships. Notably, the specific path for H1, which proposes a positive association between supplier development and quality performance, is disapproved, even if all H1 hypotheses were tested at a significant level of 0.000. The presumed relationship between supplier development initiatives and quality performance has to be reevaluated in light of the negative and negligible t-value (-0.529, $p=0.598$), which calls into question the expected positive association. In contrast, H2, which claimed that proactive product recall and quality performance were positively correlated, produced a favourable and statistically significant outcome. The significant t-value of 24.763 ($p=0.000$) supports the validity of H2, showing that proactive product recall programs significantly impact quality performance.

Due to a time shortage, we have taken data from a few respondents, but it is recommended that the data be taken from more respondents, which will increase the reliability of the data. Due to the questionnaire design, answer errors can be found while collecting the data, and this mistake can be reduced by gathering data through face-to-face interviews with preferred supply chain professionals. In this study, responses were obtained within Karachi's geographic location; therefore, more detailed data is proposed to be obtained from other areas of Pakistan to generalize the results. Given the conflicting results, organizations might need to refocus their attention on supplier development while investing significantly in proactive product recall procedures. These modifications help create a more complex and successful quality control plan. Future studies should investigate additional variables

that could mitigate or moderate this association, delving deeper into the complexity of the relationship between supplier development and quality performance. The generalizability of these findings in various industries and organizational situations could also be investigated further. This research is restricted to Karachi only. We have faced time constraints while conducting this study, and the sample size is small because a large sample size would be challenging to manage due to the limited time and resources. This research also has demographic constraints as it is conducted with small sample size and is limited to the manufacturing sector only. Organizations should evaluate supplier development's effect on quality performance and look at any potential nuances in the relationship, especially in light of the results. It may be necessary to adjust supplier development strategies to match them with better quality outcomes. On the other hand, the robust endorsement of hypothesis 2 highlights the significance of giving proactive product recall measures top priority and optimizing them in order to improve overall quality performance.

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