

Stakeholders' Management Approaches in Construction Supply Chain: A New Perspective of Stakeholder's Theory

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Abstract

Construction is dependent on accurate, timely and safe supply chain, otherwise whole project will be halted. Previously, it has found that most construction projects failed to complete on designated time that ultimately surges the cost as well. Although there are various approaches to deal with the situation, there is evidence that collaboration among stakeholders would reduce the risks and enhance the performance. Therefore, the aim of this study is to verify the relationship between the supply chain performance (SCP) with three stakeholder management approaches, namely supplier relationship (SR), customer relationship (CR), and risk and reward sharing (RRS). A total of 585 questionnaires were distributed using systematic probability sampling of listed construction organizations and only 258 responses were returned. The data were analyzed through the Smart PLS Software using two types of function i.e. PLS Algorithm and Bootstrapping. Based on the PLS Algorithm, the path coefficient results confirm that SR, CR, and RRS influence the SCP. It also has found that all three approaches have 56% of explaining power on SCP (R^2 value = 0.560). The bootstrapping function revealed that the three hypotheses supported and this confirmed the hypotheses are true. This study enhances the relationship among stakeholders beyond the traditional collaboration to risk and reward sharing simultaneously. This integration will provide a competitive position as all members share their expertise that will ultimately improve the quality and lead time and enrich the flexibility. Thus, it can be concluded that long-term success is heavily dependent on relationships with the suppliers, customers, risk and reward sharing. This study will help construction managers to understand the importance of good relationships while doing strategic decision making.

Keywords: *Construction supply chain, stakeholder relationships, stakeholder theory*

1.0 Introduction

It is undoubtful that construction industry not only contributes to the growth of economy but also promotes other industries of a country [1]. Construction industry of developed and developing countries has been facing problems to achieve its construction project goals due to the highly unpredictable and variable causes like availability of resources, financial problems, environment and political conditions, contractual relations and low productivity [2]. Successful project must fulfil the prime factors of construction management including cost, time and quality [3, 4]. Therefore, construction project management is a very tough undertaking, and the responsibility is shouldered by construction manager [5] who has to deal with the different stakeholders and manage the construction supply chain throughout the project life cycle. The rapid growth in the global supply chain requires interconnectedness among stakeholders. As a result, a high level of interdependency and complexity develop in the supply chain [6-8]. Empirical studies have proven that stakeholder's management approaches increased performance [9, 10]. The study of Chen [11] has revealed that stakeholder's management approaches reduce the supply chain risks. Likewise, another example will add to the importance of collaboration, the policy of Dow Chemical Company proposed a plan with their partners. For instance, Dow with their logistics providers in North America, who deal 90% of Dow's shipment, develop a highway security network that shares intelligence information, discuss best approaches and generate a mutual security plan for safe shipment [12].

There are many factors that can affect the performance of the organization. Kolk and Pinkse [13] stated that stakeholder's influence should not be undervalued. All stakeholders have a strong interest in the performance of the organization. There is a direct relationship between stakeholder's collaboration and the performance of the organizations [14, 15]. According to Freeman [16], a stakeholder is any individual or group who can influence or can be influenced by activities of the organization [17, 18]. Since shareholders can be affected negatively, stakeholders must communicate with the firm to enforce better supply chain management strategies. One well-known example is that although Mattel Company had a strong relationship with its suppliers, they still had to face a negative reputation when a supplier exposed that they use lead-based paint in few toy products. Even though they were appreciated before for having strong management relationship with its suppliers, public still blamed them for failing to keep a strong eye on their stakeholders. They should collaborate with their supplier to stop using leadbased paint. International Organization for Standardization (ISO) has also recognized the importance of supply chain and have launched certification program for standardization of supply chain management (ISO-28000-2007). They have certification for risk management that is (ISO-31000:2009), and also include ISO/IEC-31010-2009 for risk assessment techniques. Fortunately, ISO is now developing a specific certification for supply chain risk management that is ISO/AWI-31020 [19].

Researchers recommend multi approaches to deal with different stakeholders like proactive, accommodation, defensive and reactive strategies [20]. Another research revealed that there is a strong bond between the organization's joint planning with their stakeholders and organizational performance in risk mitigation management [14]. There can be many stakeholders of any organization. External stakeholders include suppliers, government, creditors, shareholders, society, customers and etc., while internal stakeholders consist of employees, managers, owner and etc. A firm can have many stakeholders in collaboration [13], however this study only covers suppliers and customers due to time and budget constraints. Specifically this study investigates the relationship between the supply chain performance (SCP) with three stakeholder management approaches, namely supplier relationship (SR), customer relationship (CR), and risk and reward sharing (RRS). The following sections will discuss on the definitions and previous studies before the illustration of supply chain performance.

2.0 Stakeholders and Supply Chain Performance

There are many definitions of stakeholders but mostly researches consider only one as comprehensive and concise that by pioneer of stakeholder's theory [14]. According to Freeman [16], pioneer of stakeholder theory in 1984, any person or group who can affect or can be affected by the objectives of the organization is called stakeholder [17]. In any organization, there may be many stakeholders like primary stakeholders (i.e. suppliers, logistics providers, distributors, customers, employees, investors and etc.) and secondary stakeholders (i.e. media, local community, governments, competitors and all other interest groups) [21]. Stakeholders can affect positively or negatively, where in this study our concerns is a positive effect of stakeholder, such that collaboration with stakeholders would have a direct positive effect on performance [16, 22]. Freeman also expresses that the main duty beside enhances performance is to consider multiple views and interest of stakeholders [16].

Since the birth of Freeman's theory, many works have been done to further develop this theory [23]. There are numerous strategies to tackle the issues. Some researchers suggest coercion and compromise approaches [24]. According to Shahbaz et al. [22], there are two different opinions. Firstly, it is ethical responsibility of the organization to make management decision that is beneficial for stakeholders regardless of their power of influence. Generally, the organization is supposed to fulfill the rights of the stakeholders. Secondly, organizations manage stakeholder's rights by their power. Another researcher revealed three attributes of stakeholder's which comprise power, legitimate and urgency [23]. World Economic Forum [25] suggested that for better risk management, organizations must adopt a balancing approach while dealing with their stakeholders. It has been revealed that supply chain

disruption caused the decline in shareholders' value of about 11% and 40% decline in their share price [26]. Chen [11] quoted an example in his thesis that in the decade 1980, automobile companies of Japan acquired the US market due to its high quality and competitive price. After many studies, it has been revealed that the secret behind this success of Japanese automobile is their high collaboration among partners. Although there are some drawbacks of collaboration such as misuse of information, misrepresentation of capabilities, etc., its advantages are prevailing. No doubt dealing with direct stakeholders may be cost-effective and beneficial but when organizations expand the collaboration with indirect stakeholders, like the supplier's supplier, it will be beyond the affordability [27, 28]. These drawbacks are also supportive of our study importance, organization emphasis on collaboration but consider these issues as well.

Meanwhile, researchers had used many ways to measure the effects of risk sources and supply chain practices with different means like firm or organizational performance [40, 41], product performance, operational performance [22, 42], logistic performance [43], financial performance [44] or supply chain performance [11, 30, 34, 45]. Nevertheless, indicators to measure the above mentioned performance are alike. Mostly used items of measurements are boost up profit, reduce cost, customer satisfaction, reduce customer complaints, increase service level, productivity improvement, decrease lead and delivery time, better order fill capacity and rate, improve variety and flexibility, reduce waste and improve quality and goodwill or some financial measures like return on equity, net present value, return on investment or shares values.

2.1 Supplier Relationship (SR)

Supplier relationship is defined as developing a better relationship between the organization and its suppliers to achieve the long-term benefits individually and collectively. Supplier relationship encourages stakeholders to participate in quality improvement programs besides usual business [29]. The aim of supplier relation is for buying goods or services from suppliers while adding values and improving performance [30, 31]. Supplier relationship can create numerous advantages such as reduce cost, new product development, reduce cycle timing, or reduce uncertainty. Additionally, due to globalization and swift technological advancement, organizations are empowered to foster various types of relationship with partners [32]. Lack of training and readily available tools have led to the tendency that most global supplier relationships become transactional, adversarial, and penalty-oriented [33]. In numerous studies, it has been revealed that supplier relationship has positive effects on performance, and therefore there is a need to assess these effects in the current scenario. As such, the following hypothesis has been developed.

H₁: Supplier relationships have positive effects on supply chain performance

2.2 Customer Relationship (CR)

Customer relationship is aimed at building a long-term relationship with customers, decrease customer complaints, and enhance customer satisfaction. By improving customer relationship, an organization can quickly respond to the changing of customer requirements [30]. It has been proven that supply chain management practices built in customer relationship have a direct effect on the performance of the organization in Taiwan, and indirect effect on the performance of the U.S organizations [34]. Meanwhile, close and continuous contact with customers is crucial for organizations to develop highly customized products [30]. Moreover, numerous surveys propose that organizations that have strong customer relationships are more confident in their ability to evaluate customer complaints and provide support to their customers [29, 35]. In this study, customer relationship practices include following-up with customers for feedback, evaluating customer complaints, enhancing customer support, predicting customers, predicting key factors affecting customer relationships, interacting with customers to set standards, future expectations, and measuring customer satisfaction. Thus, it is hypothesized as follow:

H₂: Customer relationships have positive effects on supply chain performance

2.3 Risk and Reward Sharing (RRS)

Risk and Reward sharing (RRS) is defined as a particular degree of relationship among chain members that results in higher business performance than what would be achieved by the firms individually [36]. Sharing of risks, costs and rewards a particular degree of relationship among chain members is required, and that can be achieved by coordinating various supply chain activities towards mutually determined goals. Apart from the previous two approaches, RRS has a positive significant effect on supply chain performance in previous studies. A balance between risk and reward would develop a close relationship among organizations that ultimately reduce uncertainty and enhance performance [37]. The aim of RRS is to develop common goals and objectives so that the organization will take care of each other [36]. Consequently, RRS has found a significant positive relationship between supply chain performance and this relationship has also been verified empirically [36, 38, 39]. Finally, the following hypothesis has been developed based on the empirical verifications. **H₃**: Risk and reward has positive effects on supply chain performance

2.4 Research framework

A framework was developed based on three independent variables (i.e. supplier relationship, customer relationship, and risk and reward sharing) and one dependent variable (i.e. supply chain performance). Previous studies have revealed that all three approaches could positively affect the supply chain performance. Figure 1 describes the research framework.

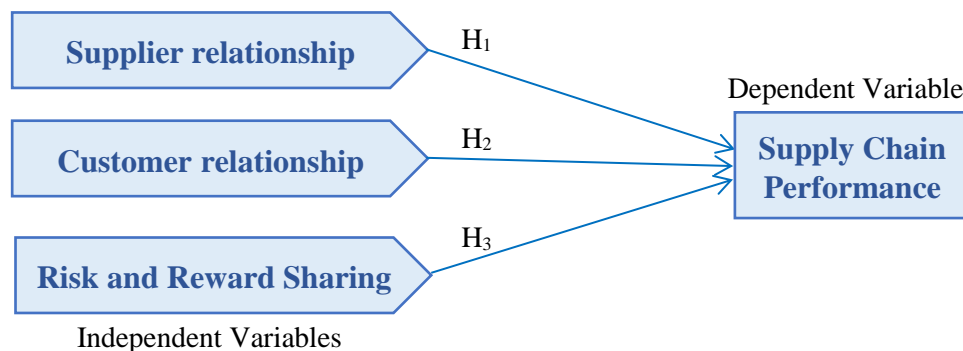


Figure 1: Research Framework

3.0 Methodology

This study utilized a quantitative study approach whereby a survey method has been used for data collection. Meanwhile, questionnaires were distributed through emails to large construction organizations of Pakistan. The items for measuring stakeholder's management were adapted from the work of Sundram et al. [45], as it has already been tested and verified for other industries. As a validated and reliable instrument, it needs to be verified for construction industry of Pakistan by assessing its convergent and discriminant validity. Different researchers have used multi constructs and indicators in their research according to their interest, subject or scenario. This study analyzes the relationship among stakeholders since the main focus of this study is a long-term relationship among stakeholders through collaboration. First, in terms of supplier relationship, its indicators include mutual assistance in problem-solving, and improvement in quality. Secondly, in terms of customer relationship, its indicators consist of forecast demand, problem-solving with customers, and improve customer satisfaction [45]. Both

customer relationship and supplier relationship are adopted from Chen [11]. Items for Risk and reward sharing include risk sharing, cost sharing, and reward sharing, which are adapted from Li et al. and Sundram et al. [40, 45]. The respondents were given 7 options from ‘strongly agreed’ to ‘strongly disagree’ (i.e. 7-point Likert Scale). Based on Krejcie and Morgan [46] sampling technique, the sample size should be 234 for 600 organizations. Questionnaire survey form were sent to 585 listed organizations and after 2 reminders within the period of one month, the total of 258 responses were received. Retrieved responses have been initially proceeded with manual screening. Missing values, incomplete and filled with same answers were excluded. Finally, 243 out of 585 responses have been considered valid for further data analysis.

4.0 Results and Discussions

The data analysis comprises three stages. The first stage is data screening which includes data cleaning, missing values, outliers, and collinearity. Secondly, measurement model analysis that explains the relationship of variables with items and ensure the validity and reliability of the instrument. Finally, a structural model development stage which provides the relationship of independent variables with the dependent variable. Details for each of the stages are discussed in the following sub-sections.

4.1 Data screening

Data screening means purification of data before final data analysis. This stage includes identification of missing values, outliers, and collinearity. The responses with missing values and outliers were first deleted through manual screening before assessing their collinearity statistics. The extent to which two or more independent variables are correlated with each other is termed as multicollinearity [47]. Multicollinearity can create many problems such as complication in interpretation and computational of relationships increases sampling variance in estimating their partial relationships, which ultimately increase and affect the width of confidence intervals [48, 49]. Hence, in order to find out multicollinearity, two values namely Tolerance and Variance Inflation Factor (VIF) were calculated. The current study selects supply-side performance as the dependent variable and all the three stakeholders’ approaches as the independent variables for multicollinearity through linear regression. All the calculated VIF values are less than 10, as shown in Table 1, which clearly justify that there is no multicollinearity issue in the data.

Table 1: VIF values for multicollinearity

Variables	VIF values
CR	2.214
RRS	2.557
SR	2.155

4.2 Measurement Model

The second stage is validity and reliability testing of the measurement model. Factor analysis and Cronbach’s α were calculated. Reliability can be verified by Cronbach’s α , where the value of Cronbach’s α should be more than 0.7 to be considered as reliable. Table 2 shows that the values of Cronbach α for all the constructs are greater than the threshold, thus it can be generally said that this scale is reliable. The internal consistency of composite reliability was also verified where all the calculated values were found to be greater than the threshold limit of 0.7, also as presented in Table 2, and therefore this scale is internally consistent as well. Average variance extracted (AVE) is the degree to which a latent construct explains the variance of its indicators. An AVE value of less than 0.50 generally indicates the remaining errors in the items are more than the variance explained by the construct [50]. As shown in Table 3, the values of AVE for all constructs are greater than 0.5. According to Hair et al. [50], the factor loading value should be in between 0.5 and 0.7 in order to be considered

as valid. It can be seen from Table 3 that factor loading values for all the constructs are within the threshold limits. Hence, it can be concluded that validity of all constructs has been attained.

Table 2: Cronbach's α , composite reliability, and average variance extracted

Constructs	Number of items	Cronbach's α	Composite reliability	Average variance extracted (AVE)
Supplier relationship	6	0.946	0.957	0.788
Customer relationship	5	0.838	0.888	0.619
Risk and reward sharing	3	0.789	0.877	0.706
Supply chain performance	5	0.917	0.938	0.753

Table 3: Coding and factor loading

Constructs	Items	Factor loading
Supplier relationship	The organization considers quality as number one criterion in selecting suppliers	0.867
	The organization regularly solve problems jointly with its suppliers	0.907
	The organization helps its suppliers to improve their product quality	0.918
	Organization has continuous improvement programs	0.884
	Organization include its key suppliers in its planning and goal setting	0.876
	The organization actively involves its key suppliers in new product development	0.871
Customer relationship	The organization frequently interacts with customers to set its reliability, responsiveness and other standards	0.877
	The organization frequently measures and evaluates customer satisfaction	0.910
	The organization frequently determine future customer expectations	0.707
	The organization facilitates customers' ability to seek assistance from it	0.824
	Organization periodically evaluates the importance of the relationship with customers	0.564
Risk and reward sharing	Supply chain members share risks and rewards	0.891
	Supply chain members share research and development costs and results	0.707
	Supply chain members help each other financial capital investment	0.909
Supply chain performance	Quality performance	0.865
	Flexibility performance	0.858
	Customer service	0.894
	Delivery speed	0.913
	Cost performance	0.805

4.3 Structural Model

All the stakeholder's management approaches also have the collective effects of supply chain performance (SCP). As depicted in Figure 2, the result from Smart PLS algorithm has shown that the coefficient of determination R^2 is 0.560, exhibiting the total variance explained by dependent variable. Apparently, this implies that all the three stakeholder's management approaches are explaining 56% of the SCP. According to Hair et al. [51], the R^2 value of greater than 0.5 can be considered as having moderate explanatory power. Thus, it can be said that all stakeholder's management approaches have moderate effects on SCP. Furthermore, there is a need to check the significance of these results for the acceptance or rejection of the hypothesis. Table 4 shows the results of Smart PLS bootstrapping. The results obtained have sufficiently supported the proposed hypotheses as significance. This study has determined the hypotheses according to one-tailed test with a 90% confidence interval. Figure 3 shows that SR, CR, and RRS have positive and significant effects on SCP, as all t-values are higher than 1.645 and P-values of greater than 0.1. These findings, which are in line with the literature as reported by Sundram et al. [38], have verified that suppliers' and customer's relationships create a synergy that performs as a competitive position for the organizations. Through risk and reward sharing, organizations can trust each other that is essential for a relationship. Thus, it can be concluded that all three stakeholders approaches are interconnected not only to enhance supply chain performance but also to reduce uncertainty.

Table 4: Path coefficient and t-values

Constructs	β -value	t-value	Result
Supplier relationship → Supply chain performance	0.278	4.360	Supported
Customer relationship → Supply chain performance	0.320	3.567	Supported
Risk and reward sharing → Supply chain performance	0.243	4.889	Supported

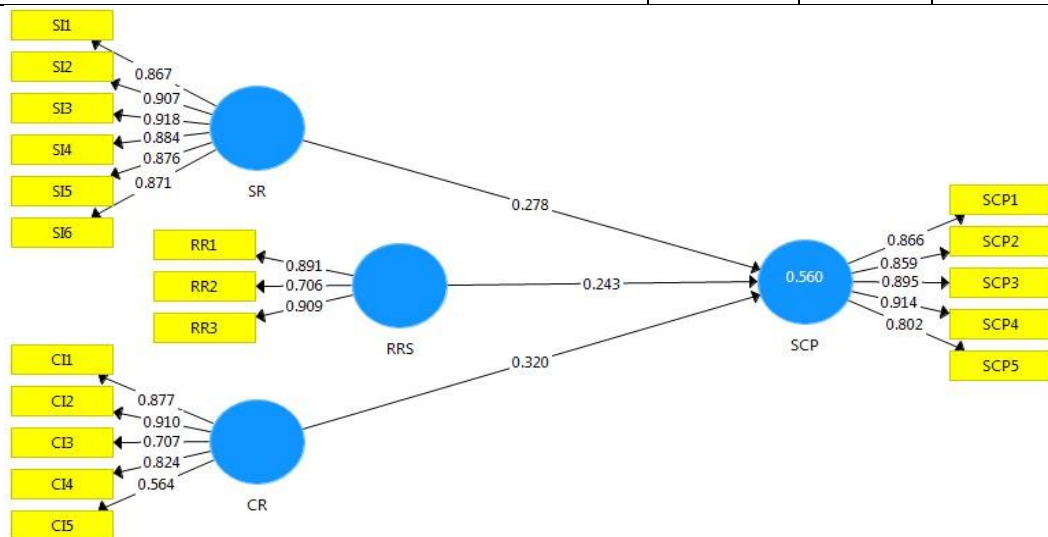


Figure 2: PLS Algorithm

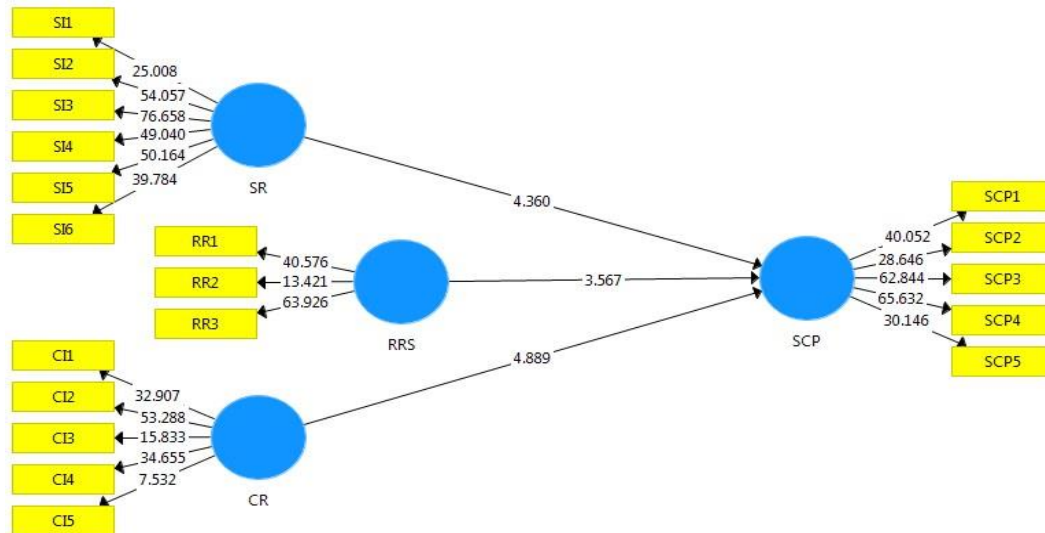


Figure 3: PLS Bootstrapping

5.0 Conclusions

The findings of this study revealed that all the approaches of stakeholder management (i.e. supplier's relationship, customer's relationship, and risks and reward sharing) have positive and significant effects on supply chain performance. This empirical verification is in line with the previous studies and concludes that suppliers of construction organizations prefer to enhance their relationship with local firms and they are also willing to share their risks as well as rewards. Applying the concept of risks and rewards sharing, organizations can trust each other as this is vital for their relationship. This integration will provide a competitive position to all where members can share their expertise that will ultimately improve the quality, lead time, and enrich the flexibility. Furthermore, the downstream supply chains, which include distributors, retailers, and wholesalers, are also willing to develop their relationships with local firms as well as with the upstream. These relationships will provide timely, accurate and up to date information to all members and also serve as a safeguard against risks and disruptions. This study enlightens the researchers and practitioners with a new perspective that all members should go beyond the traditional relationships, and not only to improve planning, forecasting, and replenishment system with suppliers and customers but also to share risks and rewards. Meanwhile, the major contribution of this study is that it focuses on the supply chain performance of the construction industry, while previous studies have focused only on the main organization. Thus, it can be concluded that the long-term success of construction organizations of Pakistan is heavily dependent on their relationships with their suppliers and customers [52]. If they want to avoid unnecessary delay or over budgeting, then they must focus on relationships with other members. This study would also help construction managers to understand the importance of a good relationship while performing strategic decision making. Although previous stakeholder's theories have verified the suppliers' and customers' relationship, this study adds a new perspective of risks and rewards sharing along with relationship. As trust is fundamental for the success of a good relationship, organizations can trust each other by sharing of risks and rewards.

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