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The effects of employee commitment and environment uncertainty on product quality: The mediating role of supply chain integration

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A B S T R A C T

The main objective of the study was to test the relationship between the uncertainty of supply chain, employee commitment and product quality with the mediating role of supply chain integration. The uniqueness of the study is that it focused on the mediating role of supply chain integration in the automobile sector of United Arab Emirates (UAE). This research is quantitative in nature. For the analysis, structural equation modelling is used. The population of the present research is the employees working in the automobile sector of UAE. A Likert scale questionnaire was used to support this study. The questionnaire was distributed among 481 respondents by using simple random sampling. The usable response rate was 66.66%. The findings of the study confirmed the direct relationship between supply chain integration, product quality, employee commitment and environmental uncertainty. This study fills the gap of limited studies regarding supply chain integration in the UAE automobile sector. The findings of the study are also helpful for policymakers in developing automobile strategies.

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1. Introduction

For a long time, several past studies have pointed out that there is a need to develop close and integrated associations between manufacturers and partners in the supply chain. Whereas this systematic approach has emerged in the integration of supply chain or SCI known as supply chain integration. According to researchers, there is a need for increased cooperative partnership in the supply chain for the mutual benefit of the organizations. Moreover, scholars have also prioritized giving importance to the need for collaborative improvement of activities at the inter-organizational level (Yu, Zhang, & Huo, 2019). Several different countries have managed the supply chains. Therefore, there is an urge and need to develop coordination and alignment in the application of the supply chain by the integration of technology. Organizations have people who are experts and can develop systems of supply chains and impact the SCI. organizations will get effectiveness in their operations because of SCI (Sebayang, Tarigan, & Panjaitan, 2021). There are two important parts of SCI namely external integration and internal integration. It is key to point out that SCI is the organizational strategy that is used to improve the competitiveness and performance of the organization. Because of SCI, organizations have the chance to maximize their shared resources, exchange of information and flow of products to enhance combined benefits. Moreover, organizations can adjust their needs in the markets by SCI. The manufacturing organizations can find out the potential problems and solve these problems well in time (Basana, Suprapto, Andreani, & Tarigan, 2022).

The automobile sector is one of the major contributors to UAE's GDP. This sector generates maximum jobs for the UAE people. On the other hand, the UAE automobile sector is one of the big industries of the country. In 2019, the annual sales of vehicles in UAE was 235 thousand annually (Statista, 2022). In this scenario, the automobile sector should identify factors that can improve product quality. Therefore, the focus of this study is to emphasize the role of supply chain integration to

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improve the quality of the products in the UAE automotive industry. On the other hand, this study also focused on the role of environmental uncertainty and employee commitment to developing SCI and product improvement. The findings of the study will contribute to the literature in terms of environmental uncertainty and organizational creativity to develop SCI.

2. Literature review

2.1 Product quality

Scholars stated that product quality is the basic feature of service and product. This feature mainly depends upon the organizational ability to amplify or meet the needs of a customer. Researchers have defined product quality as the product functionality on the actual basis along with consistency among online quality of product and actual physical product. The assessment of product quality components that are used by researchers for the review includes the availability of the product, selection of product and different reviews of product quality (Razak, Nirwanto, & Triatmanto, 2016). Researchers highlighted five basic elements in terms of product quality. The design quality has linkage with the first element. The design quality is very important for customer satisfaction. It is very important for the product quality that can meet the customer's needs. Moreover, conformance to the quality is also one of the key elements of product quality that plays a vital role to develop customer satisfaction (Namjoshi, Dabbaghi, Roberts, Grice, & Mohammed, 2020). Additionally, the third element is the factor of reliability which is important to ensure the security of the products and also the errors in the products can be fixed easily. It is key for the organizations to remain in business and market for a longer period so they can improve their profitability. In this context reliability of the products produced plays a very important role (Bray, Serpa, & Colak, 2019). The next element of product quality is related to safety which ensures that the final products being produced by the firm are healthy. The factor of safety is important for the products that are related to the food industry and is one of the increasing concerns. In the end, the last element is proper storage which ensures that the final product must be well processed and packed. The quality of the product will remain until the product is not expired. The product must be sold before expiry (Ghani, 2020).

2.2. Supply Chain Integration (SC Integration)

In the context of research, the concept of SCI is relatively new. There exists an extensive literature on the unidimensional nature of supply chain relations. Very limited researchers have focused on the association at two-level among the partners of supply chain partners. Whereas a few scholars have also emphasized the single process of the supply chain. Therefore, individually it works as an important part of the system. Uygun and Dede (2016) have defined SCI as the focus on the flow of material. It is also defined as the focus on the resources, information, and flow of cash. There are several important elements considered in these mentioned definitions of SCI (Tiwari, 2020). The literature that is available in the context of SCI is developed on the factor of internal integration such as manufacturers. Moreover, it also extends to the integration of customer and supplier. The combined, as well as uninterrupted control of economic activities within the supply chain, is referred to as integration (Khanuja & Jain, 2019). In the context of the supply chain, SCI is referred to as the level to which there exists strategic linkage among the partners of the supply chain and the manufacturers. It also manages Intra and inter-organizational partners under the supply chain. Therefore, the goal is to develop and maintain an effective and efficient flow of money, decisions, products, services and information. Moreover, it also involves providing maximum value to the customer at a minimum price (Prajogo, Oke, & Olhager, 2016). The definition of SCI includes some important elements that are of strategic importance such as the regular partnership with the stakeholders for the success of the business and to achieve organizational goals. In the light of these integrations, contract duration is increased, mutual trust is developed, risks are shared, and information is shared with other partners. Additionally, because of operational integration organizations can enjoy operational benefits. Whereas strategic integration leads to both operational and strategic advantages (Ralston, Blackhurst, Cantor, & Crum, 2015). On the other hand, it also focuses on intra and inter-organizational operations.

2.3 Relationship between SC Integration and Product Quality

Several studies have focused on studying the effect of SCI on product quality. The focus of the studies is on the SCI and improvement of quality. The focus of researchers has remained on the overall effect of SCI on the quality of products, but they represented the two dimensions of product quality. Researchers investigated the interaction between external integration and internal integration in the context of Thailand. They revealed that there exists a positive relationship between SCI and product quality (Lotfi, Sahran, & Mukhtar, 2013). Scientists also investigated the relationship between SCI, the internal integration on the performance and production flexibility. This study gathered data from 151 automobile companies in Thailand and SCI has a positive relationship with the quality of the product (Xu, Blankson, & Prybutok, 2017).

3. Extensive Literature Review and relationships of independent variables

3.1 Employee commitment

Researchers have defined organizational commitment as the commitment of the employee to attend the office on a regular basis. Moreover, to work full and also the willingness of the employee to perform extra tasks along with feeling to be part of

the mission and mission of the organization. The work-related behavior has mostly affected the commitment of the employee toward the organization. researchers have defined commitment in the context of continuance commitment, affective commitment and normative commitment (Byza, Dörr, Schuh, & Maier, 2019). Affective commitment is defined as the level to which the emotional attachment of a person is identified with the organization. There are three main aspects of effective commitment. Firstly, the wish of a person to be an important organizational member. When the values of employees are consistent with the organizational values, it becomes easy for the organization to achieve organizational goals. The affective commitment of the organization is identified as the behavior of the workplace, OCB, personnel stability and increased productivity (Rahman, Zaman, Hossain, Mannan, & Hassan, 2019). The second aspect of commitment is the continuance commitment. When an employee works for the organization for a longer period, he spends time and effort to achieve organizational goals. Researchers have mentioned that employees evaluate the workplace in terms of the effort the employee puts into the organization in terms of what they get in return (Pham, Tučková, & Phan, 2019).

On the other hand, the third factor is the normative commitment which is explored very little in past studies. Researchers have tried to differentiate between continuance commitment and affective commitment. Normative commitment shows obligation by the employees so they can continue employment with their firm. According to scholars, employees need to continue their commitment to the organization by providing regular services. When the worker has a feeling of obligation toward the organization, it reflects normative commitment toward the organization. It is the feeling of the employee that the firm has invested a lot of money and time to provide them with training so these employees can get the skills to perform organizational tasks and day to day activities. Thus, employees feel morally obliged toward the organization (Malaysia, 2016).

3.2 Relationship between Employee commitment and SC Integration

To deliver a value chain for the organization, the organization needs to focus on employee commitment. Scientists argued that SCI must be studied with the aspect of employee commitment. Among important aspects of SCI, one of the key elements in employee commitment. It is because the extra sensitivity and effort need development of the long-lasting relationship with employees (Atif, Nazir, & Abdullah, 2017). In the literature on supply chain management, commitment is one of the important factors. Commitment in literature is referred to as the belief that partners involved in an exchange relationship are important to each other and they have to do extra effort to maintain this kind of relationship. The partners can get involved in several collaborative projects in the presence of commitment. Integration involves the exchange of interconnection and information among strategic activities and operational levels from their counterparts. Moreover, the goals of the organizations are also aligned. The commitment is demonstrated by the wholesalers and other partners at each level of the supply chain of manufacturers so they can share risks (Ramirez, Roman, Ramos, & Patrucco, 2020).

Integration of the supply chain narrows down emphasis on providing maximum value to the stakeholders. Different studies pointed to a relationship between commitment among employees and supply chain integration. Scholars pointed out that the supply chain is the employee who is the important member of the supply chain of any organization. The efficiency of the supply chain is dependent upon the commitment of the employees (Amin, 2019).

3.3 Environmental uncertainty

Past literature has defined uncertainty as the organizational uncertainty to predict the future event probability. It also includes difficulty to predict the outcomes of the decisions because of the availability of information that is incomplete. The study conducted by Inman and Green (2021) focused on the external outcomes of environmental uncertainty in terms of organizations. In terms of the supply chain, environmental uncertainty is the basic condition for the consistency of the organization. In the presence of uncertainty, the organization must develop inventory, capacity and safety buffers so the poor quality of the supply chain can be avoided. Scholars have also classified organizational uncertainty in terms of three elements namely technological uncertainty, demand uncertainty and customer uncertainty (Darvishmotevali, Altinay, & Köseoglu, 2020). The uncertainty in the supply is defined by scholars as the unpredictability of suppliers in terms of delivery and quality of the product. Some of the examples of uncertainty in the supply include quality of raw material, delivery dependency, lead time and engineering level of suppliers. The supplier who has poor performance in terms of delivery of products and quality of products is also unable to maintain its external stakeholder relationships (Inman & Green, 2021). The uncertainty of customers or demand is referred to as the level to which unpredictability or change is according to the demand or taste of the customers. In the context of uncertainty, demand uncertainty is one of the major contributors. As the global market is getting competitive day by day to which customer choices are also being affected. At this time the market is very volatile. customers are more inclined toward faster delivery, higher quality, better resources and more choices (Heidary, Aghaie, & Jalalimanesh, 2018). Scholars have defined technology to answer uncertainty as to the level to which unpredictability and change in the development of technology in the industry of organization. Despite its benefits and impacts on production and information technologies, few threats can be caused by the technologies to these organizations. Therefore, there is a need for the time that organizations invest in technologies that are new so they can minimize the cost (Ganbold & Matsui, 2017).

3.4 Relationship between Environmental uncertainty and SC Integration

Past studies have examined the effect of integration on the different outcome variables such as performance and integration of the supply chain. Whereas organizations have rarely examined the direct effect of the environment on the integration of the supply chain. Researchers have pointed out that a higher level of supply chain integration is expected as a result of a high level of uncertainty in the environment. Keeping in view serious and major environmental sources of uncertainty along with uncertainty in demand, the waste and excess inventory will be increased along with the overall cost of the organization (Kalyar, Shafique, & Ahmad, 2019). Researchers are also of the view that there exists a direct relationship between performance and the strategy of the organization. On the other hand, SCI is one of the strategies that can be chosen by the organization. The exterior environment tends to affect the strategy of the organization. If there is uncertainty in the environment, it will affect the organizational performance negatively. Thus, it will also affect the supply chain integration as well (Bae, 2017). Following hypotheses are developed from the above relationships

H_1: *Employee commitment is related to Supply chain integration.*
H_2: *Environmental uncertainty is related to Supply chain integration*.
H_3: *Supply chain integration is related to Product quality.*
H_4: *Supply chain integration mediates the relationship between Employee commitment and Product quality.*
H_5: *Supply chain integration mediates the relationship between Environmental uncertainty and Product quality.*

Below is given the framework of the study. In this research, employee commitment and environmental uncertainty are the independent variables while Supply chain integration is the mediating construct of the study. Product quality is the dependent variable of this study.

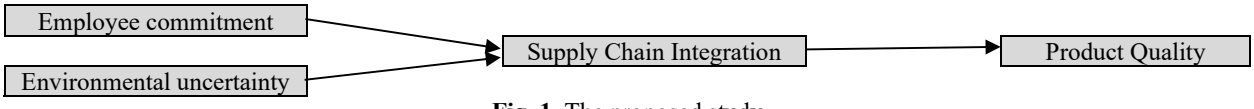


Fig. 1. The proposed study

4. Research Method

This study examined the effect of environmental uncertainty and employee commitment on product quality with the mediating role of SCI. The data was collected from the employees who are working in the automobile sector of UAE. This data was collected from the employees using self-administered questionnaires. To find out the sample size in this study, the sampling guidelines of Morgan (Kotrlik & Higgins, 2001) were followed. Therefore, simple random sampling was used for the collection of data from the employees. The data was collected from 481 employees in the form of questionnaires. These questionnaires were designed from past studies. The items of SCI were adapted from (Rai, Patnayakuni, & Seth, 2006), items of Product quality were adapted from (Banker, Bardhan, & Asdemir, 2006), items of environmental uncertainty were adapted from (Ganbold & Matsui, 2017). And employee commitment was adapted from (Amin, 2019). All of these questionnaires were designed using Likert 5 scale anchored by 5 as strongly agree to 1 as strongly disagree. As mentioned earlier the questionnaire was distributed among 481 respondents. However, 331 questionnaires were received back. Among these 11 questionnaires were omitted as they were incomplete. Thus, response rate was 66.66% showing a high level of response rate (Farouk, Elanain, Obeidat, & Al-Nahyan, 2016).

5. Results

Researchers used IBM-SPSS for the initial analysis of the present study. The data was entered in SPSS to identify missing values, demographic analysis and accuracy of the data. Subsequently, the data entered in SPSS was also used to identify outliers. It was revealed that no outlier was reported in the study. Later this data was used in PLS for further analysis. The Smart PLS was used to test the hypothesis and estimations as well (Jabeen & Ali, 2022). Table 1 of the study shows the demographics of the respondents.

Table 1
Demographics of the participants

S.No	Description		Percentage
1	Gender	Male	57%
		Female	43%
2	Marital Status	Married	69%
		Single	31%
3	Age Group	Less than 25%	11%
		26-35 years	34%
		36-45 years	32%
		More than 45 years	23%

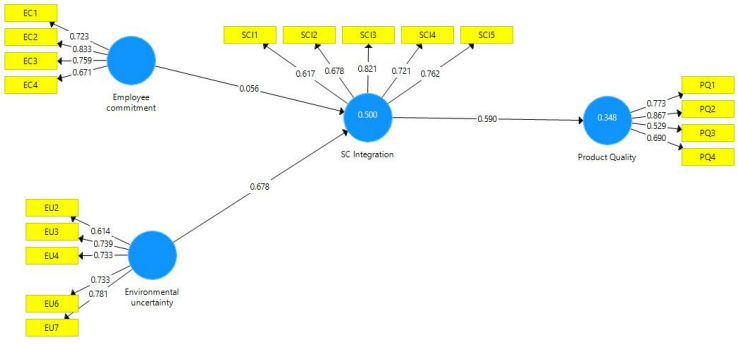
Table 1 mentioned above demonstrates the demographic profile of the respondents. We concluded that 57% of the respondents were male whereas the remaining were female. Moreover, 69% of the respondents were married. In the end, the age group of maximum respondents fell under the age group of 26 years to 35 years (i.e., 34%). After this analysis, we moved towards the analysis through smart PLS. The analysis through Smart PLS began with a measurement model that is used to examine the gathered data's effectiveness (Sarstedt & Cheah, 2019). This step also examines the validity and reliability of the data. The results generated regarding validity and reliability are discussed below. The reliability of the data is gathered through CR and Cronbach Alpha which are presented in Table 2. The values mentioned in table 2 show that the values of CR and Cronbach Alpha are more than 0.70. These values are according to the suggestions made by (Hair, Ringle, & Sarstedt, 2011). On the other hand, the values mentioned in Table 2 also demonstrate the values of Average Variance Extracted (AVE) which is a minimum of 0.50 in the present study (Ali, Azeem, Marri & Khurram, 2021). These values are also meeting the criteria suggested by (Hair et al., 2011).

Table 2

Reliability and Validity

	Cronbach's Alpha	rho_A	Composite Reliability	AVE
EC	**0.738**	**0.756**	**0.835**	**0.561**
EU	**0.770**	**0.782**	**0.844**	**0.522**
PQ	**0.701**	**0.783**	**0.812**	**0.526**
SCI	**0.769**	**0.781**	**0.845**	**0.523**

Note: EU= environmental uncertainty, EC=employee commitment, PQ= product quality, SCI= supply chain integration



Note: EU= environmental unveracity, EC=employee commitment, PQ= product quality, SCI= supply chain integration

Fig. 1. Measurement Model

Under the measurement model of the study, it is also important to evaluate the factor loading of the data (Ali, Perumal, & Shaari, 2020). According to Hair Jr, Sarstedt, Hopkins, and Kuppelwieser (2014) minimum acceptable value for factor loading is 0.60. the values of factor loading mentioned in table 3 and figure 2 demonstrate that this criterion is fulfilled.

Table 3

Factor loading

	EC	EU	PQ	SCI
EC1	0.723			
EC2	0.833			
EC3	0.759			
EC4	0.671			
EU2		0.614		
EU3		0.739		
EU4		0.733		
EU6		0.733		
EU7		0.781		
PQ1			0.773	
PQ2			0.867	
PQ3			0.529	
PQ4			0.690	
SCI1				0.617
SCI2				0.678
SCI3				0.821
SCI4				0.721
SCI5				0.762

Note: EU= environmental unveracity, EC=employee commitment, PQ= product quality, SCI= supply chain integration

This study has also assessed the discriminant validity based on Fornell and Larcker (1981) criterion. Table 4 of the present study shows the discriminant validity of the study by the Fornell and Larcker (1981) approach. The outcomes show that the square root of AVE is less than the values of correlation. This suggests that these constructs are distinct and unique.

Table 4

Fornell and Larcker (1981)

	EC	EU	PQ	SCI
EC	**0.749**			
EU	0.496	**0.722**		
PQ	0.438	0.596	**0.725**	
SCI	0.392	0.705	0.590	**0.723**

Note: EU= environmental unveracity, EC=employee commitment, PQ= product quality, SCI= supply chain integration

At the end of the measurement model, R squared values were also generated. According to the suggestions of Hair et al. (2017), the values of mediating and the dependent variable is substantial.

Table 5

R Square

	R Square
PQ	0.348
SCI	0.500

Note: product quality, SCI= supply chain integration

Later, this empirical study tested five hypotheses through the utilization of bootstrapping techniques with 5000 subsamples. A summary of the results of the proposed hypothesis is mentioned below.

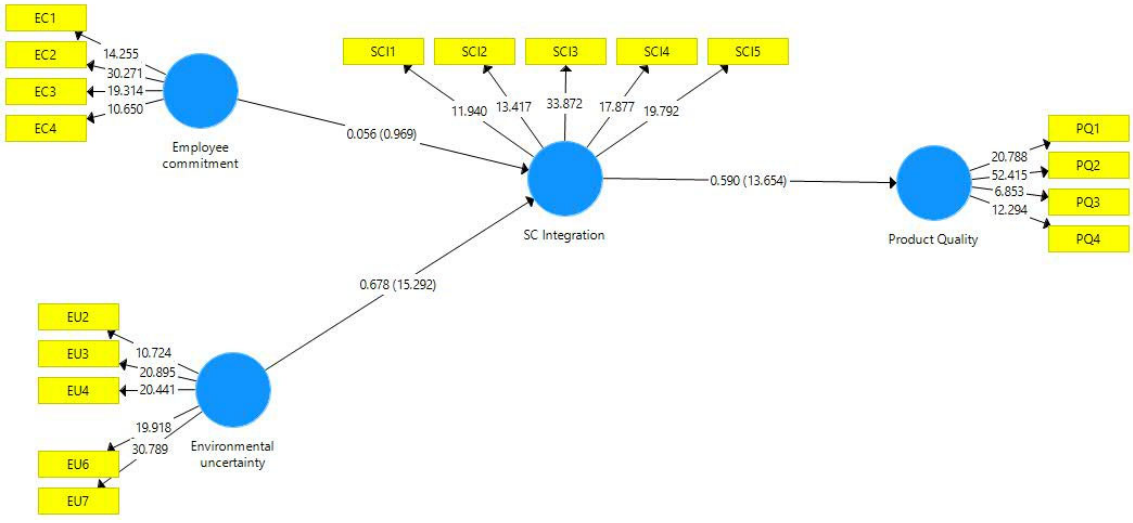
Table 6

Direct and indirect Results

	Beta	SD	T Values	P Values	Decision
EC → SCI (H1)	0.056	0.057	0.969	**0.166**	**Rejected**
EU → SCI (H2)	0.678	0.044	15.292	**0.000**	**Accepted**
SCI → PQ (H3)	0.590	0.043	13.654	**0.000**	**Accepted**
EU → SCI → PQ (H4)	0.400	0.043	9.335	**0.000**	**Accepted**
EC → SCI → PQ (H5)	0.033	0.034	0.952	**0.171**	**Rejected**

Note: EU= environmental unveracity, EC=employee commitment, PQ= product quality, SCI= supply chain integration

The direct and indirect results of the study are mentioned in table 6. According to these values, EC and SCI are not significantly related to each other. Moreover, SU and SCI are supported with Beta=0.678 and t-value=15.292. Thus, H2 is supported. The results also supported H3 as SCI and PQ are supported with Beta =0.590, t=13.654. Additionally, results also show that SCI mediates the relationship between EU and PQ supporting H4. In the end, SCI does not mediate the relationship between SC and PQ.



Note: EU= environmental uncertainty, EC=employee commitment, PQ= product quality, SCI= supply chain integration

Fig. 2. Structural Model

6. Discussion and Conclusion

The present research examined the relationship between employee uncertainty, employee commitment, supply chain integration and product quality in the UAE automobile industry. In this research, supply chain integration was tested as the mediating role. This study used self-administered data for the collection of data from the respondents. The target population of the study was employees working in these organizations. The analysis was conducted by using the SEM technique through PLS. The findings of the study revealed that employee uncertainty has a significant positive relationship with supply chain integration. This finding is similar to the results presented by (Kalyar, Shafique, & Ahmad, 2019). The results of the study also revealed that employee commitment is positively related to supply chain integration aligned with the findings of Ramirez et al. (2020). The results also posted that integration of the supply chain also positively affects product quality. In past studies, the same results were pointed out by (Xu, Blankson, & Prybutok, 2017). The results of the study also suggested that supply chain integration mediates the proposed relationship. The findings of the study emphasized that organizations could improve their product quality through the integration of supply chain partners. For this purpose, environmental uncertainty must be reduced by the automobile firms and must focus on the commitment of employees. The findings of the study contribute to the literature in two aspects. These findings point out the way environmental uncertainty can impact product quality and integration of the supply chain. Additionally, these findings enriched the supply chain integration literature in terms of its mediating role. There are a few limitations of the study as well. This study is cross-sectional in nature. Future studies should employ a longitudinal research design. These findings are helpful for policymakers to develop strategies to improve the product quality of the automobile sector.

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