

Information Sharing in OBOR Projects to Ensure Better Performance: Mediating Role of Dynamic Manufacturing Capability

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Abstract— China's One Belt One Road (OBOR) initiative has also connected Thailand with many other markets to support its manufacturing industry. Yet, due to such long-range trade relationships, information sharing is becoming a key figure for success. Such information sharing from manufacturer to customer reduces the uncertainties and can improve production process too. In this study, author has seen the impact of manufacturer to supplier information sharing and manufacturer to buyer information sharing on supply chain performance of such firms which are located in OBOR plans. Moreover, mediating role of dynamic manufacturing capability has also been tested in relationship between information sharing dimensions and supply chain performance. Data has been collected from those manufacturing firms of Thailand who are either doing or willing to do trade through OBOR initiative through survey questionnaire. Responses were then analyzed on SPSS and AMOS to get the empirical results. Findings have revealed that information sharing dimensions have significant impact on supply chain performance and dynamic manufacturing capability is playing a significant positive mediating role in the respective relationships. This study is novel due to the mediating role of dynamic capabilities which were not taken in prior literature and also has its very own implications for academia and practice.

Key Words: Information Sharing, Dynamic Manufacturing Capability, Supply Chain Performance and One Belt One Road

1. Introduction

OBOR stands for one belt, one road. OBOR is now considered as a milestone in trading world. Those nation which are connected with OBOR and doing

trade through one road are continuously growing their economies and lifestyle as well. OBOR is necessary for cross cultural growth and fundamental development of two different region [1]. Manufacturer supplier information and manufacturer buyer information is needed for OBOR trade. In the past supply chain performance got better day by day after shared information of buyer and supplier on OBOR. Dynamic manufacturer capabilities (DMC) referred as change in competences and also the change in production and technology as well. DMC also caused the facilitator in production and supply chain performance. OBOR helped the different companies to maximize the production and their earning as well. In the past the study is concerned with only the information shared in OBOR but now a days this OBOR system got popular among every trader. Cross border trade explores new businesses and great revenue as well [2]. That is why people now prefer international trade where demand of their product is high.

Figure no.1 is showing China's one belt one road plan. The study will be going to search the effect of manufacturer supplier information sharing on OBOR supply chain performance. The study will also have the aim to know about the impact of manufacturer buyer I information system on OBOR supply chain performance. This study will have a deep insight into the mediating role of dynamic manufacturer capabilities on manufacturer supplier information sharing and OBOR supply chain information, and between manufacturer buyer information sharing and OBOR supply chain performance [3].



Figure 1: China's OBOR (Source: Economyria)

From past few years' researchers suggested the positive relationships between these variables, we will conduct this researcher to prove them right or wrong and whether there is significant relationship or not. This study will be going to be conducted in Thailand by selecting 300 people from the manufacturing sector of Thailand. Now information shared in OBOR is challenge for whole world. This is the problem of the world. World is finding the solution to fight with this challenge [4]. Everyday different researches around the globe conduct researches and gave solutions to the problem but most of the solution are not reliable. The mediator role of DMC must solve the problem and must establish the facts regarding the better use of information shared in OBOR of both manufacturer and buyer as well. This study has intention to know about the relation of manufacturer supplier information sharing and OBOR supply chain performance, and also the relationship between Manufacturer buyer information sharing and OBOR supply chain performance as well [1]. The goal of this study will be to know that is there any significant and positive and important impact between these variables or not? The objective will also be to know about the role of mediator between these variables. The people related to this sector can get beneficial knowledge. They can take facts in account for betterment of the trading zone which is related to OBOR. This study will significantly implicate its findings towards literature. It will increase the literature material on the internet. Students and researchers can have deep knowledge and beneficial

knowledge about the OBOR information sharing system. The students get reliable data about the problem which will be discussed int his literature in a huge amount. This study will also contribute to practical life manufacturer supplier and manufacturer buyer can share similar and dependent information on OBOR which can be used by different supplier and buyer at the same time in huge amount through that information they can get solutions about the challenges they faced about OBOR [2]. In the past few years information shared in OBOR has not very huge considerations, and researchers did not research the problem properly they did not solve the problems and present the solution of the challenges the manufacturer and supplier are facing. In this study, the solutions and facts are presented. In this study mediating g role is stated clearly and its impacts are also stated clearly. This research is reliable on the topic of information shared in OBOR, and this study is also knowledgeable [5].

2. Literature review

2.1. Game Theoretical Approach

Ref [6] explains the role of One Belt and One Road (OBOR) that explores the supply chain coordination issues arising from the supply chain performance this however, investigated the cost sharing process on the key decisions for logistics service supply chain with mass customization. Information sharing through the theoretical and conceptual approaches [7] of Game theory approaches, which clearly examine the effect of logistics services and logistics integrator. However, four basic models that explained the supply

chain performance which could be further evaluated by game theory and its implication over the cost sharing contract between supplier and buyer information sharing [30]. Theorists [8], demonstrated about the application of game theory and its relevant approaches that analyze the cost sharing information which act as a key decision in which each supporting player is being analyzed. OBOR primarily benefits the logistics services supply chain (LSSC) which is considered as a new supply chain of with the basic components that includes: functional logistics service providers (FLSP). According to theorists [9], there can be found that there are interactions and mutual reinforcement between the logistics services supply chain and the mass customization. The combination of these two sources requires a high cost, but a good cooperation between the integrator, buyers, and suppliers that are responsible in the reduction of cost through the economy of scale. Economy of scale can be evaluated with the help of game theoretical approaches.

2.2. Manufacturer Supplier Information sharing and its impact on OBOR supply chain performance

[10] suggest that, manufacturer supplier information sharing (MSIS) plays a major role in the formation of OBOR supply chain performance. A moderated mediation model and Game theory [11] approaches elaborate the empirical evidences regarding the information sharing and market intelligence responsiveness that positively impact firm performance via operations capabilities. An increasing number of academic literature [12] have been conducted to improve the understanding between the approaches of game theory and MSIS, which further effects the performance of OBOR supply chain. Regarding OBOR empirical studies [13, 31] results in the existing literature that remain largely inconclusive. The presence of potential mediators and moderators in the information-sharing performance influences the impact of MSIS which develops a relation with the OBOR supply chain. However, dynamic capability theory and game theory revisits the important link between supply chain performance and MSIS that is somehow, sufficient to improve firm performance. Ordinary or advanced capabilities affect the factors of information sharing that are required by the suppliers in generating the

road to gain competitive advantages through OBOR supply chain performance. OBOR leverages from the supply chain performance and supply chain management however, in other studies operations capabilities have been widely regarded not only as key outcomes of information sharing, but also as significant antecedents firm performance. Thus, the following hypothesis is proposed:

H1: Manufacturer supplier information sharing has a significant impact on OBOR supply chain performance.

2.3. Manufacturer Buyer Information sharing and its impact on OBOR supply chain performance

According to past studies by [14], that shows the theoretical perceptions about the affectivity of manufacturer buyer information sharing that directly influence the performance of OBOR supply chain for the purpose to maintain firm capabilities as well as operational capabilities that will somehow increase the role on contingencies that may influence how information sharing effects firm performance. Information sharing travels from manufacturer buyers to the supply chain management teams who are responsible for having market knowledge regarding the value and merits of the productivity of goods and services. Manufacturer buyers correspond to the game or moderating theory that represents the market orientation as the key source of applying market intelligence responsiveness. Studies by [15], elaborate the role of manufacturer buyers in the development of information sharing because of which firm will react proactively and effectively to the external environment, taking such forms as designing and producing products that cater to customer needs. Buyers information sharing has to cater the needs of customers, management and market based knowledge. [16] believe that information sharing with respect to OBOR supply chain performance particularly; rely upon operational capabilities and firm performance. [17] Logistic approaches under the coherence of OBOR initiatives processed the use of logistic flaws to apply three layer of supply chain framework, to further evaluate the concept of manufacturer buyer information sharing along with its impact on OBOR supply chain performance. Manufacturer buyer information sharing is basically composed of mass customization

which includes mass customization approach and its product design, mass customization therefore develops a technique of proper production planning to control technology which further influences the effect of manufacturer buyer on OBOR supply chain performance. Thus, the following hypothesis is proposed:

H2: Manufacturer buyer information sharing has a significant impact on OBOR supply chain performance.

2.4. Mediating Role of Dynamic Manufacturing Capability between Manufacturer supplier information sharing and OBOR supply chain performance

According to recent studies by [18], there are different types of potential mediators that work to support manufacturer supplier information sharing in the process of firm performance and operational capabilities. However, mediating role of dynamic manufacturing capabilities directly affect the performance of supplier information sharing through using latest technology or IT techniques that further highlights the impact of information sharing and dynamic manufacturing capabilities on the improvement of supply chain performance. Studies by [19] explain the concept of the theoretical background regarding game and moderating theory with the help of four operational models that facilities the suppliers and provides proper channels as well as techniques through which information can be shared regarding firms, productivity, organization and information-sharing operation capabilities. According to different literatures by [20], that elaborates the factor information sharing while suppliers are used as the tool for manufacturing information sharing, suppliers usually promotes the logistic algorithm industry that focuses on the activity of information sharing, with the help of the mediator. Dynamic manufacturing capabilities drives the performance of firms, organization and supply chain to attain fruitful results, while contributing efficiently in the field of information sharing along with the manufacturer supplier. According to past literature [21], Dynamic capabilities related to manufacturing industry consider itself the part of game theory to deal easily with the supply chain coordination problem. Whereas, the combination of sustainable supply chain management (SSCM) with the dynamic

capabilities are considered one of the most young and latest topic, on which researchers are still searching, it also attracts many scholars, theorists and analysts towards itself, for further study. However, the presence of dynamic capabilities [22] is essentially required for enterprises performance as well as for manufacturer supplier information sharing. Furthermore, it also highlights the influence of dynamic capabilities over both the variables especially OBOR supply chain performance. Thus, the following hypothesis is proposed:

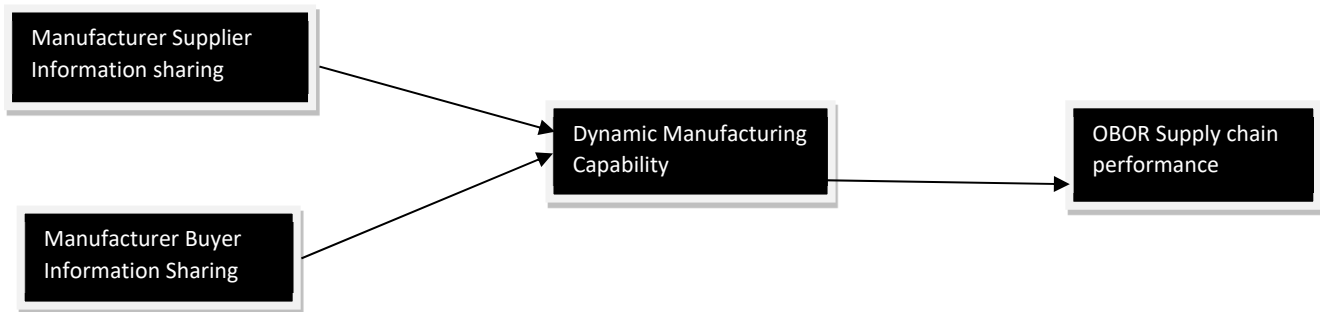
H3: Dynamic manufacturing capabilities have a significant mediating role between the relationship of manufacturer supplier information sharing and OBOR supply chain performance.

2.5. Mediating Role of Dynamic Manufacturing Capability between Manufacturer Buyer information sharing and OBOR supply chain performance

Scholars like [23], figures out the role of the mediator of dynamic manufacturing capabilities within the manufacturing sector of organizations or developed enterprises that further influence its role on two variables that includes manufacturer buyer information sharing and OBOR supply chain performance. Theorists [24], believes that moderating ground of theories and models provides a huge platform for the functioning and practicing of dynamic manufacturing capabilities to influence the environmental performance along with economic strategies. However, it is considered that performance of dynamic manufacturing capabilities usually take place in the developed countries where they can easily take care of buyer information sharing at manufacturing level and also at the level of OBOR supply chain performance. Researchers like [12] analyze the performance and capabilities of manufacturer buyer information sharing after the effect of the mediator performance. They find out that SCM does not play a Vitol role in maintaining the sustainability of social and economical performance, however due to the presence of enterprises value and performance, dynamic capabilities widely mediate between the two existing variables related to the study. To comprehend, a cultural environment within an organization for the betterment of the buyers while, this type of set up of culture will make it easy for the information to travel

from the employees to the suppliers and then to the buyers. Dynamic capabilities [26] also play an important role in following the leadership criteria to enhance the performance of OBOR supply chain and buyer manufacturer information sharing. Thus, the following hypothesis is proposed:

Model:



3. Research Methodology

3.1. Population and Sample Selection

In this research study, researcher examined the role of dynamic manufacturing capabilities in relationship among information sharing and OBOR supply chain performance. Researcher has been selected manufacturing sector of Thailand as a population of this research study. Top rated manufacturing industries of Thailand such as food manufacturing, automotive and electronic industries have been chosen as a sample of this research study because these industries implement dynamic manufacturing capabilities to ensure the better performance of OBOR projects. Researcher selected the managers of these industries as respondents because they were responsible for operations of whole company and they were knowledgeable about inter-firm information sharing, operations capabilities and firm's performance. The main issuing point in sampling is sample size because previously researcher used small sample size but [12] reported that sample size has to be large while using covariance-based SEM approach in research analysis. Researcher used idea of [13] for the sample size selection, which elaborates that number of questions*10 provide with accurate sample size. 300 questionnaires have been distributed among the respondents, after the data collection procedure only 294 valid responses has been collected.

H4: Dynamic manufacturing capabilities have a significant mediating role between the relationship of manufacturer buyer information sharing and OBOR supply chain performance.

3.2. Data collection procedure

Data collection method has been used in this quantitative study is questionnaire. Questionnaire helps in collecting primary data and numeric data which can easily be analyzed statistically. In order to conduct a survey, researcher used closed ended question which clearly related to the items of this study. Researcher conduct the pilot study, in which he or she includes 25 respondents and feedback has been collected from them about the understanding of the items of the study. If respondents shown negative feedback to some specific items, researcher immediately change it according to the feedback. Afterwards, language and content validity of scale have been checked before finalizing the questionnaire. Questionnaire has been administered by using both techniques such as online and self-administered questionnaire.

3.3. Measurement Model

In the measurement model, analysis of reliability and validity has been performed through SPSS and AMOS respectively. For the assessment of reliability, two criteria have been examined such as composite constructs and Cronbach's α , both of them has to be greater than 0.70 [21]. Because satisfactory level of internal consistency and desirable level of items reliability have been achieved if its values were exceeded than specific limit. Coming towards assessment of validity, convergent validity has been

assessed by observing the criterion which states that AVE has to be greater than 0.50 because its values were stronger above the 0.50 [27]. As far as the discriminant validity between constructs is concerned, it has been assessed by examining the criterion which entails that square root of AVE has to be compared with the inter-correlated coefficients of remaining constructs. According to [23], its values have to be exceeded as they compared with other correlated constructs.

Risk of common bias has been observed in this research study, as the respondent used similar subjective measures in this study which has been recommended by common rater [29] for explanatory and dependent variables. Variables have been assessed in this research study are manufacturing supplier information sharing, manufacturing buyer information sharing, OBOR supply chain performance and dynamic manufacturing capability. In order to test the existence of common bias in this research study, Harman's single factor test has been conducted. In this test, all the variance of constructs has been included and researcher checked whether most of variance of the construct accounted for by one factor or not. Because if the 50% of variance interpreted by single factor than common bias existed otherwise not existed. Test results shown that 89% of variance accounted for by multiple factor and 19% of variance accounted for by single factor. Consequently, researcher has ensured inexistence of common bias.

3.4. Hypothesis Testing

Hypothesis testing has been accompanied in order to check which hypotheses relationship is negative or which is positively related. Structure equation modeling has been used to conduct hypothesis testing and SEM has been run on AMOS. Further, AMOS used covariance-based approach in order to operate

the SEM. In this research study, hypotheses have been tested are impact of information sharing on OBOR supply chain performance, in mediating role of dynamic manufacturing capability. Direct, indirect and total effect and significance of influenced path has been examined in order to assess the acceptance or rejection status of hypotheses.

3.5. Measures

MSIS was measured from the scale of [21], and four items were taken to measure it on a five-point Likert scale, MBIS was measured by [22], with the modification according to the present study and these were also measured on a five-point Likert scale. DMC and OBORSCP were measured by four items on a five-point Likert scale by [23].

4. Empirical Results

4.1. Demographical Results

The study was conducted in Thailand and data was from 300 participants and the number of respondents was 294. The associations with the help of a self-organizational questionnaire were analyzed by using SPSS and Amos. It is very important to conduct the prerequisite analysis in order to check the reliability, normality, and validity of the data. The researcher applied the frequency distribution test in order to check the respondent profile. The findings showed that 114 males and 180 females participated in this study. 23 of the participants had graduation degree, 136 respondents had done post-graduation. Whereas, 125 respondents had master's degree and 10 had another degree. The participants included 224 people in age range 21 to 30 years, 49 people in age range 31 to 40 years, 19 people in age range of 41 to 50 years and only 2 participants were of age more than 50.

4.2. Descriptive Statistics

Table 1. Descriptive Statistics

	N Statistic	Minimum Statistic	Maximum Statistic	Mean Statistic	Std. Deviation Statistic	Skewness Statistic	Std. Error
MSIS	294	1.00	5.00	3.6122	1.06441	-.919	.142
MBIS	294	1.00	5.00	3.5946	1.05842	-.869	.142
DMC	294	1.00	5.00	3.3934	1.10472	-.461	.142
SCP	294	1.00	5.00	3.5774	1.12173	-.791	.142
Valid N (listwise)	294						

Table no. 1 is showing that there is no outlier in the given data as the maximum values lie in the threshold range of 5-point Likert scale, as the skewness value is somewhere between -1 and +1 which is the threshold

range of normality assumption and so the data is normal and is valid to go for further testing.

4.3. Rotated Component Matrix

Table 2. Rotated Component Matrix

	Component			
	1	2	3	4
MSIS1		.722		
MSIS2		.777		
MSIS3		.848		
MSIS4		.842		
MSIS5		.836		
MSIS6		.806		
MBIS1			.787	
MBIS2			.800	
MBIS3			.806	
MBIS4			.823	
MBIS5			.808	
DMC1	.806			
DMC2	.848			
DMC3	.892			
DMC4	.886			
DMC5	.897			
DMC6	.892			
SCP1				.800
SCP2				.837
SCP3				.839
SCP4				.823

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

The above table is showing the RCM values, almost all of the indicators are showing the factor loading more than 0.7, it means that all of the indicators are eligible to be added in the further hypothesis testing because all factor loadings are in suitable threshold

level and in a suitable and valid range. Moreover, there is no cross-loading data shown in RCM so, data is good to go for further testing.

Table 3. Convergent and discriminant validity

	CR	AVE	MSV	Max R(H)	DMC	MSIS	MBIS	SCP
DMC	0.960	0.801	0.264	0.967	0.895			
MSIS	0.943	0.736	0.382	0.979	0.494	0.858		
MBIS	0.927	0.717	0.383	0.984	0.514	0.568	0.847	
SCP	0.937	0.788	0.383	0.987	0.403	0.618	0.619	0.888

4.4. Convergent and discriminant validity

The results of convergent and discriminant validity show that the overall model is a good fit because the composite reliability of each variable is more than 70% and average variance extracted is more than 50% while the discriminant validity shows that

loading of each variable discriminates from others. Every variable has maximum loading with itself as compared to with others so these validities prove the authenticity of collected data.

Table 4. CFA

Indicators	Threshold range	Current values
CMIN/DF	Less or equal 3	2.295
GFI	Equal or greater .80	.885
CFI	Equal or greater .90	.964
IFI	Equal or greater .90	.964
RMSEA	Less or equal .08	.066

4.5. Confirmatory Factor Analysis

Table no. 4 is showing that CMIN is less than 3, GFI is greater than .80, CFI is greater than .90, IFI is greater than .90 and RMSEA is less than .08 so, all of

the indicators have the values in the valid threshold range so data is good to go for further testing. Following is screenshot of CFA:

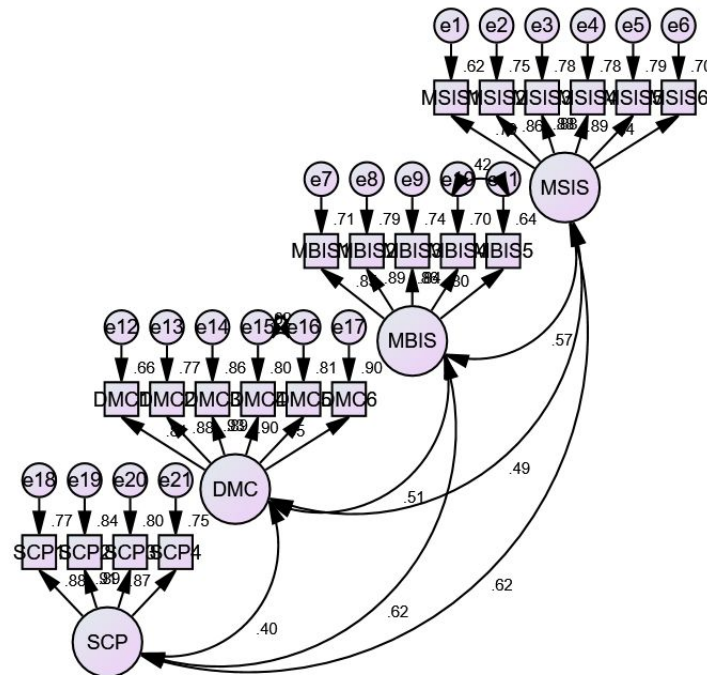


Figure 2: CFA

4.6. Structural Equation Modeling

Table 5. SEM

Total effect	MBIS	MSIS	DMC
DMC	.361***	.293***	.000
SCP	.364***	.399***	.538***
Direct effect	MBIS	MSIS	DMC
DMC	.361***	.293***	.000
SCP	.170*	.241***	.538***
Indirect effect	MBIS	MSIS	DMC
DMC	.000	.000	.000

Total effect	MBIS	MSIS	DMC
SCP	.194**	.158**	.000

Total effect of MBIS is 36.1% and 36.4% on DMC and SCP respectively. The impact of MSIS is 29.3% and 39.9% on DMC and SCP respectively. The impact of DMC is 53.8% on SCP. Directly, MBIS has 36.1% and 17% impact on DMC and SCP

respectively. MSIS has 29.3% and 24.1% impact on DMC and SCP respectively. DMC has 53.8% impact on SCP. MBIS has 19.4% impact on SCP and MSIS has 15.8% impact on SCP so SCP will increase by 15.8% with 1 unit increase in MSIS.

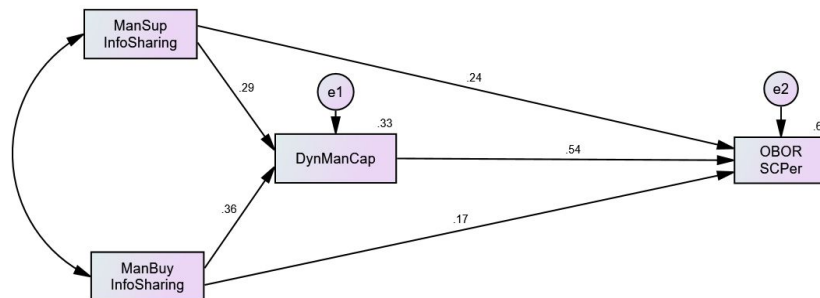


Figure 3: SEM

5. Discussion and Conclusion

5.1. Discussion

The aim of this study was to know about the effect of manufacturer supplier information sharing (MSIS) on OBOR Supply chain performance (OBOR-SCP). Another aim was to know about the impact of Manufacturer buyer information sharing (MBIS) on OBOR Supply chain performance. This study took dynamic manufacturing capability (DMC) as a mediator so the impact of MSIS and MBIS was studied on DMC and then the impact of DMC was studied on OBOR-SCP [27]. The detailed literature review of this study proposed some hypothesis that was exposed to testing techniques and gave out the outcomes that will be discussed in this section. The first hypothesis suggested in this study was that “MSIS has a significant impact on OBOR-SCP.” This hypothesis is accepted according to the past evidence provided by X Liu and K Zhang that OBOR-SCP focuses on improving connectivity and cooperation of the supply chain among multiple countries and this improves the performance ultimately, this OBOR-SCP can be smoothly regulated by the implementation of MSIS system [28]. The second hypothesis suggested was that “MBIS has a significant impact on OBOR-SCP.” This hypothesis is accepted as well as famous researchers X Feng and K Pang concluded that manufacturer and

buyer alignment and integration impact the OBOR-SCP system very significantly and positively. The third hypothesis suggested was that “DMC significantly mediates between MSIS and OBOR-SCP.” This hypothesis is accepted as well because of YT. Lin and YH. Hsieh in their Sustainability report showed that, because of the increase in DMC, OBOR-SCP increases so does the MSIS so it can be stated that all of these variables have got a positive relationship between the [29]. The fourth and the last hypothesis suggested that “DMC significantly mediates between MBIS and OBOR-SCP.” This hypothesis is accepted as well as in the research paper of R. Shretta, B. Johnson and L. Smith about improving performance of the firm it was stated that, when MBIS increases the DMC also increases that causes a significant and positive change in the OBOR-SCP.

5.2. Conclusion

This study was conducted in Thailand. The sample number that was selected for the sake of data collection was of three hundred people. Data was collected from three hundred people of Thailand, 294 responses were valid and the Purposive sampling technique was used in this research, the philosophy for this research was the positivist philosophy, the study used deductive approach, in this study the

researcher used the quantitative method because researcher dealt with results in numeric form. This study was also conducted one time only that was the reason that cross-sectional time horizon was used. Then the researcher performed different tests like reliability, correlation, regression, confirmatory factor analysis, and structured equation modeling by using SPSS and AMOS. The results then concluded that MSIS and MBIS have a significant impact on OBOR-SCP and DMC significantly mediates between these variables.

5.3. Implications of the Study

This study has its implications in the manufacturing sector of not only Thailand but anywhere in the world as the results are generalized for the whole world as it was a general problem. The study also has increased valuable material in the literature about the variables like DMC, MSIS, and MBIS. The study purposed that MSIS and MBIS should be applied for successful OBOR-SCP system.

5.4. Limitations and Future Research Indications

Future researchers are encouraged to conduct the same research by taking a larger number of sample and a different sector to conduct the research. Future researchers are also suggested to conduct the same research by taking a different mediator such as supply chain agility and perform the research by both qualitative and quantitative methods to increase accuracy.

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