Can Big Data Benefits Bridge Between Data Driven Supply Chain Orientation and Financial Performance? Evidence from Manufacturing Sector of Thailand

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Abstract--- With the digitalization of industry, many of business operations depend upon the data which either support them or reject them due to versatile reasons. Such data has been managing through big data analytics now which has diverse benefits ranged from transaction to strategic benefits. However, their implication on financial performance of manufacturing firms in Thailand has stayed as grey area in literature. This study has aimed to analyze the impact of data driven supply chain orientation on financial performance in manufacturing firms of Thailand in mediating role of transactional, transformational, strategic and informational benefits of big data. Almost 42 manufacturing organizations have been surveyed in this regard which were currently engaged in big data operations and data has been collected from their employees through questionnaire. SEM and CFA were run to analyze the data to analyze hypotheses and model fitness respectively. Results have depicted that data driven supply chain significantly enhances financial performance through big data benefits and also in its direct path too. This study can help manufacturing firms in Asia to incorporate big data analytics in their manufacturing systems to ensure good financial health.

Key Words: *Data Driven Supply Chain, Big Data Benefits, Financial Performance, Thailand and Manufacturing Sector*

1. Introduction

Financial performance means how well an organization is utilizing its assets to generate profits. It is the financial condition of any organization at a given period of time [1]. Financial performance can be estimated by using profits, revenues and sales etc. of an organization as well as the financial statements of the company. All the people associated with the company such as its stakeholders, suppliers, distributors etc. have their interests in financial performance of the company [2]. They usually use annual report of the company for estimating its financial performance. This annual report is based on 10K and includes three basic financial statements i.e. balance sheet, income statement, cash flow statement of the company [3; 35].

Data driven supply chain orientation can be used to for providing value to customers, measuring performance and maintain competition in the market [4, 29]. Big data can be described by using 5V technique which includes volume, variety, velocity, veracity and value. Volume refers to the size of data, variety refers to the different sources of data, velocity means how often and how swiftly it is transmitted, veracity involves the quality and trust level of data and finally value shows that how much economic value a particular data has. Data driven supply chain orientation DDSCO can be defined as the use of big data in different business practices for the improvement of supply chain performance [5]. Big data has become very important in business sector because it helps in decision making process and increase in performance of the company. Big data from large number of customers helps companies to estimate the needs and wants of costumers and then they act in such a way that the costumer is

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completely satisfied [6]. Big data is used to know certain product manufacturing processes, customers and suppliers and help to build better relationships with them to increase the efficiency and effectiveness of any company. Several studies have shown the importance of using big data for the betterment of supply chain capabilities [7].

Figure 1: Benefits of Big Data

Figure 1 shows the benefits of big data that can be used to improve the performance of an organization. Big data benefits include transactional, transformational, informational and strategic benefits [8]. Transactional benefits refer to the increase in productivity and growth. We can say that bid data helps organizations to meet their goals efficiently by reducing operational costs and increasing revenues and profits. Strategic benefits mean that the organization make certain strategies and policies to improve their business practices and supply chain performance [9, 30]. Big data helps in managing all the information effectively and thus the internal processes of any organization gain sustainability. Moreover, it also helps the organizations to deal with unexpected changes in the business environment. Transformational benefits help businesses in adopting new technologies and innovative business practices [10]. This process need new machinery and new technical staff, so big data helps them in in collecting information about these people and new technology. This improves the supply chains performance and ultimately the company's performance. Big data can also create new business opportunities between different companies and may also employees'

performance. Last benefit, informational benefits involve data management, safe data transfer and careful data handling by the employees. Big data is very beneficial for this purpose [11].

Data driven supply chain orientation can be used to improve financial performance of any organization by utilizing certain benefits of big data [12]. This not only increases the productivity of an organization but also improve its profit levels, which ultimately improve the financial performance of an organization. In Thailand manufacturing sector, unfortunately the big data is not used that much which directly affects the financial performance of organization [13]. The organizations of other developing and under developed countries that do not get enough benefit from big data are also not showing any better financial performance. This issue has dramatically decreased the productivity on macro level which is not in best interest of the company. If this problem is not solved soon, it will cause more difficulties for the country's economy [14]. So it is very important to start using big data to get enough benefits from it and use them in the organizations to improve its financial performance and productivity. There are several studies that have shown the impact

of DDSCO on the financial performance of an organization but no study has given the mediating role of big data benefits between DDSCO and financial performance. A research paper has recommended, thus, studying the mediating role of big data benefits between DDSCO and financial performance [15]. The main objectives of this research paper are as follows:

- Analyze the significant impact of DDSCO on financial performance in manufacturing sector of Thailand
- Analyze the significant mediating role of big data benefits between DDSCO and financial performance in manufacturing sector of Thailand
- Analyze the significant mediating role of transactional, transformational, informational and strategic benefits of big data between

2. Literature review
2.1. Theory of principles for financial theory

Study by [18] suggest the complementary assisting framework that draws theoretical concepts regarding the availability of data driven supply chain (DDSC) and accountability of financial performance (FP). To develop a connection between these two variables, manufacturing sector of different business firms are taken to evaluate the framework of these two variables more precisely and justly. Using moderating regression analysis to understand the effect produced by the process of DDSC which has the capability to indicate the performance of DDSC along with FP in the process of innovation function. Early development in information and communication technologies have empowered the data driven collection and storage for the purpose to drive improvement in performance and market capabilities to gain new market and business insights. There are multiple features of finance that further embellishes financial performance such as: it includes investment opportunities, profitable opportunities, optimal mix and fund, system of internal control and future decision making particularly. These features of FP are designed in such a way that it gives rise to a theoretical base, highlighting various theoretical models and theories regarding the function of DDSC and FP. The theory of Principles [19] for financial theory is a theory that

DDSCO and financial performance in manufacturing sector of Thailand

Big data industry in Thailand will have 16.4% growth expected from last year. In addition, big data is going to have much importance in the future in the manufacturing sector of Thailand as a survey has reported that 70% of companies that are not using the big data benefits are planning to use them in near future [16]. This shows the importance of big data in Thailand manufacturing sector. Theoretical significance includes that several researches have been conducted for the study of big data usage and financial performance of industries [17]. These researches have helped the manufacturers to understand the importance of big data and its adoption. Govt. is also taking keen interest in this regard for the improvement in financial performance of manufacturing sector of Thailand.

contributed in the theories of markets, business promotions, and promoted efficient use of the limited resources and competitive advantage. This theory set out the accounting standards referring to the performance of DDSC for the economic fluctuations in the market environment. However, financial accounting theory is divided into three theories of 1) Public interest, 2) Capture theory and 3) Economic interest theory; these are the typical theories that benefit the growth of FP along with the effect of DDSC. The Principle theory defines the concepts of financial analysis that develops a relationship between decision making and ultimate business survival. In carrying out financial analysis great part is being played by shareholders, customers, retailers and business management teams to promote the effectiveness and productivity of business in the relevant market. The principle theory provides the articulation of certain rational frame of references to be used for the improvement, maintenance and development of accounting standards who act along the standard setting procedures, for further setting up of a frame of market orientation.

1) Data Driven Supply chain and its Relationship with Financial Performance

As per past studies by [14] there is always a link present between the function and performance of DDSC and FP. Big data collection often relates itself with supply chain performance to operate within the sight of supply chain management. However, there is

little research papers available to understand the basic link between DDSC and FP which could show its effect on business performance, therefore principle theory determines the two variables while connecting them through complementary asset framework (CA). This framework develops on the resources which build on the resource-based view of the firm. Basic functions of DDSC depends supply chains, big data applied, improving profit rate and enhancing revenues for creating competitive advantage. Supply chain operations play a unique role in connecting the two variables together via strategic contribution of assets between DDSC and FP. DDSC promotes the setup of FP because it creates various circumstances through which DDSC contributes to the firm financial performance [6]. For capturing benefits contingency plays a major role of innovation-focused complementary assets that promotes the reliability of capability and resources that are prominently, associated with primary assets. DDSC gain a lot of private competitive advantages to drive competitive environment firms so that they can increase the level of financial performance. The insight study of primary assets and innovation assets which can make managers of the firms realize about the improvement of financial performance related to firm capabilities. Studies believe that DDSC does contribute to the financial performance improvement with the help of firm performance, supply chain management, improvement in quality of products, and utilizing the innovation and primary assets for manufacturing firms. Various theoretical and practical arguments are being tested in order to find out the role of CA in the development of the relationship between DDSC and FP. Thus, the following hypothesis is proposed:

H1: Data driven supply chain has a significant impact on financial performance.

2) **Mediating Role of Transitional Benefits between data driven supply chain and financial performance**

According to researchers [20], transitional benefit prioritizes the effect of DDSC and FP. Transitional benefits are changing with the time due to change in customer demands with the passing time. DDSC and big data capabilities has to satisfy their customers by transiting their demands according to demand planning strategies by collecting, documenting and analyzing the latest required objects, products and customer needs related to real time data in a real

situation. Moreover, digitalized data accessibility has the potential to generate lower costs product, reduce manufacturing time and increase the rate of product availability. Transition process can benefit both the aspects related to business performance and completive advantage through the process of DDSC [21] which will further enhance the financial performance of the market highly, depending on the customer demands. It is considered through the transitional benefits that digitization enhances the affectivity of supply chain including supply chain management, including agility performance and responsive sharing of knowledge while collaborating with complex supplier networks. This supplier network if develops, it can drive big data and DDSC as per the situation of the market and customer requirement, which will gradually increase the level of financial performance keeping in view the accessibility of big data application in the transitional processing. Thus, the following hypothesis is proposed that:

H2: Transitional benefits have a significant mediating role between the relationship of DDSC and Financial performance.

3) **Mediating Role of Informational Benefits between data driven supply chain and financial performance**

Studies by [22] who analyzes the effect of informational benefits on the supply chain, so that the researchers can clearly investigate about the real-time information benefits on data driven supply chain and FP. Due to rise in automatic supply chains related to manufacturing sectors of different organizations and firms which particularly benefits the emerging technology and enhances the concepts of big data capabilities. The theory of principles for financial theory reflects the idea of global supply chain that works on the aspects of demand planning and production programs that eventually gives rise to DDSC which simultaneously enhances the impact of a mediator on FP. Suppliers and managers are majorly benefitted by the introduction of latest information technology in an organization, because this can make their work more easy however, which can help them in gaining competitive advantages within the logistics and supply chain. Informational sector benefits the transportation management and customer relations to make it more agile than ever before, so that DDSC and FP can easily adapt

themselves to the changes made in the manufacturing sector of business processes, to run more smoothly and work efficiently. Thus, the following hypothesis is proposed:

H3: Informational benefits have a significant mediating role between the relationship of DDSC and Financial performance.

4) Mediating Role of Transformational benefits between data driven supply chain and financial performance

Studies by [23] believe that supply chains are driving the transformational benefits from DDSC application to financial performance capabilities under the process represented by theory of principles. This theory develops a platform for the function and performance of transformational activities, technology and knowledge from one source to another. Supply chain can be transformed from backwater to the center stage. It has gained its position in the business manufacturing sector that manages the supply chain operation apart from the critical factors. Literature guides the researcher about the development and transformation of supply chain that leads toward the process of aligning retail and supply chain planning with the proper business strategies as well as well managed business strategic goals, going all the way to technical implementation of demands and resources. Transformation in supply chain, brings it to the level of management systems and which enhances the value and effect of DDSC on the FP with the help of transformational benefits [24]. It is the function of successful transformational approach that it seeks to align the supply chain with the company's overall performance, aims and goals. Contribution of CA in the transformational success can improve the forms of DDSC along with the big data which will further improve the affectivity of financial performance. Thus, the following hypothesis is proposed that:

H4: Transformational benefit has a significant mediating role between the relationship of DDSC and Financial performance.

5) Mediating Role of Strategic Benefits between data driven supply chain and financial performance

Studies by [25] suggest the function of big data that has become available to almost every sector and function of the global economy. Rise in global economy causes a rise in the involvement of strategic benefits within the environment of DDSC and FP that supports and enhances the value, quality, orientation, accessibility of market functions, therefore which enhances firm age/size and firm ownership. Strategies and approaches develop with the internal or external culture of the business environment. Firm productivity and performance both depends on the function of strategic plan, if the plan is organized well then, it might cause development of productivity and growth rate, however if strategic plans are not well developed or not well maintained then it might cause decline in the productivity and growth rate of the product. Strategic plans easily benefits the application of big data along with DDSC performance which further collaborates with the performance of financial and economical growth rate. Supply chain visibility technologies develops due to proper strategic planning and orientation which accelerates the cost of data storage as well as the involvement of computational performance along with the capabilities. This computational capability enables productivity improvement which directly causes dramatic improvement in customer satisfaction. These suitable circumstances are produced by strategic planning which benefits firm's performance along with DDSC and FP. Thus, the following hypothesis is proposed that:

H5: Strategic benefits have a significant mediating role between the relationship of DDSC and financial performance.

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Model
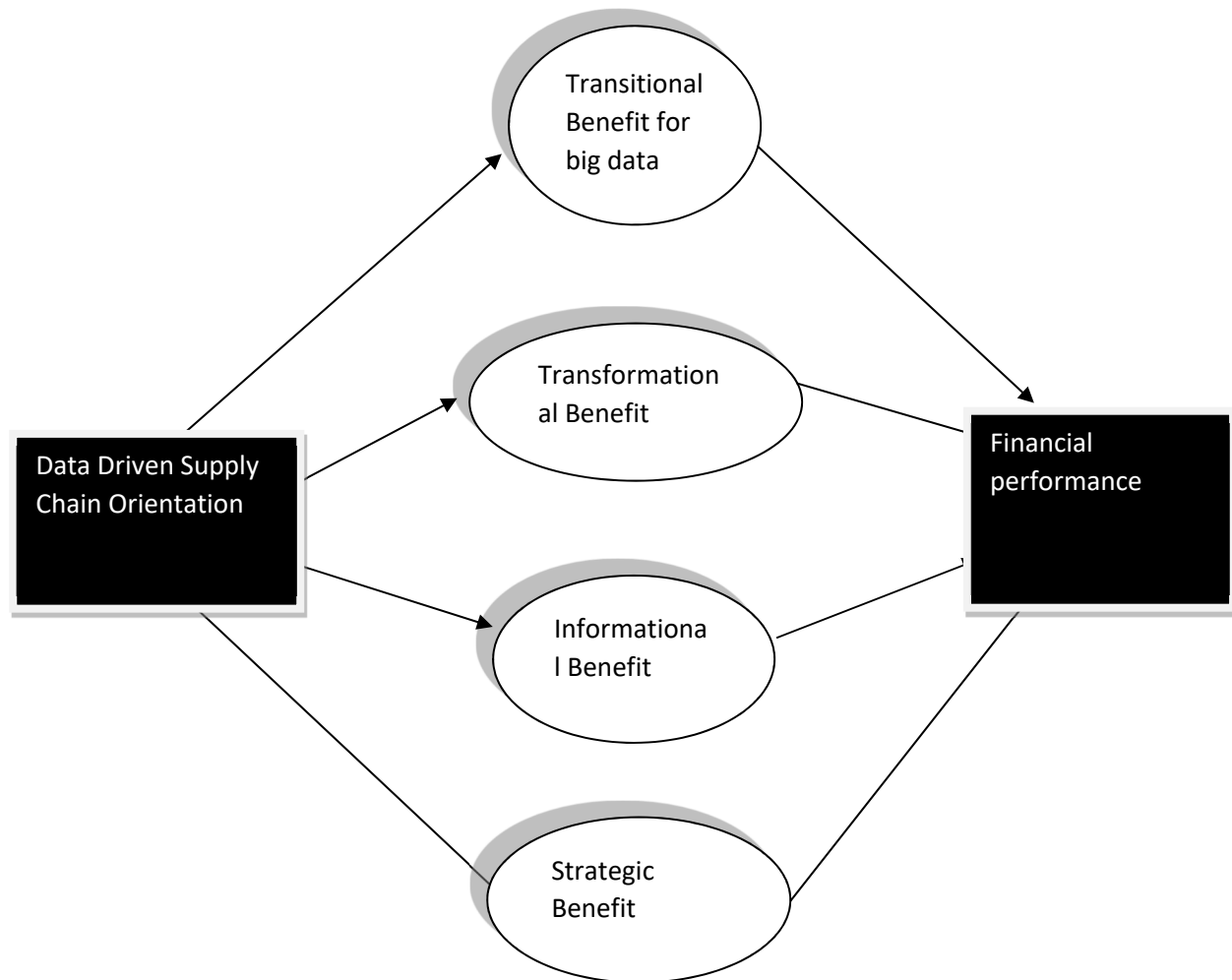
3. Research Methodology
3.1. Population and Sampling
The target population for this research study is manufacturing sector of Thailand, in this sector researcher observed whether the big data benefits influence the relationship between data driven supply chain orientation and financial performance. Researcher has been selected automotive, electronics and agriculture industries because these were top rated industries and major contributor of the Thailand economy that's why their financial system and data driven supply chain has to be well developed and documented. Researcher has been collected the data from the managerial employees about the integration of transformational, transactional, informational and strategic big data benefits in the relationship of supply chain and financial performance. In sampling,

researcher has to be critical while selecting sample size because according to the (Hazen et al., 2015), researcher has to select the large sample size while using SEM approach in analysis. Researcher has been selected the sample size on the bases of formula such as number of questions*10, which has been represented by (Klein, 2015). In this study, 300 questionnaires have been distributed among respondents but due to the missing values and invalid responses, 292 responses has been considered valid.

3.2. Data Collection Techniques
Data collection method which researcher has been used for this research study is questionnaire. Because numeric data can easily be analyzed statistically and researcher can report the results in graphic form through which significance of relationship can easily be understood. Before finalizing the questionnaire,

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content validity of scale has to be checked and it has been ensured that language of questionnaire must be Thai which the managerial employees of Thailand companies can easily understand. Researcher Reliability and validity have been assessed through SPSS and AMOS respectively. As far as validity is concerned, both discriminant and convergent validity have been assessed through AMOS but to examine it different criteria have been used by researcher. For convergent validity, three criteria have been used such as (1) items loading (λ) has to be greater than 0.70, because its values were strong at above 0.70, (2) composite constructs reliability which has to be exceed the specified value 0.80 and (3) average variance reliability (AVE) , its threshold range is greater than 0.50. Coming towards discriminant validity, criteria has been used entails that AVE must has to exceed when compared with all other constructs [11]. Reliability has been assessed through SPSS and it examined by the criteria which states that Cronbach's α must has to be greater than 0.70 because its values were strong at 0.75 or above this value.

Common bias method has been conducted when respondent measure all the variables of study by using similar measures which has been recommended by common rater [13]. Every study has different dependent and explanatory variables and have to be measure differently. Set of variables used in this study consist of data driven supply chain orientation, big data benefits and financial performance. Harman's single factor test has been used by researcher to minimize the risk of common bias, exploratory factor analysis and confirmatory factor analysis have been performed under this test. In EFA, developed by and five items were taken which were measured on a five-point Likert scale.

4. Empirical Findings

The current study was about the investigation of the impact caused by Data driven supply chain orientation (DSO) on financial performance along with the mediating roles of transformational, transactional, informational and strategic benefits of big data. The data collected through questionnaires was put into analysis in which the "demographic analysis, descriptive analysis, suitability analysis, convergent and discriminant validity, CFA and SEM" were performed to conduct the analysis of the current

administered the questionnaire through online questionnaire for the convenience of employees.

3.3. Reliability, Validity and Common Bias

researcher checked whether all the constructs accounted by single factor but results report that different factors have been used for the interpretation of constructs. 87% of variance accounted for by factor solution and 13% of variance accounted for by one factor. CFA has been used in order to confirm the absence of risk.

3.4. Hypothesis Testing

Structure equation model has been used to test the hypotheses relationship; it has been run on AMOS. Covariance based approach has been used by AMOS in order to run the diagnostics of structure equation model. In this study, researcher has tried to see the impact of data driven supply chain orientation on financial performance in mediating role of big data benefit in structure equation model. Direct, indirect and total effect and relative significance of relationship have been used to assess the acceptance or rejection status of hypotheses of this study.

3.5. Measures

DDSCO was measured with the scale developed by [11], with the help of five items that were taken on a five-point Likert scale. Then TTBBD and TFBBD were assessed by the scale developed by the researcher [12] and here four items were taken on a five-point Likert scale and were assessed. FA was measured by a scale developed by [13], four items were taken and measured on a five-point Likert scale. Finally, IBBD and SBBD were measured by the scale

data. The total acceptable responses received from respondents were 292 in number because the responses with missing value and blank responses were eliminated from the analysis. Out of 292 acceptable responses, 190 were filled by females and 112 were filled by males. Among 292 respondents, 136 were post-graduated and 123 were Master degree holders. Among 292 respondents, 23 respondents were graduated while remaining respondents have other educational backgrounds. The age of 230 respondents was ranging from 21 to 30 years and the

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age of 42 respondents was ranging from 31 to 40 years. There were 18 respondents whose age was ranging from 41 to 50 years while only 2 respondents were of age greater than 50 years.

The descriptive analysis of the current study revealed the acceptability and adequacy of the data through key indicators i.e. "mean value, minimum value, maximum value, standard deviation, and skewness".

Table 1. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
DSO	292	1.00	5.00	3.5849	1.11042	-.806	.143
TBD	292	1.00	5.00	3.6067	1.06595	-.909	.143
TRBD	292	1.00	5.00	3.5882	1.06477	-.860	.143
IBD	292	1.00	5.00	3.6116	1.07224	-.881	.143
SBD	292	1.00	5.00	3.4646	1.12501	-.556	.143
FP	292	1.00	5.75	3.4050	1.04791	-.292	.143

The mean values of DSO, FP, TBD, TRBD, IBD, and SBD are all falling between their respective minimum and maximum values that are 1 and 4 respectively. Not a single mean was less than 1 and more than 5 so, there is no abnormal value in the current data of any of the variable. The value of skewness is showing that not a single variable showed skewness less than -1 and more than +1 so, the normality of the current data has been proved

Table 2. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.942
Bartlett's Test of Sphericity	Approx. Chi-Square	8943.526
	Df	435
	Sig.	.000

The results of KMO are further proving the suitability of the data because the value of KMO for the current data is more than 0.6 as it is 0.942. Hence, the current data is normal, adequate, and suitable for analysis.

The Convergent and discriminant validity of the current data was assessed by checking the multicollinearity and internal consistency of the data in which the AVE, MSV, CR and correlations were mainly overlooked to decide the respective validity. Table 3 depicts the discriminant and convergent validity of the data.

Table 3. Discriminant and convergent validity

	CR	AVE	MSV	SBD	TBD	TRBD	IBD	FP	DSO
SBD	0.962	0.807	0.472	**0.898**					
TBD	0.944	0.737	0.402	0.508	**0.858**				
TRBD	0.917	0.734	0.378	0.505	0.576	**0.857**			
IBD	0.941	0.761	0.386	0.461	0.552	0.577	**0.872**		
FP	0.894	0.678	0.472	0.687	0.570	0.515	0.474	**0.824**	
DSO	0.949	0.789	0.402	0.401	0.634	0.615	0.621	0.417	**0.888**

The AVE of DSO, FP, TBD, TRBD, IBD, and SBD is more than 0.5 and CR for all of them is greater than 0.7. The CR is confirming the reliability of data of all these variables while AVE is confirming the discriminant validity of the data. The value of MSV less than AVE for all variables i.e. DSO, FP, TBD, TRBD, IBD, and SBD proves the convergent validity of the data. Furthermore, each variable has highest correlation with itself than its correlation with any other variable. It means that the convergent validity has been proved in the data.

The CFA test and its key indicators have been presented in table 4 that depict the model fitness of the data.

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Table 4. CFA

Indicators	Current values
CMIN/DF	2.200
GFI	.836
CFI	.947
IFI	.947
RMSEA	.064

The value of RMSEA for the current model is 0.064 which is less than 0.08 and the values of CFI and IFI both are greater than 0.90. Furthermore, the value of GFI is more than 0.8 and the value of CMIN/DF is less than 3. Hence, the results of CFA are confirming the good model fitness of the data. Figure 1 further clarifies the CFA of the current variables.
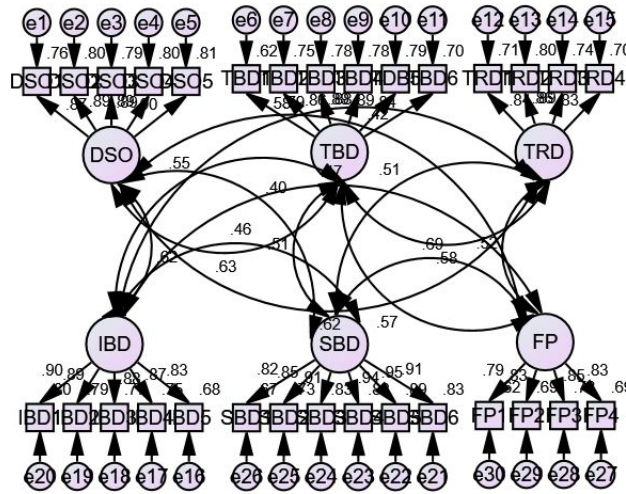

Figure 1: CFA

The hypotheses were tested by running SEM on the current data through which the direct, indirect and total effect were computed. Table 5 shows the results of SEM.

Table 5. SEM

Total effect	DSO	SBD	IBD	TBD	TRBD
SBD	.387***	.000	.000	.000	.000
IBD	.593***	.000	.000	.000	.000
TBD	.613***	.000	.000	.000	.000
TRBD	.578***	.000	.000	.000	.000
FP	.411***	.487***	.086	.244***	.119**
Direct Effect	DSO	SBD	IBD	TBD	TRBD
SBD	.387***	.000	.000	.000	.000
IBD	.593***	.000	.000	.000	.000
TBD	.613***	.000	.000	.000	.000
TRBD	.578***	.000	.000	.000	.000
FP	-.047	.487***	.086	.244***	.119**

Total effect	DSO	SBD	IBD	TBD	TRBD
Indirect effect	DSO	SBD	IBD	TBD	TRBD
SBD	.000	.000	.000	.000	.000
IBD	.000	.000	.000	.000	.000
TBD	.000	.000	.000	.000	.000
TRBD	.000	.000	.000	.000	.000
FP	.458***	.000	.000	.000	.000

The reuslts of SEM are indicating that DSO has signficnat psotive impact on financial performance (p-value<0.01) but the direct effect of DSO on the FP is not equal to its total effect on FP. Through this inequality of the total and direct effect of DSO on FP revelas the presence of some indirect effect. This indirect effect is caused by mediators. The results of SEM are showing that there is signifncat mediation of SBD, TRBD and TRD between DSO and financial perofrmance however, there is no signficant mediation of IBD between DSO and FP because the p-value agaisnt this effect is >0.05. Hence, the signficnat positve impact of DSO on FP is proved and the signifcnat mediation of SBD, TRBD and TRD between DSO and FP is confirmed through results. Figure 2 provides the image of SEM revelaing the effects.
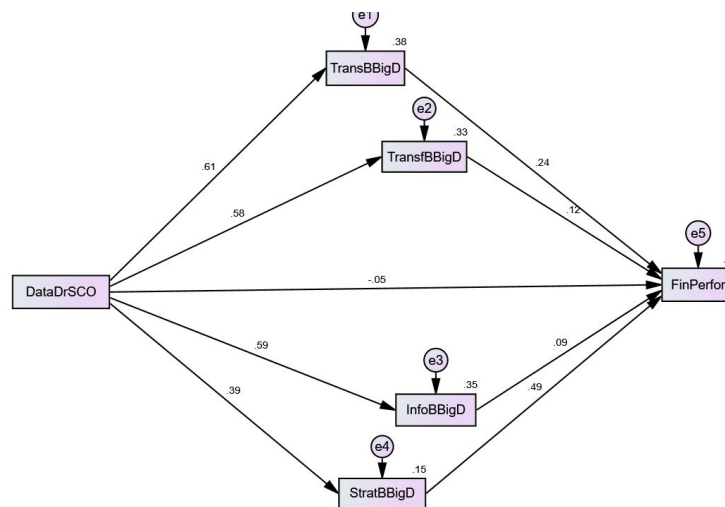

Figure 2: SEM

5. Discussion and conclusion
5.1. Discussion
The purpose of this investigation was to know about the relationship between Data-Driven Supply Chain Orientation (DDSCO) and Financial Performance (FP). The study was aimed to know about the mediating role of Big Data Benefits (BDB) like, Transactional Benefits of Big Data (TBOBD), Transformational Benefits of Big Data (TBBD), Informational Benefits of Big Data (IBOBD) and Strategic Benefits of Big Data (SBOBD) between (DDSCO) and (FP). This study stated the following hypothesis. The very first hypothesis suggested that the impact of DDSCO on FP is significant and positive. This first hypothesis was accepted. As per the published research of "Yu. wantao" and "Jacobs, Mark A" the DDSCO positively impact the organizational activities and automatically improved the financial position of the sector [26]. The second hypothesis was that there is TBOBD significantly, mediates between DDSCO and FP. This hypothesis was also got accepted. Because with the use of big

data the supply chain management and the financial performance of the company enhanced. The next hypothesis proposed was that TBBD positively mediates between DDSCO and FP. This hypothesis is accepted. According to the study of "Nitya Singh" Transformational benefits resulted in the improved supply chain data-driven capabilities and better FP [27]. BDB generates new capabilities for the firm that is why there is the positive mediating role of TBBD. The fourth hypothesis suggested that the important mediating role of IBOBD between DDSCO and FP. This hypothesis is accepted. According to the "Wantao Yu's" research, the survey gathered and analyzed different manufacturing sectors and concluded that the flow of information enhances the data which can prove successful for the organization [28]. The last hypothesis suggested that there is a positive mediating role of SBOBD within the DDSCO and FP. This hypothesis is also accepted. The study of "Min Shi, and Wei Yu" explained that strategic integration drives the organization towards performance by creating a positive relationship with supply chain management.

5.2. Conclusion

This study concluded that the aim of the study was to know about the association between DDSCO and FP. This research also has the aim to study the role of BDB on DDSCO and FP. The study was conducted in Thailand. The data was collected through a questionnaire by selecting a sample of three hundred people of manufacturing sector of Thailand, 292 people responded. The results of the research concluded that the relationship between DDSCO and FP is positive, BDB plays a crucial and significant role between DDSCO and FP.

5.3. Implications of the study

Our research has increased the data about DDSCO and FP. This research is a great addition to the literature material. People can get reliable data from this research. Our research has added additional information about the role of BDB between DDSCO and FP. With the help of this study, the manufacturing sector of Thailand can get knowledge about related problems discussed in this paper and can find a moderate solution to the problem. This study can help the government in making the policies. This study can be applied in any other

country has the same issues, because countries with the same issues must need to solve the problems.

5.4. Limitations and future research indications

This study was conducted in Thailand. This problem is worldwide so the study can be conducted worldwide as well. The study was conducted by selecting a sample of 300 people of manufacturing sectors of Thailand. Future researchers can do this research by selecting a large sample of the same sector. A large sample may help them in collecting more reliable feedback and suggestions about the problem. They can use different and more than one data collection tools because our research only used the questionnaire tool for data collection. Future researchers can take more than four BDB.

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