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Determinants of Company Performance with Supply Chain Risk Management as an Intervening Variable: Empirical Studies on BUMN Construction in Indonesia

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Abstract: *BUMN construction companies are required to be competent to maintain the quality of the company by having good performance. Due to the phenomenon of declining financial performance and the phenomenon of outsourcing, a system is needed which is a synergy between SCM and risk management, that is Supply Chain Risk Management (SCRM). This study aims to further explore the supply chain risks that occur in state-owned construction companies in Indonesia by developing a system that can control risk and play an important role in Vendor Trust, Contractor-Vendor Relationship and Top Management Involvement to measure company performance. The data collection was carried out using a survey method using questionnaires and interviews. Respondents were selected using the purposive sampling method, that experts on Indonesian BUMN construction projects using the Smart PLS analysis method. The results of the study concluded that Vendor Trust has no effect on Supply Chain Risk Management. This is related to the existence of Law No.2 of 2017 reinforced by Minister of BUMN No.08 of 2019 which regulates the readiness of database infrastructure and Vendor criteria. Based on this regulation, a Vendor Management System was created that applies ratings, sanctions and Blacklists to Vendors, if there are errors or even a shortage of Vendor expertise documents, Unverified will occur and the impact on billing to contractors will be hampered so that trust can increase mutually beneficial relationships in long-term partnerships hard to do. Contractor-Vendor Relationship and Top management Involvement influence SCRM. Vendor trust, Contractor-Vendor Relationship and Top Management Involvement influence company performance after being mediated by Supply Chain Risk Management.*

Keywords: Supply Chains Risk Management, Trust, Contractor Vendor Relationship, Top Management Involvement, and Company Performance.

1. Introduction

National construction service companies are required to be competent to maintain the quality of the company by having good performance. The construction services industry is an industry that includes all parties related to the construction process including professional staff, construction workers and suppliers who together meet the needs of industry players. Construction service companies have complex and varied risks so they always try to improve company performance by increasing productivity, efficiency, with good quality in order to survive and compete with similar companies (Zhao, et al, 2013). Complex risks in construction

companies are caused by uncertainty so that risk management is needed and must cover not only project risks, but also risks that will be faced by business companies in general (Schaufeberger, 2009).

The problem is how to manage the strategy to achieve cost efficiency so that financial measures are needed as a solution that is considered appropriate for measuring financial performance.

Table 1: Liquidity Ratio, Solvability, Leverage, Activity Average Cost Recovery Rate of Construction Companies in 2019-2021

Description	2019	2020	2021
Liquidity Ratio	1,193388	1,010107	1,167353
Solvability Ratio	0,461756	0,309194	0,341019
Leverage Ratio	0,740973	0,648274	1,822307
Activity Ratio	0,028824	0.000993	0,002564
Cost Recovery Rate	0,056517	-0,002053	-0,003942

If it's seen from a financial perspective, the performance of construction companies has a declining performance phenomenon because, "To finance its operations, companies need debt because the existing assets are very small to generate profits while getting new loans is very difficult and the income capability is very minimal". Based on this, performance measurement by looking only at financial aspects will not be sufficient because in the short-term financial performance may be used as a guide for management but not for the long term. For this reason, a measurement and the fast control system is needed, precise and comprehensive, which is derived from the company's vision and mission.

The phenomenon of declining financial performance in the construction industry, coupled with the phenomenon of outsourcing, the process of transferring work to third parties, encourages state-owned construction companies in Indonesia to be able to increase the complexity of inter-organizational relationships with a system known as the concept of Supply Chain Management (SCM). In applying the concept of Supply Chain Management (SCM) it is used primarily for interests focused on the relationship between main contractor vendors, material vendors and production subcontractors (Briscoe, Dainty, & Millet, 2001). Construction service companies realize that achieving the desired level of performance can only be achieved through end-to-end integration of the supply chain (Holcomb, 2011).

The problems that arise in the implementation of Supply Chain Management (SCM) will be experienced because this concept has uncertainty, the conditions that are not expected with all the consequences that may arise and can cause project delays or failures (Gray and Larson, 2000). The possibility of a risk occurring in project completion is always there, for that we need a system that can control the risk (Controllable Systemic Risk) to survive. In this study, the Controllable Systemic Risk used is Supply Chain Risk Management (SCRM), the synergy of Supply Chain Management with Risk Management. Researchers will analyze the Supply Chain Risk Management (SCRM) that has been implemented by Indonesian state-owned construction companies. An understanding of supply chain risk management can help construction companies manage supply chain risk and present a comprehensive supply chain risk management process in the company's business activities. This conceptual study is expected to be a guide for companies in seeing the importance of risk management and steps to implement supply chain risk management.

The supply chain risks begin to arise when the project is in operation, which can be in the form of scheduling, technology, payment, distribution, and even cost uncertainty. Waters, D, 2007 said that Supply Chain Risk Management is a systematic process for identifying, analyzing, and dealing with risks in the supply chain. In this study Supply chain risk management is used as mediation for three independent variables that are Vendor Trust, Contractor-Vendor Relationship and Top Management Involvement to determine its effect on company performance.

Based on the background and problem identification in this study, the limitations of the problems in this study include:

i. This study pays attention to the obstacles and uncertainties in implementing SCRM by using the variables Vendor Trust, Contractor-Vendor Relationship, Top Management Involvement.
ii. Company Performance Assessment uses the Balanced Scorecard method with four perspectives, that are the financial perspective, the customer satisfaction perspective, the internal business perspective and the learning and growth perspective.
iii. The construction company referred to in this study is an Indonesian state-owned construction company, those are PT. Waskita Karya (Persero) Tbk, PT. Adi Karya Tbk, PT. Pembangunan Perumahan (Persero) Tbk, PT. Nindya Karya (Persero), PT. Brantas Abipraya (Persero), PT. Wijaya Karya (Persero) Tbk, PT. Hutama Karya (Persero) in the category of 10 (ten) largest and best construction companies in Indonesia with experience, certification and full responsibility for the implementation of development plans.
iv. The research respondents are the Directors of construction companies, Project Managers, SAM (Site Administrative Manager), SOM (Site Operational Manager) and SEM (Site Engineering Manager), SPLEM (Site Procurement, Logistics & Equipment Manager) and SCARM (Site Contract Administration & Risk Manager).

From the main problems that have been formulated, the objectives to be achieved in this study include:

i. Develop the influence of Vendor Trust on Supply Chain Risk Management (SCRM).
ii. Develop the influence of Contractor-vendor relationship on Supply chain risk management (SCRM).
iii. Develop the influence of Top management involvement on Supply chain risk management (SCRM)
iv. Develop the influence of vendor trust on company performance
v. Develop the influence of relationships (relationships) between contractors and vendors to become partners in project development on company performance.
vi. Develop the influence of Top Management Involvement on company performance.
vii. Develop the influence of Supply Chain Risk Management (SCRM) on company performance
viii. Develop the role of mediating supply chain risk management in the relationship between vendor trust and company performance
ix. Develop the role of mediating supply chain risk management in the relationship between contractor-vendor relationships on company performance
x. Develop the role of mediating supply chain risk management in the relationship between top management involvement and company performance.

2. Method of The Study

This study used a quantitative descriptive research method because it aims to describe a phenomenon or event in a systematic, factual, and accurate manner. The data analysis method used to test the hypothesis is Structural Equation Modeling (SEM), using PLS (Partial Least Square). The numerical results of this study will be concluded and described in narrative form. This study also builds a two-stage construct or what can be called a second-order construct by adopting the Hierarchical Component Models (HCMs), where the latent variable is company performance, while other latent variables are assumed to be first order without analyzing its sub-components.

In measuring company performance, this study combines 4 latent constructs, those are Financial/Financial Perspective, Customer Perspective, Internal Business Process Perspective, and Learning and Growth Process Perspective by adopting observed variables (indicators) from previous studies.

3. Discussion

This study involved respondents who work in BUMN Construction Services companies in Indonesia with the criteria of having a mega project that is included in the 10 best construction companies in Indonesia. This BUMN Construction Services Company consists of 7 companies, those are:

i. PT. Adhi Karya (Persero) Tbk, started commercial operations on March 11, 1960.
ii. PT. Brantas Abipraya (Persero), was founded on November 12, 1980 in Malang, East Java.
iii. PT. Hutama Karya (Persero), started operating in 1960.
iv. PT. Nindya Karya (Persero)
v. PT. Pembangunan Perumahan (Persero) Tbk, operating since 1971
vi. PT. Waskita Karya (Persero) Tbk, was founded on January 1, 1961
vii. PT. Wijaya Karya (Persero) Tbk , founded in 1970

In this study, a descriptive statistical test was used to analyze data by describing or describing the data that has been collected as it is without intending to make general conclusions or generalizations. Based on the distribution of the questionnaire, the results can be described as follows:

Table 2: Descriptive Statistics of Respondent's Profile

Variable	Categorized	total	Percentage
The name of work Institution	PT. Adhi Karya (Persero) Tbk	4	4%
	PT. Brantas Abipraya (Persero)	11	10%
	PT. Hutama Karya (Persero)	14	13%
	PT. Nindya Karya (Persero)	4	4%
	PT. Pembangunan Perumahan (Persero) Tbk	11	10%
	PT. Waskita karya (Persero) Tbk	42	40%
	PT. Wijaya Karya (Persero) Tbk	19	18%
Total		**105**	**100%**
Sex	Male	86	82%
	Female	19	18%
Total		**105**	**100%**
Role of the Company	Company Directors	3	3%
	Project Manager	21	20%

Variable	Categorized	total	Percentage
	Site of Administrative Manager (SAM)	4	4%
	Site of Engineering Manager (SEM)	4	4%
	Site of Operational Manager (SOM)	1	1%
	Others (SPLEM, SCRAM)	72	69%
Total		**105**	**100%**
Length of work	< 5 years	17	16%
	5 - 10 years	26	25%
	10 - 15 years	22	21%
	> 15 years	40	38%
Total		**105**	**100%**
Scientific Background	Bachelor Degree	76	72%
	Post Graduate	28	27%
	Master	1	1%
Total		**105**	**100%**

Source: Data processed by the researcher (2022)

Based on the coefficient of determination test, to determine the extent to which the ability of Vendor Trust, Contractor-Vendor Relationship, and Top Management Involvement affects Supply Chain Risk Management (SCRM) and company performance can be seen in the following coefficient of determination test table:

Table 3: Coefficient Determination Test

	R Square	R Square Adjusted
Company Performance (η2)	0.915	0.912
Financial Perspectives (η2.I)	0.022	0.012
Customer Satisfaction Perspective (η2.II)	0.948	0.947
Learning and Environmental Perspectives (η2.IV)	0.857	0.855
Internal Business Process Perspectives (η2.III)	0.953	0.953
Supply Chain Risk Management (η1)	0.799	0.793

Source: Output Smart PLS (2022)

From the test table for the coefficient of determination it can be concluded as follows:

i. Supply Chain Risk Management (η1), has an adjusted R Square of 0.793; means that Vendor Trust, Contractor-Vendor Relationship, and Top Management Involvement affect Supply Chain Risk Management by 79.3% and the remaining 20.7% is influenced by other factors.
ii. Company Performance (η1), has an Adjusted R Square of 0.912: means that vendor Trust, Contractor-Vendor Relationship and Top Management Involvement affect Company Performance by 91.2% and the remaining 8.8% is influenced by other factors.

To see the performance of the most dominant companies, it can be seen from the results of the significance test of the relationship between dimensions (LOC) with variables (HOC), it was found that the t-statistic value was above 1.96 and the p-value was below 0.05, it can be concluded that all the construct used for the lower order dimension is a component forming the higher order variable construct.

Table 4: HCMs Interconstruct Significance Test

	Original Sample (O)	T Statistics (|O/STDEV|)	P Values
Company Performance (η2) -> Financial Perspective (η2.I)	0.551	1.978	**0.015**
Company Performance (η2) -> Customer Satisfaction Perspective (η2.II)	0.973	157.575	**0.000**
Company Performance (η2) -> Learning and Growth Perspective (η2.IV)	0.927	59.739	**0.000**
Company Performance (η2) -> Internal Business Process Perspektif (η2.III)	0.976	175.849	**0.000**

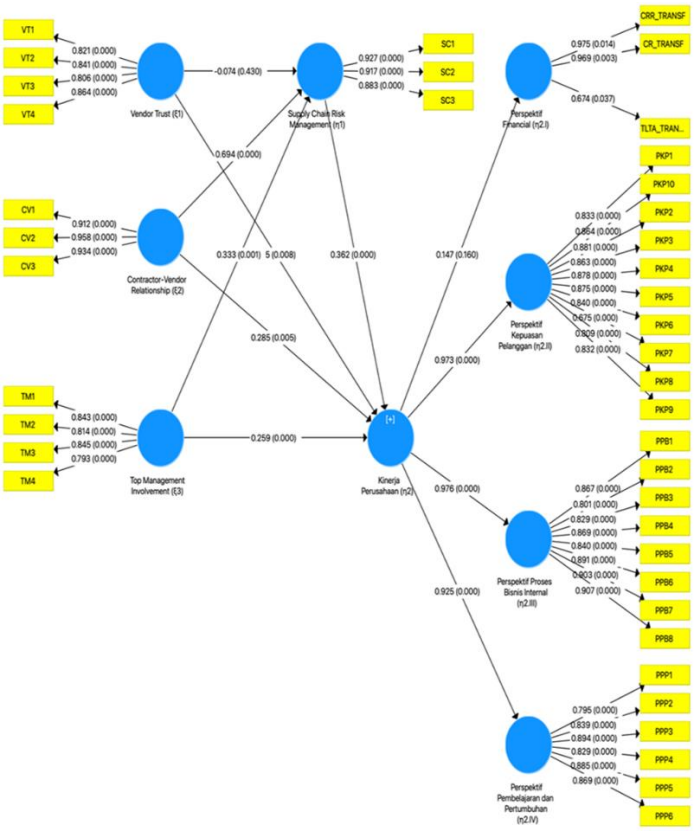
Source: Output Smart PLS (2022)

From the results of the dimensional significance test (LOC) with the variable (HOC), it can be concluded that the most dominant company performance can be sorted as follows:

i. Internal business process perspective of 97.6%
ii. Customer Satisfaction Perspective of 97.3%
iii. Learning and growth perspective of 92.7%
iv. Financial Perspective of 55.1%.

The result of influence study between variable

This stage is carried out to find out whether the research hypothesis proposed in the research model is accepted or rejected. To test the proposed hypothesis, it can be seen from the path coefficients, T-Statistic values through bootstrapping procedures and p-values. According to Hair et al. (2014), the path coefficient values are in the range of values -1 to +1, where the path coefficient values that are close to +1 represent a strong positive relationship and the path coefficient values which are -1 indicate a strong negative relationship. While T-Statistics (*bootstrapping*) is used to see the significance value between constructs.



Graph 1: Bootstrapping Procedure

The next finding is the Structural Equation Model of the Research obtained as follows:

First Equation :

$$\eta 1 = \gamma 1\xi 1 + \gamma 2\xi 2 + \gamma 3\xi 3 + \varsigma 1$$

SCRM = -0,074 VT + 0,694 CVR + 0,333 TMI

This equation model can be interpreted that:

i. *Vendor Trust* value - 0.074 (negative), means that the vendor trust is unable to improve Supply Chain Risk Management (SCRM). These results contradict research conducted by Abdullah, Z, & Musa, R 2014 which said that trust affects company relationships when implementing Supply Chain Management (SCM). Based on the respondents' answers, vendor trust is formed by mutual respect for institutional regulations and communication is not formed for long-term partnerships. For this problem, the researcher conducted interviews with respondents who were considered representative, that is the Site Procurement, Logistics & Equipment (SPLEM) and Site Contract Administration & Risk Manager (SCRAM) sections. From the results of the interviews, it was found that Law No. 2 of 2017 which was strengthened by the legal basis of Minister of BUMN No. 08 of 2019 which regulates the readiness of database infrastructure and vendor criteria. Based on this regulation, BUMN construction companies create a Vendor Management System (VMS) that applies ratings, sanctions and blacklists to vendors. If there are errors or even a lack of vendor expertise documents, unverified will occur and the impact on billing to contractors will be hampered. This shows that company management must focus on building vendor trust to increase mutually beneficial relationships because vendor trust is an important element for building relationships, the higher the level of trust, the lower the risks that the company will face (Szezepanski & Swiatowiec-Szezepanska, 2012).

ii. *The Contractor-Vendor Relationship* is worth 0.694 (positive), meaning that there is an effect of the Contractor-vendor Relationship on Supply Chain Risk Management. This is in accordance with the research results of Breuer, Siestrup, Haasis & Wildebrand, 2013 that a close relationship between Contractor-Vendor will lead to collaborative cooperation in Supply Chain Risk management and create dependence on one another. Chen & Paulraj, 2004 argue that a close relationship will make partners more willing to share risks and rewards by maintaining the relationship over a longer period of time.

iii. *Top Management Involvement* has a value of 0.333 (positive), meaning that if Top Management Involvement increases by one unit, Supply Chain Risk Management will increase by 0.333. Chen & Paulraj, 2004 argue that Top Management plays an important role in understanding the needs of supply chain management and is the party most aware of the need for Company strategy to remain competitive in the market.

Second Equation :

$$\eta 2 = \gamma 4\xi 1 + \gamma 5\xi 2 + \gamma 6\xi 3 + \beta 1\eta 1 + \varsigma 2$$

KP = 0,165 VT + 0,285 CVR + 0,259 TMI + 0,362 SCRM

This equation model can be interpreted that:

i. *Vendor Trust* is worth 0.165 (positive), means that there is a vendor trust effect of 0.165 on company performance after being mediated by Supply Chain Risk Management (SCRM).

ii. *Contractor-Vendor Relationship* is worth 0.285 (positive), means that there is an effect of the Contractor-vendor Relationship on company performance after being mediated by Supply Chain Risk Management (SCRM).
iii. *Top Management Involvement* has a value of 0.259 (positive), means that there is an influence of Top Management Involvement on performance after being mediated by Supply Chain Risk Management (SCRM).
iv. Supply Chain Risk Management (SCRM) is worth 0.362 (positive), means that there is an effect of Supply Chain Risk Management (SCRM) on company performance.

From the Structural Equation Model of this study can be concluded that: "Supply Chain Risk Management (SCRM) has an important and influential role on the performance of Indonesian BUMN companies and is a supply chain strategy for selecting vendors by forming partnership relationships between contractors and vendors that require decisions and policies from Top Management in implementing Supply Chain Management.

4. Conclusion

i. Vendor Trust in state-owned construction companies is not able to improve Supply chain Risk management. The partnership is formed because one sees the institutional regulations with each other, while the vendor partnership trust relationship is not formed because of communication. From the results of the interviews, it was found that there was a Vendor Management System (VMS) which carried out ratings, sanctions and blacklists if the Vendor made a mistake or lacked expertise documents which resulted in delays in billing to contractors. To overcome this problem, the role of top Management is needed to focus on building Vendor trust in order to improve mutually beneficial relationships.
ii. There is a relationship between Top Management Involvement and Supply Chain Risk Management. Long-term and short-term strategies are made by Top Management to reduce risks that will occur in the future.
iii. Contractor-Vendor relationship has a direct effect on Supply Chain Risk Management. The rules that apply in construction companies can be used as a guide to reduce risk but cannot guarantee the accuracy of delivery and billing is still in doubt.
iv. There is an influence of Vendor Trust on Company Performance, vendor trust in contractors will improve company performance. Vendor trust is an important element in fostering relationships, the higher the level of trust, the lower the risks faced by the company, the company's performance can be improved.
v. There is an influence of the Contractor-Vendor Relationship on Company Performance, the relationship that is formed begins with trust to keep promises to each other which affect company performance.
vi. Top Management Involvement affects Company Performance, strategic decisions made by Top management are used as guidelines for short-term and long-term operational business.
vii. There is an influence of Supply Chain Risk Management on Company Performance. Supply Chain Risk Management is able to develop risk identification that will arise in carrying out projects by carrying out governance to map negative and positive risks to be evaluated every month and respond to risk management mechanisms for business continuity.
viii. Supply Chain Risk Management does not have a mediating role (No mediation) in the relationship between vendor trust on company performance. Vendor partnership trust is not formed due to uncertain communication.

ix. Supply chain Risk Management has a mediating role (complementary Mediation) in the Contractor-Vendor relationship on company performance, meaning that there is no change from the direct relationship but indicates an increase in company performance.
x. Supply Chain Risk Management has a mediating role (complementary mediation) in the relationship between Top Management Involvement and company performance. Top Management is proactive in handling risk by conducting monthly evaluations

5. Suggestions

a. Some suggestions for BUMN Contruction Company:
i. To expedite the business and business continuity of the company, further studies should be carried out regarding Vendor partnerships through the Vendor Management System (VMS) by looking at financial statements, completeness of incorporation letters, and certificates of expertise which can reflect the ability to partner and commit to each other. With a good Vendor Management System (VMS), it is hoped that the company can create standards according to what is desired and benefit both parties so that trust will increase.
ii. Carry out a governance process to map negative and positive risks by conducting monthly evaluations so that the company can work more proactively to respond to risk management.
iii. Create SOPs to provide speed of service by paying attention to the accuracy of recording project work. Based on this, Top Management commitment is needed based on time, cost and resources to support forming partnerships in the long term and can provide benefits for the company so that both parties can proceed in a stable manner.
iv. There is Top Management support in determining strategic steps to build a communication system with external and internal parties to maintain the values that apply in the company and commitment to advancing the company.

b. Suggestion for further research.
i. The findings of the Supply Chain Risk Management study in the field of construction are expected to provide a significant contribution to researchers or prospective researchers to serve as a reference in formulating a Supply Chain Risk Management with a view to updating or deepening studies on more specific aspects, for example studies on price changes, project environmental adaptation, government policies, politics, economic conditions, and so on.
ii. The findings and references of this study, especially for Vendor Trusts, can be a contribution to BUMN construction companies as input material in formulating a Vendor Management System (VMS) in the future, especially short-term policies as guidelines for daily operations in completing projects, especially relations with vendors so that creating a sense of mutual trust and mutual commitment to each other in improving the company's overall performance, because by being able to maintain relationships with vendors, Indonesian BUMN construction companies are able to complete projects on time.
iii. This research study can be developed towards the ability to anticipate risks and determine risk management strategies before risks actually occur, things that need to be considered for development are:
    a) concept of supply chain agility, in terms of responding to supply chain demands.
    b) Responsiveness which includes :
        1) Sensing (feeling and anticipating change)
        2) Directly react to changes that occur.
        3) Recovery from the changes that have occurred.

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