Factors Affecting Buyer-Supplier Relationship in Sarawak, Malaysia from the Construction Contractor's Perspective: A PLS-SEM Approach

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ABSTRACT

The relationship management between buyers and suppliers has always been an indispensable issue in the construction industry. In order to obtain direct and/or indirect benefits of good buyer-supplier relationship, construction firms are required to put in efforts in maintaining the relationship. Some of the benefits of effective buyer-supplier relationship management include good project quality, on time project delivery and reasonable construction cost. However, it is highlighted in the literature that the buyer-supply relationshipin Malaysia are often poorly maintained due to lack of trust, ineffective communication and poor collaboration. Poor relationship may bring forth negative impacts such as delay, cost overrun and substandard material quality during the project delivery process. In Sarawak, many projects were also being affected due to poor buyer-supplier relationship management. Therefore, the present research aimed to study the factors affecting buyer-supplier relationship in Sarawak construction industry from the contractors' perspective. A quantitative research approach was adopted in the present research. Self-administered questionnaires were distributed to Grade 7 contractors in Sarawak to collect primary data. The collected data was subsequently analyzed using the partial least squares structural equation modelling (PLS SEM)approach.Based on the generated results, "commitment", "trust" and "quality" are three factors that showed significant relationship with buyer-supplier relationship. The findings of the present research would contribute to enhancing the relationship between buyers and suppliers and thereby improving the performance of construction projects in Sarawak.

Keywords: Factors, Buyer-Supplier Relationship, Partial Least Squares Structural Equation Modelling (PLS SEM)

INTRODUCTION

Buyer supplier relationship management is the backbone of the supply chain management (Dash et al., 2018). Effective supply chain management is crucial in ensuring better performance and productivity in the construction industry as suppliers are the main contributors of project delivery time, cost and quality (Noorizadeh et al., 2019). The relationship management between buyer and supplier has always been an indispensable issue in the construction industry and construction firms are commonly being motivated to sustain a stable buyer-supplier relationship in order to obtain direct or indirect benefits (Wang et al., 2014). According to Kharade and Pataskar (2016), buyer-supplier relationship management is one of the key factors to be considered when determining the programs of a project.

There are quite a number of research related to factors that can affect the buyer-supplier relationship, mostly conducted overseas. Powers and Reagan (2007) found that mutual goals, ability to adapt to new relationship, and trust were the most significant factors. Jiang et al. (2011) had conducted a large quantitative survey to

collect 636 responses from the buying companies and found that trust, commitment, and long term orientation are important factors. Morsy (2017) found that trust, commitment, and suppliers' reputation are some of the important factors that will affect the relationships between the buyers and suppliers. Besides, Dash et al. (2018) had also ranked the factors that affect the buyer-supplier relationships based on Analytical Hierarchy Process (AHP). They discovered that trust, supplier competency, and good management practice are among the most important factors. In addition, Mabrouk (2020) had identified 12 factors that will affect the buyer-supplier relationship through literature review. Some of the factors include commitment, trust, information exchange, degree of satisfaction of both parties through collaboration, capability of suppliers, suppliers' reputation, and operation quality of suppliers.

Although many research related to factors affecting buyer-supplier relationship had been conducted overseas, this topic remains understudiedin Malaysia. Therefore, the present research aims to study the factors affecting buyer-supplier relationship management in Sarawak, Malaysia from the construction contractors' perspective.The present research adopted the 12 factors identified by Mabrouk (2020) (as shown in Table 1) in designing the hypotheses and structural model.

BUYER-SUPPLIER RELATIONSHIP

There are many benefits for contractors to maintaining a good relationship with suppliers. Kharade and Pataskar (2016) stated that effective buyer-supplier relationship management is crucial in the construction industry to reduce the overall payment for building projects. Bildsten (2014) stated that one of the significant concerns of construction firms during the procurement process is the nature of the relationships among the buyers and suppliers. The close relationships between buyers and suppliers should be maintained in order to achieve certain benefits such better project quality, on time project delivery and reasonable construction cost. Besides, Noorizadeh et al. (2019) also highlighted that invigorating the relation and broadening the business dealing with high-performance suppliers can help buyers in improving performance during the construction process.According to Qian et al. (2023), building high-commitment relationship with suppliers can help buyers generate financial return, strengthen innovation performance and develop competitive advantage. Moritz (2023) also stated that some benefits of good relationship include access to lowest price, better delivery performance, early access to supplier innovations, and consistent quality levels. In addition, Uddin (2024) found that good buyer-supplier relationship could influence supply chain integration and firms' operational and innovation performance.

In spite of the above-mentioned benefits, Mirawati et al. (2015) pointed out that the relationship between buyers and suppliers in Malaysia are often poorly maintained due to lack of trust, ineffective communication and poor collaboration which consequentlycause construction delays. Hasmori et al. (2018) reported that late in delivering materials was ranked the 3rd place among the other factors of construction delays in Klang Valley, Malaysia. Besides, Othman and Ismail (2014) also found that some projects in Kedah had faced a few major issues such as delay in material delivery, delay in manufacturing building components and untrustworthy suppliers. In addition, Hishamand Yahya (2016) discovered that material shortage ranked the 5th among the 29 causes of delay from the perspectives of consultants and contractors in Johor. Another research conducted by Okpala et al. (2019) found that late materials delivery is one of the causes of delays and disruption of construction projects in Selangor. Furthermore, Hasim et al. (2023) also stated that material acquisition is an "arising problem" in the construction industry. Some common issue related to material acquisition include poor material quality, late delivery of material, unavailability of materials and materials not according to specification.

The construction projects in Sarawak also suffered from the impacts of ineffective buyer-supplier relationship management. In Kuching, the project completion date of the a dual-carriageway road linking the E-Mart roundabout at Matang Road with Stapok Road in Batu Kawah was postponed because the supplier was late in supplying the construction equipment (Borneo Post, 2015). The Pan Borneo Highway project that linked Sabah and Sarawak was delayed due to supply issue related to material, construction vehicles and labours (Malaysiakini, 2018). Besides, Batang Lupar bridge project also faced delay due to late delivery of materials and contractors competing for raw materials (New Sarawak Tribune, 2022). Limbang Museum project, despite its simple structure, was delayed for one year due to late delivery of roofing materials (Dayak Daily,

2023).In addition, it was also reported that several health clinic construction projects in Sarawak was delayed due to shortage of cement and materials for Industrialized Building System (IBS) which were imported (Bernama, 2023). In 2023, Sarawak state Ministry of Infrastructure and Development had identified 36 critically delayed and 340 sick projects state-wide (Malay Mail, 2023). One of the reasons causing sick and delayed projects was due to lack of building materials. Furthermore, Marudi bridge project also faced multiple delays due to building materials supply chain disruption and the contract was terminated and awarded to another contractor (Dayak Daily, 2024).

A research conducted by Kamaruddeen et al. (2020) further justified the problems faced by the construction industry in Sarawak as they discovered that "material shortage" and "plant and equipment shortage" were the top 2 causes of project cost overruns in Sarawak. Similarly, based on the research conducted by Ngu and Sam (2018), G7 contractors in Sibu and Kuching agreed that "shortage or late supply of materials" and "shortage of tools and equipment" are factors that had affected the productivity of their projects. Ting et al. (2022) analyzed the risks identified in 111 projects in Sarawak and found that material risk which includes late delivery and shortage of materials is one of the 8 main categories of risk commonly faced by projects in Sarawak.

Apart from the various problems in the construction industry caused by poorly maintained buyer-supplier relationship, it was also discovered that the existing literature pertaining to factors affecting buyer-supplier relationship in Sarawak are still limited. Therefore, the present research is essential in order to bridge the gap of literature. In addition, the present research can also contribute to enhancing the relationships between buyers and suppliers in the construction industry. Contractors in Sarawak can focus on the important factors in order to maintain strong relationships with their suppliers. Through effective buyer-supplier relationship management, the construction projects will progress more smoothly and thereby creating a win-win situation for both buyers and suppliers.

METHODOLOGY

The present research adopted a quantitative approach in order to reach construction contractors that are geographically dispersed and to enhance research generalizabiliy (Creswell & Creswell, 2018). According to Zyoud et al., (2024), a quantitative approach allows for evaluation of phenomena using numerial data and also easier hypothesis testing. The research design is presented in Figure 1.
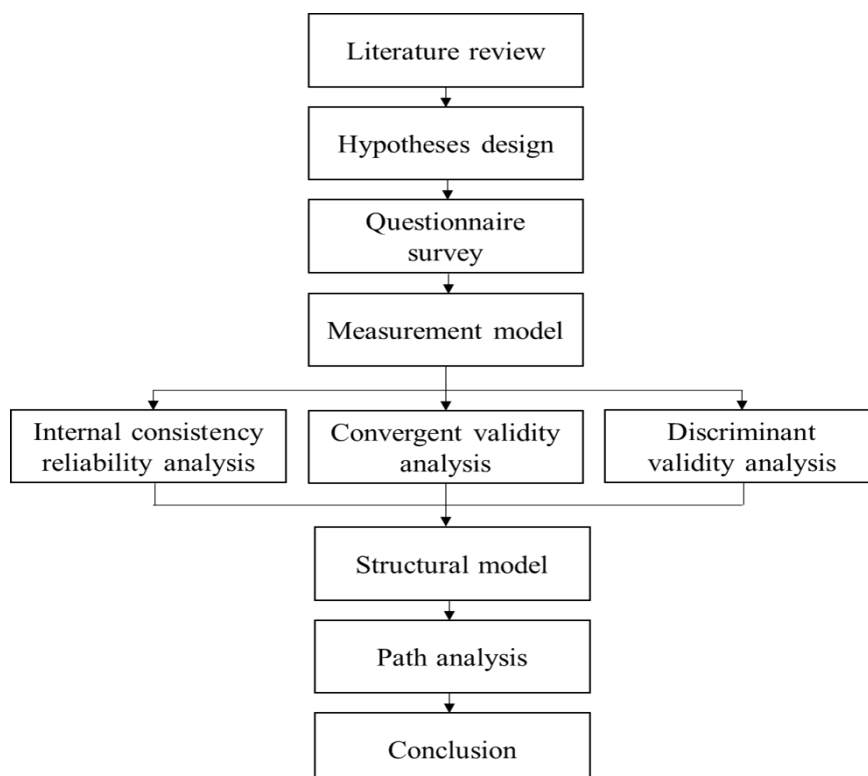

Figure 1: Research design for the present research

The hypotheses for the present research are as follows:

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H1.	"Commitment" exercises a significant influence on buyer-supplier relationship
H2.	"Trust" exercises a significant influence on buyer-supplier relationship
H3.	"Satisfaction" exercises a significant influence on buyer-supplier relationship
H4.	"Innovation and technology" exercises a significant influence on buyer-supplier relationship
H5.	"Information exchange" exercises a significant influence on buyer-supplier relationship
H6.	"Quality" exercises a significant influence on buyer-supplier relationship
H7.	"Supply chain capabilities" exercises a significant influence on buyer-supplier relationship
H8.	"Safeguards" exercises a significant influence on buyer-supplier relationship
H9.	"Cost reduction" exercises a significant influence on buyer-supplier relationship
H10.	"Flexibility" exercises a significant influence on buyer-supplier relationship
H11.	"Cooperation" exercises a significant influence on buyer-supplier relationship
H12.	"Corporate reputation" exercises a significant influence on buyer-supplier relationship
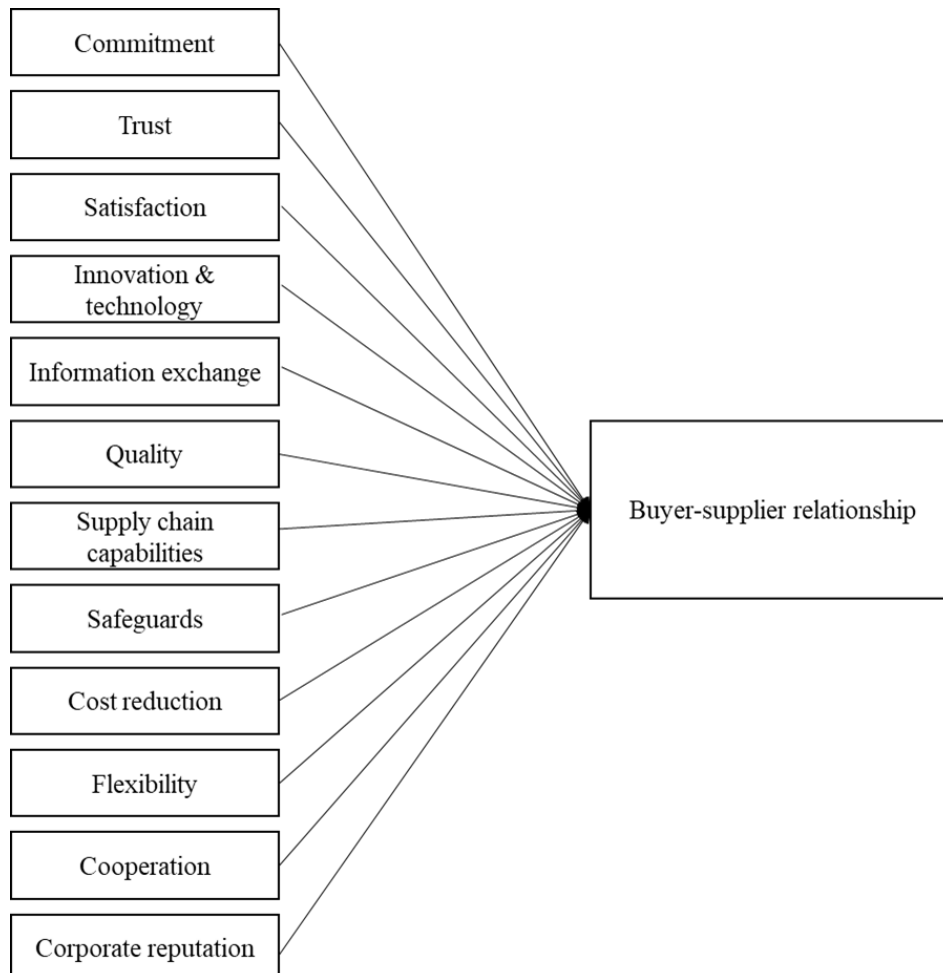
Figure 2: Conceptual framework of the present research

Figure 2 shows the conceptual framework of the present research. The targeted respondents for this study was Grade 7 construction contractors in Sarawak registered under Construction Industry Development Board (CIDB). This was because Grade 7 construction companies are of the highest grade under CIDB. Therefore, it was expected that they have more extensive experience in buyer-supplier management and their valuable inputwould enhance the representativeness of the present research. By employing a simple random sampling method, structured self-administered survey questionnaires were distributed to 254 construction contractors in Sarawak through email.Each set of the survey questionnaire consist of three sections, namely Section A (general information and background of respondent), Section B (factors which may have a significant influence on the buyer-supplier relationship), and Section C (current relationship of respondent with his/her suppliers). Under section B and C, the respondents need to rank each question (as shown in Table 1 & 2) based on a five-point Likert Scale, where 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree.

Table 1: Questions for indicators under Section B of the questionnaire

Dimension	Code	Item
Commitment (C)	C1	I put in effort in maintaining relationship with my suppliers.
	C2	I am willing to create short term sacrifices to preserve relationship with my suppliers.
Trust (T)	T1	I am willing to create inter-organization trust.
	T2	The degree of trust between my suppliers and I is high.
Satisfaction (S)	S1	I am satisfied with the products and services provided by my suppliers.
	S2	I am willing to repeat business with my suppliers.
Innovation and Technology (IT)	IT1	I adopt supply chain technologies to create an organized network.
	IT2	I adopt supply chain tools to improve interaction with my suppliers.
Information Exchange (IE)	IE1	I ensure timely sharing of information with my suppliers to avoid disputes.
	IE2	My suppliers and I are willing to share information with each other.
Quality (Q)	Q1	My suppliers always provide quality products and/or services to me.
	Q2	My business benefits from high-quality suppliers' performance.
Supply Chain Capabilities (SC)	SC1	My suppliers are able to fulfill my demand.
	SC2	My suppliers are able to deliver products to me in a timely manner.
Safeguards (SG)	SG1	My suppliers take care in ensuring that the transactions between us occur as intended.
	SG2	My suppliers provide safeguards against disputes to create a cooperative working atmosphere.
Cost Reduction (CR)	CR1	My suppliers always offer lower purchase prices to me.
	CR2	My procurement cost can be saved based on the prices offered by my suppliers.
Flexibility (F)	F1	My suppliers offer flexible service in relation to quantity, preparation time, and type of product, etc.
	F2	My suppliers possess a capability of adaptation and change.

Cooperation (CP)	CP1	My suppliers and I put in collaborative effort to meet common goals and expectations.
	CP2	My suppliers and I work together harmoniously.
Corporate Reputation (RP)	RP1	My suppliers have a good reputation in the business market.
	RP2	My suppliers are known for their reliability and trustworthiness in the market.

Table 2: Questions for indicator under Section C of the questionnaire

Dimension	Code	Item
Buyer-Supplier Relationship (BSR)	BSR1	I have a good relationship with my suppliers.
	BSR2	I am willing to continue the relationship with my suppliers.
	BSR3	My suppliers and I obtained mutual benefits from our relationship.

The data collected were analyzed using the partial least squares structural equation modelling approach of Smart PLS 4.The measurement model were analyzed using convergent validity analysis, internal consistency analysis, and discriminant validity analysis. The indicators examined include factor loading, AVE, Cronbach's Alpha, composite reliability, Fornell-Larcker criterion and HTMT (Chin 2010; Hair et al., 2022). Whereas, the structural model were analyzed using path analysisby looking at t values,p values and coefficient for determination (R^2) (Hair et al., 2022). Through path analysis, the hypothetical path between the 12 factors and buyer-supplier relationship were interpreted.

FINDINGS AND DISCUSSIONS

In the present research, a total of 81 responses out of 254 questionnaires distributed were received (31.89% response rate). The present research is considered reliable since the response rate is higher than the rate recommended by Aghimien et al. (2018) and Sekaran and Bougie (2016) which is at least 20% to 30%.

Table 3: Geographical location of respondents

Location	Frequency	Percentage (%)
Kuching	34	41.98
Samarahan	1	1.23
Sri Aman	1	1.23
Sarikei	3	3.7
Sibu	18	22.22
Bintulu	13	16.05
Miri	11	13.58

As shown in Table 3, out of the 81 respondents who participated in the present research, 34 of them are from Kuching (41.98%), 18 from Sibu (22.22%), 13 from Bintulu (16.05%), 11 from Miri (13.58%), 3 from Sarikei (3.70%), and 1 (1.23%) each from Samarahan and Sri Aman.

Table 4: Position of the respondents

Position	Frequency	Percentage (%)
Architect	3	3.7
Engineer	8	9.88
Quantity Surveyor	12	14.81
Director	14	17.28
Managing Director	22	27.16
Project Manager	12	14.81
Construction Manager	5	6.18
Site Supervisor	5	6.18

As shown in Table 4, most of the respondents are managing directors (27.16%), followed by director (17.28%), quantity surveyor (14.81%), project managers (14.81%), and engineers (9.88%). There were also a few construction manager and site supervisors, and architects participated in the present research.

Table 5: Years of experience of the respondents

Years of Experience	Frequency	Percentage (%)
1 - 5 years	5	6.17
6 - 10 years	10	12.35
11 - 15 years	24	29.63
Above 15 years	42	51.85

As shown in Table 5, most of the respondents (51.85%) possess more than 15 years of working experience. Apart from that, 24 of them (29.63%) have 11 to 15 years of experience, 10 of them (12.35%) have 6 to 10 years of experience, and 5 of them (6.17%) have 1 to 5 years of experience.

Measurement model

The collected data was analyzed using the partial least squares equation model (PLS-SEM) approach of SmartPLS 4. According to Hair et al. (2022), assessment of measurement model include the evaluation of reliability and validity. The former focuses on evaluating indicator reliability and internal consistency reliability whereas the latter focuses on evaluating convergent validity and divergent validity. For the present research, in evaluating indicator reliability, the outer loading (factor loading) and variance inflation factors (VIF) of each indicator was examined. Table 6 shows that the loadings for all indicators are statistically significant since all are above 0.708 (Hair et al. 2022). Whereas, the VIF for all indicators are less than 5. Therefore, it can be concluded that there is an appropriate level of reliability.

Table 6: Factor loadings and variance inflation factors (VIF)

Constructs	Measurement	Factor Loading	VIF
Commitment	C1	0.953	2.957
	C2	0.952	2.957
Trust	T1	0.94	2.118

	T2	0.917	2.118
Satisfaction	S1	0.917	2.071
	S2	0.937	2.071
Innovation & Technology	IT1	0.983	2.023
	IT2	0.828	2.023
Information Exchange	IE1	0.788	1.736
	IE2	0.98	1.736
Quality	Q1	0.933	2.527
	Q2	0.952	2.527
Supply Chain Capabilities	SC1	0.802	1.822
	SC2	0.981	1.822
Safeguards	SG1	0.944	2.695
	SG2	0.949	2.695
Cost Reduction	CR1	0.908	3.253
	CR2	0.988	3.253
Flexibility	F1	0.955	3.099
	F2	0.954	3.099
Cooperation	CP1	0.99	3.051
	CP2	0.891	3.051
Corporate Reputation	RP1	1	2.827
	RP2	0.814	2.827
Buyer-Supplier Relationship	BSR1	0.871	1.847
	BSR2	0.821	1.479
	BSR3	0.806	1.681

The second criterion for evaluating reliability is internal consistency reliability which can be assessed through Cronbach's Alpha scores and Composite reliability. As shown in Table 7, the composite reliability and Cronbach's alpha scores are all above 0.70, indicating higher level of reliability (Hair et al., 2022).

Table 7: Reliability and convergent validity

Constructs	Average Variance Extracted (AVE)	Composite Reliability (CR)	Cronbach's Alpha
Commitment	0.907	0.951	0.897
Trust	0.863	0.926	0.842
Satisfaction	0.859	0.924	0.837
Innovation & Technology	0.826	0.904	0.831

Information Exchange	0.791	0.882	0.789
Quality	0.888	0.941	0.875
Supply Chain Capabilities	0.803	0.89	0.804
Safeguards	0.896	0.945	0.885
Cost Reduction	0.9	0.947	0.908
Flexibility	0.912	0.954	0.903
Cooperation	0.887	0.94	0.901
Corporate Reputation	0.831	0.907	0.891
Buyer-Supplier Relationship	0.69	0.872	0.781

The convergent validity is commonly evaluated using average variance extracted (AVE) measure. As shown in Table 7, the AVE of all constructsare more than 0.50, indicating that they explain more than half of the variance of the indicators (Hair et al. 2022). Moreover, discriminant validity is evaluated using Fornell-Larcker criterion and HTMT. As for the Fornell-Larcker criterion, Table 8 shows that there is no cross loading problems between constructs since each item has the highest loading on its respective construct.In addition, after examining HTMT of all constructs in PLS SEM, it was discovered that all values are less than 0.85 (Henseler et al., 2015).Therefore, it can be concluded that discriminant validity is satisfactory.

Table 8: Discriminant validity (Fornell-Larcker criterion)

BSR	C	CP	RP	CR	F	IE	IT	Q	SG	S	SC	T
BSR	0.833											
C	0.596	0.952										
CP	0.131	0.359	0.942									
RP	0.071	0.203	0.373	0.912								
CR	0.134	0.172	0.323	0.458	0.949							
F	0.084	0.121	0.236	0.278	0.569	0.955						
IE	-0.055	0.069	0.121	0.294	0.363	0.599	0.889					
IT	0.024	-0.051	0.081	0.122	0.537	0.442	0.178	0.909				
Q	0.535	0.419	0.325	0.137	0.204	0.091	0.064	0.057	0.942			
SG	0.145	0.295	0.427	0.403	0.436	0.445	0.378	0.438	0.24	0.947		
S	-0.136	-0.099	0.215	0.091	0.12	0.173	0.217	0.153	0.036	0.361	0.927	
SC	0.113	0.258	0.289	0.264	0.427	0.255	0.298	0.205	0.259	0.369	0.058	0.896
T	0.67	0.548	0.344	0.289	0	0.171	0.131	0.101	0.599	0.316	-0.044	0.205

Structural Model

To test the hypotheses, a structural model was created to measure the path coefficient. All path coefficients were assessed through bootstrapping with 81 cases and 5,000 subsamples. Figure 3 shows the graphical output

generated by Smart PLS 4. For the structural model, path coefficients and p values are presented whereas for the measurement model, t values are presented. One of the most essential assessments in PLS-SEM is examining the R^2 value of the endogenous variable (buyer-supplier relationship).According to Hair et al. (2022), R^2 value ranges from 0 to 1, with higher value indicating higher levels of explanatory power. In the present research, the R^2 for "buyer-supplier relationship" is 0.609, indicating moderate explanatory power. In other words, the exogenous variables (factors) may be able to account for 60.9% of buyer-supplier relationship.

As shown in Figure 3, "commitment" and "trust" show a significant relationship with the buyer-supplier relationship with p < 0.001. "Quality" also shows a significant relationship with the buyer-supplier relationship with p < 0.05. Besides, as summarized in Table 9, the t values for these three hypothetical paths with buyer-supplier relationship is also significant since it is higher than +/-1.96 (Hair et al. 2022).Therefore, it can be concluded that only three out of twelve hypotheses namely, H1, H2, and H6 were supported.
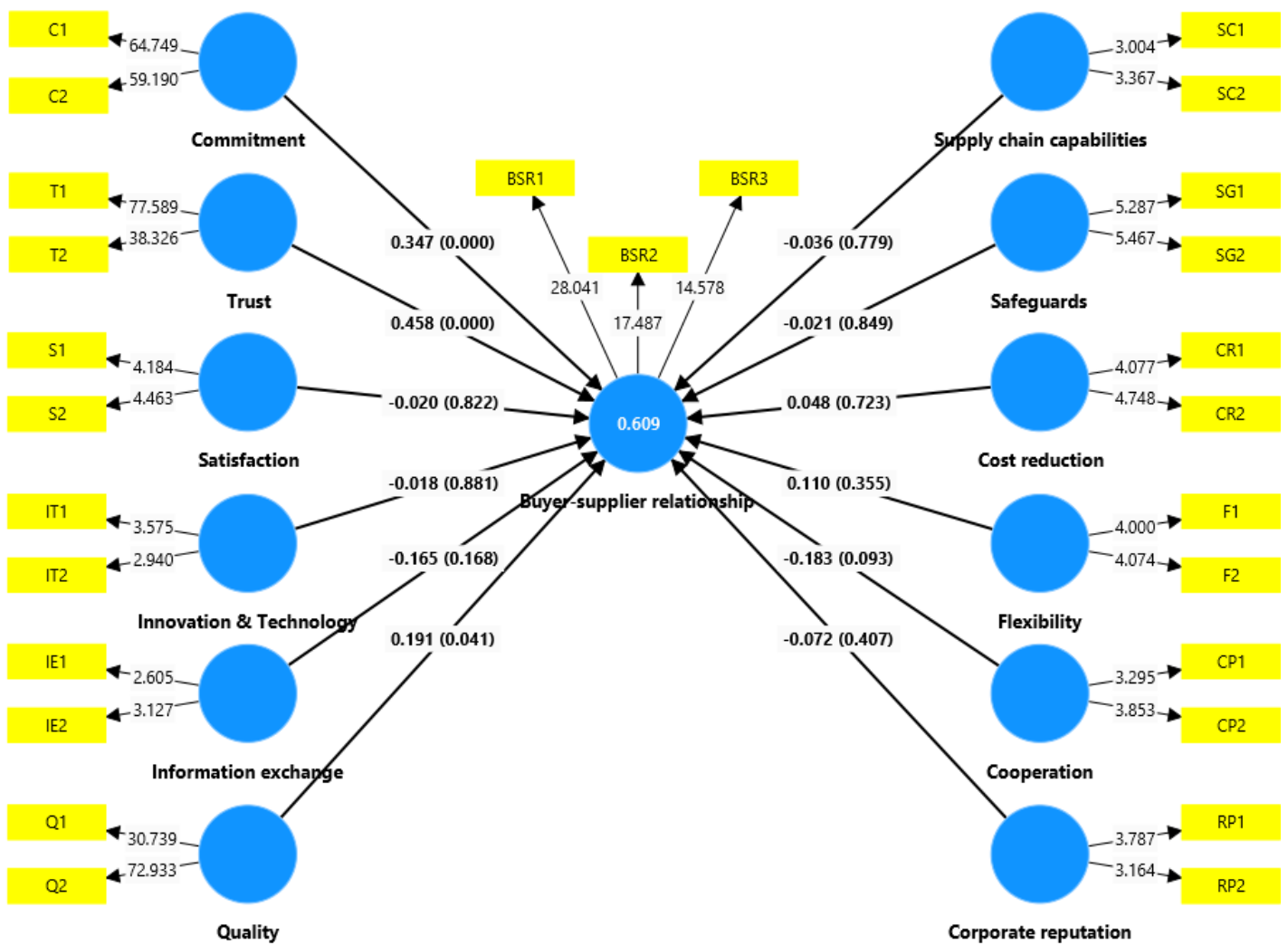

Figure 3: Result of structural model

Table 9: Path coefficient and interpretation

Hypothetical Path	Path Coefficient	T Value	P Value	Interpretation
H1 Commitment → buyer-supplier relationship	0.347	3.565	0	Supported
H2 Trust → buyer-supplier relationship	0.458	4.695	0	Supported
H3 Satisfaction → buyer-supplier relationship	-0.02	0.224	0.822	Rejected

H4 Innovation and technology → buyer-supplier relationship	-0.018	0.149	0.881	Rejected
H5 Information exchange → buyer-supplier relationship	-0.165	1.379	0.168	Rejected
H6 Quality → buyer-supplier relationship	0.191	2.043	0.041	Supported
H7 Supply chain capabilities → buyer-supplier relationship	-0.036	0.281	0.779	Rejected
H8 Safeguards → buyer-supplier relationship	-0.021	0.191	0.849	Rejected
H9 Cost reduction → buyer-supplier relationship	0.048	0.355	0.723	Rejected
H10 Flexibility → buyer-supplier relationship	0.11	0.925	0.355	Rejected
H11 Cooperation → buyer-supplier relationship	-0.183	1.679	0.093	Rejected
H12 Corporate reputation → buyer-supplier relationship	-0.072	0.83	0.407	Rejected

Commitment is "a willingness to work together to increase the value arising from a relationship." (Patrucco et al., 2021). According to Ganguly (2019), if the buyers offer more help to the suppliers and allow them to experience more relational benefits, the suppliers are expected to show higher commitment. The result of the present research is consistent with those of the previous research. In 2011, interviews were conducted by Frodell (2011) to identify criteria for achieving buyer and supplier relationship. He discovered that commitment was among the ten most frequently mentioned criteria. It is an important criterion for achieving higher quality, lower total cost, and competitive advantage. Besides, a research conducted by Oghazi et al. (2016) found that lack of commitment is one of the major obstacles of good buyer-supplier relationship. According to them, this obstacle can be overcome by increasing sense of belongings of suppliers so that they feel that they are a part of the big family. In addition, there are also a few research being conducted to study the correlation/relationship between various factors and buyer-supplier relation as well as project performance. A research conducted by Patrucco et al (2021) using structural equation modeling revealed that higher suppliers commitment has a positive role in enhancing project performance. Similarly, a research conducted by Karungani and Odhiambo (2021) using correlation coefficient revealed that commitment between buyers and suppliers could positively influence on company performance.

Similar to the present research, previous research also revealed that trust is an important factor in ensuring a good buyer-supplier relationship. Jiang et al. (2012) stated that quality relationship in UK construction industry is mainly driven by trust between the buyers and suppliers. Their research revealed that trust shows significant strong effects on the buyer-supplier relationship. According to Mabrouk (2020), trust can bring higher rate of satisfaction among buyers and suppliers. If the degree of trust is higher, the willingness to maintain the relationship will also be higher. Similarly, Gunawan et al. (2024) also stated that trust is an important factor if the buyers and suppliers intend to achieve satisfaction through collaboration. Furthermore, a research conducted by Karungani and Odhiambo(2021) also revealed that trust had a strong influence on buyer-supplier relationship and could contribute to enhancing company performance. Therefore, they recommended that companies should invest on trust factor to ensure efficiency and effectiveness of buyer-supplier relationship. Another research conducted by Nwaguru et al. (2022) found that the buyer-supplier relationship get stronger with the presence of trust. On the other hand, the outsourcing efficiency would decrease if trust is absent.In addition, Hasim et al. (2023) also discovered that trust is one of the important factors in developing a long-term buyer-supplier relationship.

In the present research, quality also shows a significant relationship with the buyer-supplier relationship.Based on the research conducted by Gupta et al (2014), the major concern of organizations in supplier selection was quality of products. Besides, "product qualities" was ranked as the most significant factors that affecting organization satisfaction which may result in a stable and continuing buyer-supplier relationship.According to Karungani and Odhiambo (2021), quality of products and reliability in delivering products by suppliers are

key factors in sustaining a good buyer-supplier relationship.Interviews conducted by Sabri et al. (2020) revealed that "product quality" is the most important indicator considered by contractors during supplier selection in projects supply chain. According to the researchers, this indicator is critical for suppliers to survive in competitive markets. In order to establish a good relationship with their customers, Gunawan et al (2024) suggested that suppliers should focus on customer-centric principles in order to know the customers' need and subsequently meet their expectation. Besides, the suppliers should also constantly innovate their products to create added value to their customer (Gunawan et al., 2024).

CONCLUSION

A quantitative research approach was adopted in the present research. The collected data was analyzed using the partial least squares equation model (PLS-SEM) approach of SmartPLS 4 to test the hypotheses. The results revealed that only three out of twelve constructs show a significant relationship with the buyer-supplier relationship and therefore, only hypothesis 1, 2, and 6 are supported. "Commitment" and "trust" show a significant relationship with the buyer-supplier relationship with $p < 0.001$ whereas "Quality" shows a significant relationship with the buyer-supplier relationship with $p < 0.05$. Therefore,buyers and suppliers should invest on these three signficiant factors in order to create a good buyer-supplier relationship. The findings of the present research would contribute to enhancing the relationship between buyers and suppliers and thereby improving the performance of construction projects in Sarawak.

LIMITATION AND FUTURE DIRECTIONS

Firstly, the present research only study buyer-supplier relationhip from the construction contractors' perspective. Future research can study the buyer-supplier relationship from the suppliers' perspective. Secondly, the present research assumed that the exogenous constructs (factors) directly affecting endogenous construct (buyer-supplier relationship) without influenced by a third variable. The present structural model can be extended to include mediator constructs or moderator constructs. According to Hair et al. (2022), mediation occurs "when a mediator construct intervenes between two other directly related constructs". Whereas, moderation occurs when the relationship between two variables depends on the third variable namely, moderator constructs (Hair et al., 2022).

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REFERENCES

1. Bernama. (2023). Health clinic construction delayed in Sarawak due to raw material shortage – Lukanisman. Retrieved from: https://www.bernama.com/en/news.php?id=2246225
2. Bildsten, L. (2014). Buyer-supplier relationships in industrialized building. Construction Management and Economics, 32(1-2), 146–159. doi:10.1080/01446193.2013.812228
3. Borneo Post Online. (2015). Matang-Stapok dual-carriageway project may be slightly delayed, says MP. Retrieved from https://www.theborneopost.com/2015/12/12/matang-stapok-dual-carriageway-project-may-be-slightly-delayed-says-mp/
4. Chin, W.W. (2010). How to write up and report PLS analyses, Handbook of Partial Least Squares.Springer, Berlin, Heidelberg.
5. Creswell, J. W. & Creswell, J. D. (2018). Research design: Qualitative, quantitative, and mixed methods approaches. 5th ed. Los Angeles: Sage Publications, Inc.
6. Dash, A., Pothal, L. K., Tripathy, S. (2018). Factors affecting supplier relationship management: an AHP approach. IOP Conference Series: Materials Science and Engineering, 390(2019), 012056. doi:10.1088/1757-899X/390/1/012056
7. Dayak Daily. (2023). Roofing delivery from New Zealand delayed Limbang Museum's construction by a year. Retrieved from: https://dayakdaily.com/roofing-delivery-from-new-zealand-delayed-limbang-museums-construction-by-a-year/

8. Dayak Daily. (2024). Marudi Bridge to be completed ahead of schedule by end of 2024. Retrieved: https://dayakdaily.com/marudi-bridge-to-be-completed-ahead-of-schedule-by-end-of-2024/#:~:text=The%20initial%20contract%2C%20which%20began,chain%20disruptions%20for%20building%20materials.

9. Frodell, M. (2011). Criteria for achieving efficient contractor-supplier relations. Engineering, Construction and Architectural Management, 18(4), 381-393.

10. Ganguly, K. (2019). Supplier satisfaction in buyer-supplier relationships: Assessment from supplier perspective. Proceedings of the International Conference on Advanced Research in Business, Management and Economics. 20-46.

11. Gunawana, R. R., Siagiana, H., Tarigana, Z. J. H., &Jie, F. (2024). The role of supplier-buyer relationship in enhancing business performance through supply chain management practice, total quality management implementation and product innovation. Uncertain Supply Chain Management, 12(2024), 2463–2478

12. Gupta, M., Choudhary, A. K., &Alam, M. S. (2014). Effect of trust, satisfaction and other relationship dimension on supplier relationship management. Review of Integrative Business & Economics Research, 3(2), 17-30.

13. Hair, H. F., Hult, G. T. M., Ringle, C. M., &Sarstedt, M. (2022). A primer on partial least squares structural equation modeling (PLS-SEM). 3rd ed. SAGE Publications, Inc.

14. Hasim, S., Belayutham, S., Ibrahim, C. K. I. C., Rahman, A. S. A., Hanafi, A. G. (2023). The impact of human relationships to material acquisition in construction projects. The International Journal of Integrated Engineering, 15(6), 107-117.

15. Hasmori, M. F., Said, I., Deraman, R., Abas, N. H., Nagapan, S., Ismail, M. H., ...Roslan, A. F. (2018). Significant Factors of Construction Delays Among Contractors in Klang Valley and its Mitigation. International Journal of Integrated Engineering, 10(2), 32-36.

16. Henseler, J., Ringle, C. M., &Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. Journal of the Academy of Marketing Science, 43(1), 115–135.

17. Hisham, S. N. A., &Yahya, K. (2016). Causes and effects of delays in construction industry. Retrieved from: https://engineering.utm.my/civil/wp-content/uploads/sites/29/2016/12/Causes-and-Effects-of-Delays-in-Construction-Industry.pdf

18. Jiang, Z. Z., Henneberg, S., &Naude, P. (2011). Supplier relationship management in the construction industry: the effects of trust and dependence. Journal of Business & Industrial Marketing, 27(1), 3-15.

19. Kamaruddeen, A. M., Chang, F. S., &Wahi, W. (2020). A Study on Factors Causing Cost Overrun of Construction Projects in Sarawak, Malaysia. Civil Engineering and Architecture, 8(3): 191-199.

20. Karungani, W., &Odhiambo, R. (2021). Influence of buyer-supplier relationship on performance of foreign based development agencies in Kenya. International Journal of Economics, Commerce and Management, 9(4), 15-22.

21. Kharade, S. R. &Pataskar, S. V. (2016). An Assessment of Factors Affecting on Buyer-Supplier Relationship Management (BSRM) in Construction Industry. International Journal of Commerce & Business Studies, 4(2), 01-12.

22. Mabrouk, N. B. (2020). Interpretive structural modeling of critical factors for buyer-supplier partnerships in supply chain management. Uncertain Supply Chain Management, 8(2020), 613-626.

23. Malay Mail. (2023). Sarawak Deputy Premier says 36 critically delayed projects identified, under performing contractors to face serious action. Retrieved from: https://www.malaymail.com/news/malaysia/2023/01/31/sarawak-deputy-premier-says-36-critically-delayed-projects-identified-under-performing-contractors-to-face-serious-action/52754

24. Malaysiakini. (2018). Review to bypass Brunei in Pan Borneo Highway a 'life-saver'. Retrieved from: https://www.malaysiakini.com/news/441911

25. Mirawati, N. A., Othman, S. N. &Risyawati, M. I. (2015). Supplier-Contractor Partnering Impact on Construction Performance: A Study on Malaysian Construction Industry. Journal of Economics, Business and Management, 3(1), 29-33.

26. Moritz, D. (2023). The impact of inflation on the buyer-supplierrelationship and the preferred customer status- a case study. Retrieved from: https://essay.utwente.nl/95579/1/Dehn_BA_BMS.pdf

27. Morsy, H. M. (2017). Buyer-supplier relationships and power position: interchanging. International

Journal of Supply and Operations Management, 4(1), 33-52.

28. New Sarawak Tribune. (2022). Late delivery of materials causing BatangLupar bridge delay. Retrieved from: https://www.newsarawaktribune.com.my/late-delivery-of-materials-causing-batang-lupar-bridge-delay/

29. Ngu, V. X. W., & Sam, M. K. (2018). A Study of Factors affecting the Labour Productivity of construction projects In Sarawak. INTI Journal – Built Environment, 2(6), 1-18.

30. Noorizadeh, A., Peltokorpi, A., &Avkiran, N. K. (2019). Supplier Performance Evaluation in Construction Projects: Challenges and Possible Solutions. Journal of Construction Engineering and Management, 145(4), 04019007. doi:10.1061/(asce)co.1943-7862.0001616

31. Nwaguru, P., John, N., & Koko, N. (2022). Managing buyer-supplier relationship in construction project outsourcing. European Journal of Logistics, Purchasing and Supply Chain Management, 10(2), 1-14.

32. Okpala, C. A., &Roslan, S. N. A. (2019).The causes of delays and disruption at construction project in Serdang Selangor, Malaysia. Infrastructure University Kuala Lumpur Research Journal, 7(1), 1-15.

33. Othman, A. & Ismail, S. (2014). Delay in Government Project Delivery in Kedah, Malaysia. Civil Engineering and Mechanics, 248-254.

34. Oghazi, P., Rad, F. F., Zaefarian, G., &Mortazavi, S. (2016) Unity is strength: A study of supplier relationship management integration. Journal of Business Research, 69(11). pp. 4804-4810.

35. Patrucco, A. S., Moretto, A., & Knight, L. (2021). Does relationship control hinder relationship commitment? The role of supplier performance measurement systems in construction infrastructure projects. International Journal of Production Economics, 233(2021), 1-13.

36. Powers, T. L., & Reagan, W. R. (2007). Factors influencing successful buyer-supplier relationships. Journal of Business Research, 60(2007), 1234-1242.

37. Qian, C., Dion, P. A., Wagner, R., & Seuring, S. (2023). Efficacy of supply chain relationships – differences in performance appraisals between buyers and suppliers. Operations Management Research, 2023(16), 1302-1320.

38. Sabri, Y., Micheli, G. J. L., &Cagno, E. (2020): Supplier selection and supply chain configuration in the projects environment. Production Planning & Control, 33(12), 1155-1172.

39. Ting, S. N., Beatrice, J., & Lee, Y. Y. (2022). Occurrence and impact analysis for time-related risks in malaysia public infrastructure projects. Journal of Sustainability Science and Management, 17(6), 104-127.

40. Uddin, M. B. (2024). Investigating the role of relational factors on buyer-supplier relationship management commitment to enhance firm performance through supply chain integration. , Benchmarking: An International Journal, https://doi.org/10.1108/BIJ-09-2023-0625

41. Zyoud, M. M., Bsharat, T. R. K., & Dweikat, K. A. (2024). Quantitative research methods: Maximizing benefits, addressing limitations, and advancing methodological frontiers. ISRG Journal of Multidisciplinary Studies (ISRGJMS), 2(4), 11-14.