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Model Design Supplier Relationship Performance Measurement

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Abstract: One way to maintain a position is how to meet customer satisfaction in a business-to-business context and build buyer-supplier relationships. There are many factors that influence customer satisfaction in the context of business to business and build buyer-supplier relationships. This paper aims to design a more comprehensive supplier relationship performance measurement (SRPM) model with the buyer's perspective and the supplier's perspective. The proposed SRPM model to make it easier for manufacturing companies to measure the performance of the established buyer-supplier relationship. The research method uses interviews and questionnaires to supply chain actors in manufacturing companies and validated by supply chain management experts. The resulting design model for measuring SRPM uses several factors including cost, quality, lead-time, flexibility, trust, power, transparency, communication, commitment, economic sustainable, social sustainable and environmentally sustainable. The proposed model is implemented directly into manufacturing companies using the Analitycal Hirarchy Process (AHP) method. The results obtained look at the total final value of the supplier-buyer relationship and do the mapping with the SRPM matrix model.

Keywords: Supplier, Supplier relationship performance measurement, SRPM, Supplier relationship management, AHP

Introduction

In today's competitive world, companies are constantly trying to make progress and maintain their current position (Beikkhakhian et al., 2015). One of the ways to maintain position is how to meet customer satisfaction in business to business and build supplier - supplier relationships. There are many factors that influence customer satisfaction in a business-to-business context and building supplier-supplier relationships (Rajagopall et al., 2009). According to Oghazi et al (2016) Supplier Relationship Management is a Supply Chain Management concept that can help achieve a competitive advantage.

Supplier Relationship Management is a way for buyers and suppliers to seek competitive advantages in the market, utilizing reciprocal resources as a result of supplier-buyer formation (Amoako-Gyampah et al., 2019). SRM is the management of directed relationships between buyers and suppliers in quality, quantity, and inventory on time. For this purpose, supplier relationship performance measurement (SRPM) is defined as one of the metrics used to measure SRM performance.

It is important to measure the performance of the supplier relationship for relationship development and increase trust. SRPM from a buyer-supplier perspective. Much of the literature on traditional models is based on a buyer perspective, such as evaluation. According to Damlin et al (2012) how to assess buyer-supplier performance by linking indicators and traditional relationships.

This paper aims to design a more comprehensive SRPM model developed by Damlin et al (2012). The SRPM model is based on the perspective of buyers and suppliers with traditional relationship indicators to see supplier relationship performance. In general, the relationship that the buyer-supplier wants to achieve is the closeness

between the buyer-supplier in competitive global competition. This study produces a SRPM model and an increase in performance from the results of calculations using the AHP method. The results of this study serve as a basis for consideration of supplier companies to improve supplier relationship performance.

Method

This research consists of several stages. Stage 1, a literature review containing a literature review of the research by Damlin, 2012; Johnson, 2015 for the SRPM model. Phase 2, building a new model. This stage provides additional criteria and develops a model with two perspectives, namely a buyer perspective and a supplier perspective with the aim of building a more comprehensive model. Stage 3, Model Validation. This stage is carried out by testing and validating the new model that has been obtained by conducting interviews with several experts. This is done to verify the new model that has been formed. Stage 4. Case study. This stage is an implementation of an existing model to be applied directly in the field. Stage 5. Results and Conclusions. This stage describes the new model and implementation results in the company.

Results and Discussion

The framework used is the Damlin model linking traditional KPIs with KPI relationships to measure supplier-buyer relationships. The Damlin model has several factors that influence the supplier-buyer relationship, the factors in the supplier-buyer relationship can be seen in Figure 1.

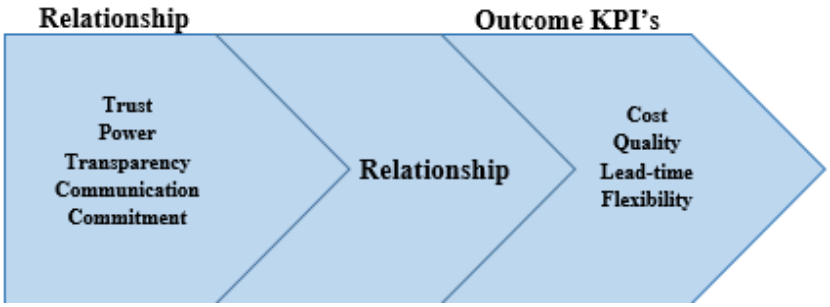

Figure 1. SRPM framework damlin (Damlin, 2012)

Damlin's model connects two categories of traditional KPIs and a relationship that uses only buyer perceptions. This study provides a more compensation model by linking traditional KPIs and relationships using a supplier-buyer approach. There are many criteria or factors that influence this relationship, the relationship criteria used in this SRPM model are criteria that broadly affect a relationship (Damlin, 2012). Supplier Relationship Performance Measurement is a performance measurement in supplier-buyer relationships with several activities including developing a relationship measurement model to identify actual and supplier-buyer perceptions, measure, and monitor and evaluate (Thanh Ha, 2015). The following is a proposed framework for Supplier Relationship Performance Measurement as shown in Figure 2.

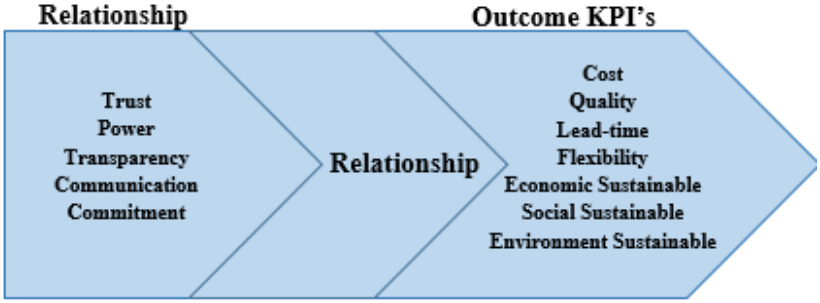

Figure 2. SRPM framework

The proposed SRPM framework is more comprehensive because it uses supplier-buyer perceptions and proposes sustainability criteria. The criteria for sustainability are proposed because the supplier-buyer company has adopted a sustainable management strategy. Sustainability proposed in the SRPM model integrates supplier-buyer sustainability strategy and evaluates sustainable performance to achieve supplier-buyer goals.

Table 1. Model supplier relationship peformance measurement buyer satisfaction

Category	Criteria	Indicator	Scale 1	Scale 2	Scale 3	Scale 4	Scale 5
Traditional (Damlin *et al*., 2012)	Cost (Taherdoost *et al.*, 2019., Cerna *et al*., 2016, Gangurde *et al*., 2015)	Product Price	20% >OE	10% >OE	OE	10% <OE	20% <OE
	Quality (Taherdoost *et al.*, 2019., Cerna *et al*., 2016., Gangurde *et al*., 2015)	Quality Product	30% defective goods	20% defective goods	10% defective goods	5% defective goods	0% defective goods
	Lead-time (Taherdoost *et al.*, 2019., Cerna *et al*., 2016)	Product Delivery	20%-50% late delivery during the contract period	20% late delivery during the contract period	10% late delivery during the contract period	Some items are on schedule, some items are late	As per the agreed schedule during the contract period
	Flexibility (Kurniawan *et al.*, 2017., Cerna *et al*., 2016)	Production Capacity	Not flexible only according to the available capacity	Flexible 10% of the available capacity	Flexible 20% of the available capacity	Flexible 20%-50% of the available capacity	Flexible >50% of the available capacity
Relationship (Damlin *et al*., 2012)	Trust (Graca *et al.*, 2015., Bandara *et al*., 2016., Yoon *et al*., 2019)	Solving Problem	Distrust in overcoming existing problems	Confidence in solving problems is limited to problems according to the interests of the supplier / buyer (calculative)	Confidence to solve the same problem, and nothing more than the existing problem (cognitive)	Trust in overcoming common problems in the form of general problems in the form of common views, expectations, and responsibilities that have been mutually agreed upon (normative)	Trust in overcoming all existing internal and external problems such as financial problems, supply chain problems of suppliers / buyers which are characterized by always keeping promises.

Category	Criteria	Indicator	Scale 1	Scale 2	Scale 3	Scale 4	Scale 5
	Power (Damlin *et al.*, 2012. Bandara *et al.*, 2016)	Reputation Branding	The power of suppliers in branding is that buyers depend on suppliers on standard goods.	The power of suppliers in branding is that buyers depend on suppliers on critical goods.	Balance of supplier-buyer brand reputation so that it is interdependent.	The dependence of suppliers in selling standard goods.	Strong buyer's brand reputation so that suppliers depend on buyers for critical goods.
	Transparancy (Gardner *et al*, 2019, Gyampah *et* al., 2019)	Information and Decisions	There is no transparency in sharing information or providing information to parties who need information	Limited transparency of supplier-buyer external needs (sales targets)	Transparency is limited to the needs of the supplier / buyer (nothing more) and is relevant to the supplier-buyer relationship.	Transparency of internal and external information is limited to buyer supplier relationships such as logistics, buying / selling, and production / operations schedules.	Full transparency in providing information without restrictions such as company objectives, customer information and marketing.
	Communication (Graca *et al.*, 2015., Vos *et al*., 2016., Maestrini *et al*., 2018)	Communication Quality	Cannot be reached except in person.	Difficult to contact, through many terrains and long waiting times.	Easy to contact, very long waiting time.	Contactable only by email, and on time.	Easy to contact by phone, cell phone, fax, email or website, good response, timely and considerate.
	Commitment (Graca *et al.*, 2015., Yoon *et al*., 2019., Bandara *et al.*, 2016)	Long term Relationship	Discommitted, irresponsible, and disloyal.	Make deals but don't commit.	Committed to agreed goals, irresponsible, disloyal.	Commit to agreed goals and be responsible.	Fully committed to realizing agreed goals, responsible and loyal.

Category	Criteria	Indicator	Scale 1	Scale 2	Scale 3	Scale 4	Scale 5
	Economic Sustainable (Giannakis *et al.*, 2020., Gardner *et al*., 2019., Jain *et al*., 2019)	Increased Sales	There is no increase in production from the start of the supplier-buyer relationship.	20% increased production from the start of establishing a supplier-buyer relationship.	30% increased production from the start of establishing a supplier-buyer relationship.	40% increased production from the start of establishing a supplier-buyer relationship.	50% increased production from the start of establishing a supplier-buyer relationship.
	Social Sustainable (Giannakis *et al.*, 2020., Gardner *et al*., 2019., Jain *et al*., 2019)	Increased social investment	There is no improvement from the beginning of the supplier-buyer relationship.	20% increased investment for environmental conservation, disaster management, social and community empowerment activities.	30% increased investment for environmental conservation, disaster management, social and community empowerment activities..	40% increased investment for environmental conservation, disaster management, social and community empowerment activities.	50% increased investment for environmental conservation, disaster management, social and community empowerment activities.
	Environment Sustainable (Giannakis *et al.*, 2020., Gardner *et al*., 2019., Jain *et al*., 2019)	Increased energy efficiency	There is no improvement from the beginning of the supplier-buyer relationship.	20% energy efficiency improvements from the start of the supplier-buyer relationship such as reduced use of electrical energy and use of energy efficient lighting.	30% energy efficiency improvements from the start of the supplier-buyer relationship such as reduced use of electrical energy and use of energy efficient lighting.	40% energy efficiency improvements from the start of the supplier-buyer relationship such as reduced use of electrical energy and use of energy efficient lighting.	50% energy efficiency improvements from the start of the supplier-buyer relationship such as reduced use of electrical energy and use of energy efficient lighting.

Table 2. Model supplier relationship peformance measurement supplier satisfaction

Category	Criteria	Indicator	Scale 1	Scale 2	Scale 3	Scale 4	Scale 5
Traditional (Damlin *et al*., 2012)	Cost (Asif *et al*., 2019., Cerna *et al*., 2016 Taherdoost *et al.*, 2019., Gangurde *et al*., 2015)	Product Price	20% > Own Estimate	10% > Own Estimate	Own Estimate	10% < Own Estimate	20% < Own Estimate
	Quality (Vos *et al.*, 2016., Cerna *et al*., 2016., Taherdoost *et al.*, 2019., Gangurde *et al*., 2015)	Purchasing Order	During the purchase contract period, there is always a change of > 50% from the initial purchase amount agreed upon from the beginning of the contract.	During the purchase contract period, there is always a change of 20% - 50% from the initial purchase amount agreed upon from the beginning of the contract..	During the purchase contract period, there is always a change of 20% from the initial purchase amount agreed upon from the beginning of the contract.	During the purchase contract period, there is always a change of 10% from the initial purchase amount agreed upon from the beginning of the contract.	Very good, as long as the purchase contract period is fixed / there is no change according to the number of purchases per month that has been agreed since the beginning of the contract.
	Lead-time (Taherdoost *et al.*, 2019., Cerna *et al*., 2016., Gangurde *et al*., 2015.)	Payment	>50% late payment during the contract period or more than 6 times late during the contract period.	20-50% late payment during the contract period or more than 2-6 times late during the contract period	20% late payment during the contract period or more than 2 times late during the contract period	10% late payment during the contract period or more than 1 times late during the contract period.	According to the agreed schedule every month during the contract period.
	Flexibility (Expert, 2019, Gyampah *et* al., 2019., Cerna *et al*., 2016)	Product Delivery	Not flexible in shipping products with varying quantities, must be according to the agreed schedule.	10% flexible delivery with varying quantities or 10% faster delivery of products according to the predetermined schedule for each shipment.	20% flexible delivery with varying quantities or 20% faster delivery of products according to the predetermined schedule for each shipment.	50% flexible delivery with varying quantities or 50% faster delivery of products according to the predetermined schedule for each shipment.	Flexible in delivery of various quantities during the contract period.

Category	Criteria	Indicator	Scale 1	Scale 2	Scale 3	Scale 4	Scale 5
Relationship (Damlin *et al.*, 2012)	Trust (Graca *et al.*, 2015., Bandara *et al.*, 2016., Yoon *et al.*, 2019)	Solving Problem	Distrust in overcoming existing problems	Confidence in solving problems is limited to problems according to the interests of the supplier / buyer (calculative)	Confidence to solve the same problem, and nothing more than the existing problem (cognitive)	Trust in overcoming common problems in the form of general problems in the form of common views, expectations, and responsibilities that have been mutually agreed upon (normative)	Trust in overcoming all existing internal and external problems such as financial problems, supply chain problems of suppliers / buyers which are characterized by always keeping promises.
	Power (Damlin *et al.*, 2012. Bandara *et al.*, 2016)	Reputation Branding	The power of buyers in branding is that suppliers depend on buyers on standard goods.	The power of buyers in branding is that suppliers depend on buyers on critical goods.	Balance of supplier-buyer brand reputation so that it is interdependent.	The dependence of buyers in selling standard goods.	Strong suppliers brand reputation so that buyers depend on suppliers for critical goods.
	Transparancy (Gardner *et al*, 2019, Gyampah *et* al., 2019)	Information and Decisions	There is no transparency in sharing information or providing information to parties who need information	Limited transparency of supplier-buyer external needs (sales targets)	Transparency is limited to the needs of the supplier / buyer (nothing more) and is relevant to the supplier-buyer relationship.	Transparency of internal and external information is limited to buyer supplier relationships such as logistics, buying / selling, and production / operations schedules.	Full transparency in providing information without restrictions such as company objectives, customer information and marketing.
	Communication (Graca *et al.*, 2015., Vos *et al*., 2016., Maestrini *et al*., 2018)	Communication Quality	Cannot be reached except in person.	Difficult to contact, through many terrains and long waiting times.	Easy to contact, very long waiting time.	Contactable only by email, and on time.	Easy to contact by phone, cell phone, fax, email or website, good response, timely and considerate.

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	Commitment (Graca *et al.*, 2015., Yoon *et al*., 2019., Bandara *et al.*, 2016)	Long term Relationship	Discommitted, irresponsible, and disloyal.	Make deals but don't commit.	Committed to agreed goals, irresponsible, disloyal.	Commit to agreed goals and be responsible.	Fully committed to realizing agreed goals, responsible and loyal.
	Economic Sustainable (Giannakis *et al.*, 2020., Gardner *et al*., 2019., Jain *et al*., 2019)	Increased Sales	There is no increase in production from the start of the supplier-buyer relationship.	20% increased production from the start of establishing a supplier-buyer relationship.	30% increased production from the start of establishing a supplier-buyer relationship.	40% increased production from the start of establishing a supplier-buyer relationship.	50% increased production from the start of establishing a supplier-buyer relationship.
	Social Sustainable (Giannakis *et al.*, 2020., Gardner *et al*., 2019., Jain *et al*., 2019)	Increased social investment	There is no improvement from the beginning of the supplier-buyer relationship.	20% increased investment for environmental conservation, disaster management, social and community empowerment activities.	30% increased investment for environmental conservation, disaster management, social and community empowerment activities..	40% increased investment for environmental conservation, disaster management, social and community empowerment activities.	50% increased investment for environmental conservation, disaster management, social and community empowerment activities.
	Environment Sustainable (Giannakis *et al.*, 2020., Gardner *et al*., 2019., Jain *et al*., 2019)	Increased energy efficiency	There is no improvement from the beginning of the supplier-buyer relationship.	20% energy efficiency improvements from the start of the supplier-buyer relationship such as reduced use of electrical energy and use of energy efficient lighting.	30% energy efficiency improvements from the start of the supplier-buyer relationship such as reduced use of electrical energy and use of energy efficient lighting.	40% energy efficiency improvements from the start of the supplier-buyer relationship such as reduced use of electrical energy and use of energy efficient lighting.	50% energy efficiency improvements from the start of the supplier-buyer relationship such as reduced use of electrical energy and use of energy efficient lighting.

After the proposed framework is made, expert validation is then carried out to obtain a framework that suits the needs in the field. The results of data collection of the proposed framework validation criteria are considered important by all experts so that the proposed framework can be accepted according to field needs. To determine the level of the supplier-buyer relationship, this study proposes the SRPM model. The basic concept in measuring the level of supplier-buyer relationship is the low / small gap between actual perceptions of supplier-buyer. The SRPM model for measuring supplier-buyer relationships uses a scale of 1-5. The SRPM model table is given in Tables 1 and 2.

Case Study

To implement the designed model, direct measurements were made at manufacturing companies, namely PT. X, P. Y and PT. Z. SRPM performance measurement in manufacturing companies is by distributing questionnaires and interviews to companies that are responsible and which deal directly with supplier buyers. There are 2 questionnaires used in this study, namely the SRPM measurement questionnaire and the pairwise comparison questionnaire in each company. The method used is the Analitycal Hirarchy Process (AHP). After distributing the questionnaires, the SRPM measurement results for each company were obtained which explained that the position of the relationship and the results of pairwise comparisons between the SRPM criteria aims to obtain the priority weight of each criterion. Furthermore, the measurement of the SRPM level score is carried out on each supplier-buyer relationship. The following is a summary of the results of the research conducted:

Table 3. Score supplier relationship peformance measurement PT. X and PT. Y

No	Criteria	PT. X to PT. Y			PT. X to PT. Y		
		Score	Criteria Weights	Final Score	Score	Criteria Weights	Final Score
1	Cost	4	0.161	0.644	5	0.131	0.655
2	Quality	4	0.142	0.568	5	0.144	0.720
3	Lead-time	5	0.125	0.625	4	0.131	0.524
4	Flexibility	5	0.12	0.600	5	0.119	0.595
5	Trust	4	0.053	0.212	4	0.052	0.208
6	Power	3	0.111	0.333	3	0.111	0.333
7	Transparancy	5	0.042	0.210	5	0.042	0.210
8	Communication	5	0.088	0.440	5	0.099	0.495
9	Commitment	5	0.081	0.405	5	0.09	0.450
10	Economic Sustainable	1	0.027	0.027	1	0.028	0.028
11	Social Sustainable	1	0.024	0.024	1	0.026	0.026
12	Environment Sustainable	1	0.027	0.027	1	0.028	0.028
	Total			4.115			4.272

Table 4. Score supplier relationship peformance measurement PT. X and PT. Z

No	Criteria	PT. X to PT. Z			PT. Z to PT. X		
		Score	Criteria Weights	Final Score	Score	Criteria Weights	Final Score
1	Cost	4	0.161	0.644	4	0.142	0.568
2	Quality	3	0.142	0.426	5	0.158	0.790
3	Lead-time	5	0.125	0.625	4	0.118	0.472
4	Flexibility	5	0.12	0.600	5	0.105	0.525
5	Trust	4	0.053	0.212	4	0.053	0.212
6	Power	3	0.111	0.333	3	0.11	0.330
7	Transparancy	5	0.042	0.210	5	0.042	0.210
8	Communication	5	0.088	0.440	5	0.098	0.490
9	Commitment	5	0.081	0.405	5	0.089	0.445
10	Economic Sustainable	1	0.027	0.027	1	0.029	0.029
11	Social Sustainable	1	0.024	0.024	1	0.027	0.027
12	Environment Sustainable	1	0.027	0.027	1	0.029	0.029
	Total			3.973			4.127

Figure 3. Matriks SRPM PT. X and PT. Y

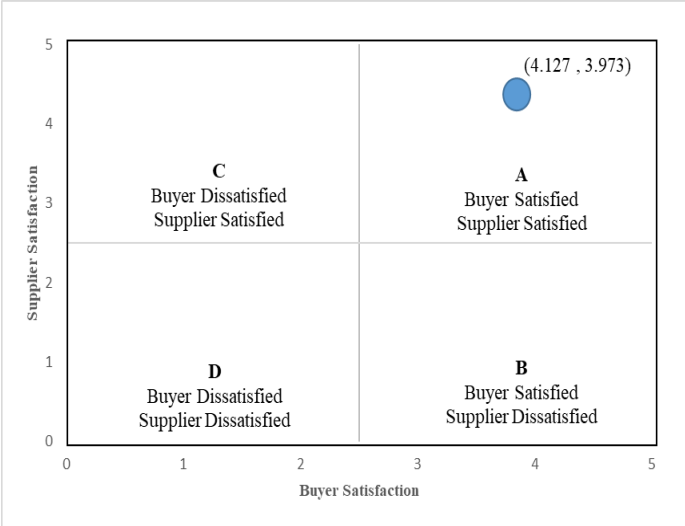

Figure 4. Matriks SRPM PT. X and PT. Z

Based on the research results above, the final value of PT. X and PT. Y with a score of 4,115 and 4,272, while PT. X and PT. Z has a score of 3,973 and 4,127. From the final value of the SRPM supplier-buyer matrix results can be seen in Figures 3 and 4 , where the supplier-buyer relationship is in quadrant A, which means that the supplier-buyer is equally satisfied. However, in this study, the researcher proposes to improve the performance of two supplier-buyer relationships in sustainable quality criteria so as to produce a more perfect SRPM score (5 and 5) as follows:

Standardizing quality by mutual agreement to overcome quality problems that often occur in recycled products and replacement products.

Integrate supply chain systems to produce better information, communication and transparency.
Build sustainable programs in living relationships to achieve mutual sustainability.

Conclusion

Based on the research that has been done, a comprehensive SRPM model was found to make it easier for companies to implement SRPM in the company. This model was built to determine the scale of measurement within the scope of SRPM. Companies are expected to have guidelines for assessing and planning for improvements in supplier-buyer relationships.

The proposal to improve the performance of SRPM in this study is to standardize quality by mutual agreement to solve quality problems that often occur in recycled and substituted products, integrate supply chain systems to produce better information, communication, and transparency, and build sustainable programs in relationship to achieve sustainability together.

Recommendations

In research there are weaknesses and strengths as well as research that has been done, this can be developed again in future research or research. The recommendation for further research is to validate the supplier relationship performance measurement model using SEM or other statistical methods.

Acknowledgements or Notes

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