

MANUFACTURERS SATISFACTION ON THIRD PARTY LOGISTICS PROVIDERS' SERVICE QUALITY

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ABSTRACT— *several authors have acknowledged logistics service quality as the determinant of customer satisfaction. By obtaining customer satisfaction, organization will gain benefits such as higher profitability, retention of customers, better reputation and company image. In Malaysia, inconsistencies of logistics service quality are stated as one of the highest issue concerned among the Malaysian manufacturers. Therefore, the main objective of the study is to examine the level of customer satisfaction among manufacturers towards outbound logistics service quality delivered by third party logistics service providers. Specifically, it undertook to determine whether delivery accuracy, product condition, quality of key contact personnel, responsiveness and timeliness variables as potential determinants for overall customer satisfaction. A self-administered on-line and mail questionnaire was selected as a mode of data collection. A sample was gathered from the Federation of Malaysian Manufacturer 2009 directory. 166 responses were received out of 1500 questionnaires distributed. Data were analyzed by using structural equation modelling AMOS software. From the information gathered, 85.1% of the respondents are users of third party logistics services. Most of respondents have high percentage of using outbound logistics services, more than inbound using logistics services. Key findings exhibit most of the respondents are generally satisfied with overall outbound third party logistics services. Whereby, 52% of the responses are within “slightly satisfied” level, and only 3% indicates slightly dissatisfaction to the 3PL services. Based on the means of satisfaction level, responsiveness is the highest rated component followed by delivery accuracy, while product condition is the lowest ranked component. Furthermore, based on the SEM path significance analysis, it is discovered that responsiveness and timeliness are having positive significant relationship with customer satisfaction and have high impact to affect the level of satisfaction level. The findings exhibits a similar pattern of timeliness impact towards customer satisfaction with earlier research of 1990s in developed countries. Whereby, in more recent studies in the United States indicates non-significance of timeliness. The results also depict the slow development of Malaysian logistics industries whereby technical quality or operational issues are still the main concerns among customers. This study aligns with the needs for more exploration and expansion on utilizing more information technology among 3PL providers as to enhance punctuality and responsiveness.*

INDEX TERMS— *Logistics Service Quality, Malaysian Manufacturers, Third Party Logistics, Customer Satisfaction.*

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I. INTRODUCTION

Customers are the most important assets for businesses [1]–[3]. This is because customers are vital elements that contribute to business success. Eventually, several studies acknowledge that satisfied customers would become as the main source of profitability [4]–[6]. Customer dissatisfaction on the other hand, is the main source of profit deprivation [1], [7] due to limited capabilities of a company to serve its customer. For example, incapability of ensuring quality product/service, failure to provide knowledgeable / responsive representative, failure to ensure optimum stock is available at any time that would be the potential cause for bad customer's experience [8]–[10]. A customer experiences bad services or product includes; damage of product/ expired product/ product performing not as expected, delay in deliveries/ failure of deliveries, receiving inaccurate/ wrong products specifications, product not available on the shelf for purchase are some examples.

In a business-to-business (B2B) context, [11] indicate that there is a critical flow and linkages between suppliers and customers in which, any glitches in between the links are intolerable. Problems such as production line down, shipment delays to end customers, inaccurate shipment are among the outcomes resulting from poor supplier management or service provider's performance [12]–[14]

These complications may worsen the whole supply chain that links up to the end customers. As a result, bad experiences of customers will potentially become as a negative feedback to the suppliers who has failed to fulfil customer expectation [12], [15], [16]. Thus, organizations or companies that receive negative feedback from their customers are likely to deal with outcomes such as, loss of customer confidence, loss of customer loyalty, multiple complaints and the worst is loss of profit [1], [10], [16], [17]. Nowadays, businesses are striving to prove that they are the best among their competitors. It becomes even more challenging with the need to have an aptitude of adapting to customers ever-changing demands. Thus, a slight mistake and carelessness in gaining customer satisfaction may turn out to be a big loss for businesses. Therefore, it is crucial for company to be able to manage and strategize the elements that shall maintain and boost up customer satisfaction.

One of the strategies which is still relevant nowadays taken by firms to enhance the logistics performance and service quality is by using the service of third party logistics providers [11], [18]. Third Party Logistics providers (3PL) or also known as logistics outsourcing is a very popular and common concept. It involves company that supplies and/or co-ordinates logistics activities in supply chain links. Service quality of logistics service provided by the 3PL providers is still an ongoing topic which extensively researched [18], [19]. With shrinking margins of market share and tight budget, service quality is the main source that could balance both limitations. Furthermore, service quality is highly demanded by customers, as it has become the primary determinants for customer satisfaction [10]

II. MALAYSIA 3PL LOGISTICS INDUSTRY

In Malaysia, there are vast expansion and growth of the logistics industry. Whereby, the actively increasing external trade in South East Asian countries like Thailand, Malaysia and Indonesia have been linked to the mounting demand for more efficient logistics services [20]. Nowadays, developing countries are becoming more

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pertinent in the global, as a result of various factors such as the geopolitical status, increasing trades, lower labour cost and high potential of growth [21].

With the increasing Malaysian trade activities, the Malaysian Industrial Development Authority (MIDA) has forecasted that the overall growth of the Malaysian logistics industry is going to be at 8.6% during the Third Malaysia Industrial Master plan period (2006 – 2020), with a contribution of 12.1% to the Gross Domestic Profit (GDP) [21], [22]. In a recent Frost and Sullivan research, it was revealed that despite the sour economic performance in 2017, Malaysian logistics industry is forecasted to grow to 11.5 per cent to RM121 billion [21], [23]. In brief, logistics players such as the shipping line expected to grow up to threefold in volume of the total marine cargo handled. [23] Also forecasted air cargo to increase from 252.6 million tonnes in 2005 to 751 million tonnes in 2023.

Considering the growth of 3PL industry, one of the crucial areas suggested for 3PL Malaysian researches is customer satisfaction level among logistic users and the logistics service quality [16], [24], [25].

Based on preceding research and information gathered, it is the attempt of this study to explore further on variables that shall explain the logistics service quality impact on customer satisfaction. [9] discovered nine variables that cover logistics service quality; they are Product Condition (PC), Key Contact Personnel Quality (PQ), Delivery Accuracy (DA), Timeliness (T), Order Discrepancy Handling (ODH), Order Quality (OQ), Ordering Procedure (OP), Order Release Quantity (ORQ) and Information Quality (IQ). The objectives of this research are as follows:

- i. To identify the impact of logistics service quality on customer satisfaction.

To determine the overall customer satisfaction level of the Malaysian manufacturers towards the logistics service quality provided by 3PL providers.

This study is significant for the 3PL users, as it gathered the information from its customer comprising of manufacturers on the overall perception towards 3PL service and to what extent manufacturers in Malaysia are satisfied with the service. With such information, 3PL providers may utilise the information to identify the elements that affect the manufacturer's satisfaction. Thus, this study offers 3PL service providers a market study which will be a useful source to improvise their services. On the other hand, this study is also an imperative source for manufacturers, or foreign investors. Whereby, the result gathered in this study will serve as a crucial indicator for new investors or manufacturers to understand the status of Malaysian 3PL providers' performance.

This study is also significant for the Malaysian logistics industry stakeholders especially government body, the result within this study may support or utilize the structuring and nurturing any policy related to development of Malaysian logistics industry. As there are several concerns in the industry, such as the preparedness of local 3PL companies to compete with the international 3PL players through the liberalization of services in Malaysia, or some other concern such providing financial or non-financial incentives to the 3PL providers. Thus, this research will perhaps provide an input related in assisting government body to address some of the matters.

Table 1: Item and Source

Item	Source
Product Delivery	[9], [26]

Accuracy	
Product Condition	[9], [26]
Quality of Key contact personnel	[9], [26]
Responsiveness	[27]
Timeliness	[9], [26]
Customer Satisfaction	[9], [26]

The population of this study consist of Malaysian manufacturers. There are approximately 32,535 active manufacturing establishments identified [28]. The most commonly used sampling frame by the researchers who study the Malaysian manufacturers is the directory published by the Federation of Malaysian Manufacturers (FMM). FMM has been established since 1968. It is well recognized and acknowledged as the representatives of the Malaysian manufacturing industry.

One of the FMM functions is to produce a bi-annually directory. Like any other directories, it is a useful source for researchers to get a brief description and information of most of companies. Furthermore, the FMM 2017 directory contains about 2400 manufacturers' all across Malaysia. FMM 2017 directory also includes details of manufacturing contact comprise of office phone numbers, fax numbers, factory addresses, website URLs and email of manufacturer's administration. In addition, it also contains information about the type of products, company registration numbers, establishment years, international standard certificates obtained and brand manufactured.

The respondent targeted to answer the questionnaire were managers at the lower, middle and upper level at the logistics department. As suggested by [29], the logistics personnel especially logistics managers would be the best people to assess the logistics services provided by the 3PL. There are many arguments in determining the adequate sample size. One of the purpose is to ensure that the number of respondents studied adequately represent the population. For this study, there are few concern considered in determining the best sample size. It includes time, cost and data analysis software. Based on [30] sample size decision table, suggested 327 as sufficient for a population of 2200.

This section explains on the data analysis that will be utilized and its processes. Upon the final cut-off date of survey collection, each answer from the questionnaire received was coded accordingly and it was recorded directly into Predictive Analytic Software 18 (PASW 18) (previously known as Statistical Package for Social Science or SPSS). Data gathered was analysed with Structural Equation Modelling (SEM) in the AMOS 18 (Analysis of Moment Structure). SEM is one of the statistical models that are used to explain the relationships among multiple variables [31]. SEM is used to examine the arrangement or structure of interrelationships depicted in a series of equations, similar to a series of multiple regression equations (Tabachnick & Fidell, 2001; Bacon, 1997; Bagozzi & Yi, 1988). [31], [32]

Out of the 195 responses received, 166 or 85.1% of the respondents were among the 3PL users. The responses received were in line with several preceding 3PL researches worldwide[33]–[36]. The 3PL users' responses were

higher than manufacturers who did not use the 3PL service. This result was consistent with the previous Malaysian 3PL studies where among all the responses received, the 3PL users were higher than the non-3PL users. [37], [38]

Almost half of the respondents (49.4%) or 82 manufacturers engaged the same 3PL provider for more than 5 years. Next, the table also exhibits that 38 (22.9%) manufacturers engaged the same 3PL service for one to two years, which is the second highest category of companies using 3PL service in this study. Moreover, 29 companies (17.5%) which used the 3PL service for three to four years represented the third highest rank.

Lastly, 17 companies (10.2%) that used the 3PL services between four and five years represented the lowest response. This finding showed similar results to that in the United Kingdom settings [39] where more companies were likely to use the same 3PL service of more than five years. The result was also in line with that of [40], in which almost half of the companies experienced using the 3PL services for more than five years.

Table 2 presents the types of 3PL service used by the manufacturers. By analysing the means of the logistics activities outsourced to the manufacturers, from a 5 point Likert scale (5 = very high or 100% used and 1 = 0% or not used at all), the highest logistics activity outsourced was outbound logistics service, followed by warehousing of finished goods with a mean of 4.132 and 3.325 respectively. The lowest 3PL service used by manufacturers was product assembly with a mean value of 1.566. The inbound logistics service was ranked at the fourth place with an average score of 3.012. The figures were in line with the preceding research in Malaysia where most companies still used outbound logistics more than inbound logistics, with the rank exhibiting outbound logistics as the first or the highest type of service used. Therefore, this suited well with the criteria of the respondents targeted in this study.

Table 2: Types of 3PL Service Used

Logistics Activities used	Mean	Standard Deviation	Rank
Outbound logistics	4.132	.870	1
Finished Goods Warehousing	3.325	1.241	2
Shipment Consolidation	3.210	1.043	3
Inbound Logistics	3.012	1.159	4
Fleet Management	3.006	1.075	5
Product Return	2.933	1.027	6
Raw Material Warehousing	2.656	1.174	7
Logistics Information System	2.295	1.251	8
Product Assembly	1.566	.980	9

Normality of the main data (logistics service quality item and customer satisfaction) data was assessed with skewness and kurtosis in SPSS. “Skewness” is a measure of how symmetrical the data are, a skewed variable is one

whose mean is not in the middle of distribution[32]. While Kurtosis is measurement of peakedness of the data distribution, it determines whether the distribution is too peaked or too flat [32]. The cut off recommended for Skewness and Kurtosis was not exceeding +1 and must not less than -1 [31], [32]. Table 3 presents the Skewness and Kurtosis of data collected.

Table 3: Skewness and Kurtosis

Variable	Skewness	Kurtosis
CS3	-.529	.897
CS2	-.307	-.190
CS1	-.217	-.327
PQ1	-.221	.287
PQ2	-.130	-.051
PQ3	-.464	-.031
TS1	-.419	-.029
TS2	-.523	-.018
TS3	-.280	-.245
PA1	-.169	.332
PA2	.044	.293
PA3	-.511	.727
T1	-.543	.882
T2	-.375	-.053
T3	-.325	.758
PC1	.007	-.439
PC2	-.233	.146
PC3	-.153	-.576

The entire item showed Skewness and Kurtosis within the cut off recommended. Therefore, data gathered is within accepted normality and may proceed to the next process which is assessment of overall model fit.

All the explanation of model fit discussed serves as guideline to in assessing the model fit in this study. All the data were processed in AMOS and run for the result. The result from AMOS SEM analysis were extracted and presented in Table 13. Based on Table 13 all the fit indices value is within the recommended threshold. Whereby, chi-square is 150.94, $d.f=120$, GFI = .916, RMSEA= .04, CFI = .98, GFI= .916, AGFI = .880, and p -value of .029. Therefore, all items were retained and acceptable to proceed to the next analysis procedure.

Table 4: Fit indices

	Full model	Recommended Level	Remarks
Chi	150.937	-	-

Square			
d.f	120.000	-	-
χ^2/df	1.258	≤ 3.0 [41]	Ok
GFI	.916	$\geq .90$ [32]	Ok
AGFI	.880	$\geq .80$ [32]	Ok
NNFI	.974	$> .90$ [32]	Ok
CFI	.980	$\geq .90$ [41]	Ok
RMSEA	.050	$< .08$ [42]	Ok
P-value	.029	$< .05$	Ok

Note:

GFI = Goodness of fit index,

AGFI=Adjusted goodness of fit index,

NNFI= Non normed fit index, CFI=Comparative fit index,

RMSEA=Root mean square error of approximation.

Table 5: Summary of Hypotheses

Hypothesis	Causal Path	Standardized path coefficient	Comment
H1	Delivery Accuracy---> Customer Satisfaction	.136 $p = .167$	Non significant
H2	Product Condition ---> Customer Satisfaction	.115 $p = .157$	Non significant
H3	Quality of Key Contact personnel -> Customer Satisfaction	.135 $p = .182$	Non significant
H4	Responsiveness -> Customer Satisfaction	.342** $p = .004$	Significant
H5	Timeliness -> Customer Satisfaction	.297** $p = .005$	Significant

	Satisfaction		
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Note: * $p < .05$

** $p < .01$

Responsiveness showed the highest loading to customer satisfaction. In addition, the result also shows that most manufacturers in Malaysia are satisfied with 3PL responsiveness. Responsiveness is an adapted theory from several preceding studies [43] which were incorporated into the logistics service quality scope. The result show significant importance of responsiveness in determining customer satisfaction. Based on the high loading of responsiveness towards customer satisfaction, it indicates that customer are highly sensitive with responsiveness of 3PL.

The empirical results in this study support and share the view of [44] where three out of eight item related to responsiveness and timeliness in their study have been indicated as highly crucial for improvement, namely flexibility , shorter delivery time, using standalone IT application, using EDI to connect with shippers. It also supports several other studies on 3PL responsiveness that it is one of the most important elements that affects dependent variables such as customer satisfaction, competitive advantage and service quality.

The result also shows that most manufacturers are highly satisfied with 3PL responsiveness, based on the statistics evidence in this study, any one disagreement of manufacturers towards service quality provided by the 3PL may affect approximately 30% drop in customer satisfaction level. The results on how manufacturers value much on responsiveness is also evident during exploratory interviews conducted, where four out of five manufacturers mentioned about the importance of 3PL providers to always be prepared for any circumstances, failure to serve at utmost quality in extreme condition may deteriorate customer satisfaction level . The nature of industry is embedded with the reality of businesses extreme sudden erratic changes and it is common nowadays that manufacturers operating in 24 hour. Thus, it is important for 3PL to be well prepared by having optimum capacity and strength. On top of that, every task must be fulfilled as expected even within the extreme volatile condition.

Next, findings in this study exhibit that timeliness has significant positive influence in determining manufacturer's satisfaction level. In comparison with preceding studies, this result contrasts to the findings of preceding studies [29], [45], [46]. Whereby, timeliness is not a significant contributor to customer satisfaction in previous study. Among the possible reasons and explanations that contribute to such result may include: the difference of time the study conducted and the location. Firstly, based on the location of studies as to compare with preceding studies, this study is conducted in Malaysia which is a developing country, while [9] was conducted in the U.S which is a developed country A developed country may have a better logistics system compared to a logistics system in developing countries. It is in line with [47] study, where they found out that there are significant difference in logistics performance across countries and regions where developing countries exhibits lower efficiencies than most of the developed countries.

Furthermore, [9] adds that although it is within a different segment of market, timeliness does not show any significant effect on customer satisfaction. One of the possible explanations was attributed by the development of

Malaysian logistics that is still underdeveloped as compared to the developed country as in [9] study. However, earlier in 1997 the development of logistics industries from the basic physical distribution in the U.S exhibits the significant importance of timeliness in determining customer satisfaction [48].

Eventually, with advancement in network and system technologies and the number of service providers competing in the industry may have improved the overall logistics system in an advanced country [9], which further resulted in an insignificance of timeliness in determining customer satisfaction [9]. Changes or improvement is evident in studies conducted in between 1997 and 2001 in the United States [9], [48].

In view of the significant of timeliness in this study, thus supports the views of several authors in Malaysian study that Malaysian logistics industry is lacking behind in terms of its development. Whereby, Malaysian logistics performance in 2018 as empirically evident in this study exhibit similar significant paths of timeliness towards customer satisfaction as what US has empirically exhibited back in 1997 (Bienstock et al.1997). The results of significant timeliness in this study somehow may reflect the moderate to low information technology usage among Malaysian 3PL providers. Therefore, the need to increase the usage of the right related information technology among 3PL in Malaysia is crucial.

Without sufficient usage of information technology among most 3PLs in Malaysia, manufacturers have little option of choosing the best 3PL provider which can assure them timeliness or punctuality. Whereas, if most of 3PL providers in Malaysia have the advanced technology or system that ensure the punctuality, manufacturers is expected to be less sensitive with the timeliness of 3PL providers. This is because, when there are high number of supplies of 3PL providers competing using advanced technology among each other, thus, it is the stage where timeliness became a basic requirement for every 3PL providers to possess. Subsequently, it may result to lesser significance or insignificance of timeliness as contributor affecting customer satisfaction. This is in line with the view of [46] [1] on the improvement of logistics study in the United Kingdom, whereby when operational or technical quality is well established, the next phase on functional quality will be valued most by customers. However, it is beyond this study objectives to explore on the relationship between information technology usage among 3PL providers or the increasing numbers of 3PL providers towards timeliness and customer satisfaction. Thus future research is recommended to address these questions.

In summary, the findings signify that timeliness of 3PL providers, in Malaysian context, may easily influence customer satisfaction. The failure of 3PL to ensure timeliness will likely result in customer dissatisfaction. While customer dissatisfaction shall adversely result in disloyalty and such consequences open up opportunities for other 3PL service providers. Therefore, in Malaysian context, it is critical for 3PL providers to ensure that the punctuality is taken care in delivery of products, within the operation process and the time taken to update status of shipment. Several factors may influence timeliness, for instance truck breakdown or accidents, product not in stock, damage rectification, congestions, poor schedule planning, poor forecasting, and many other aspects influencing logistics service timeliness [49]. By understanding, the factors that influenced timeliness shall enhance the knowledge on how to further improve timeliness and maintain it at the best performance level. Thus, it is also recommended for future research to go in depth on the factors that may affect timeliness of 3PL services. The next discussion is on the quality of key contact personnel (PQ), product condition (PC) and product delivery accuracy (PA). Two of the hypothesized relationship is in line and supports the findings of [9]. Whereby, based on [9]

study, delivery accuracy and product condition are not significant contributors to customer satisfaction. Except for key contact personnel quality, [9] study indicate that in general market, key contact personnel is a significant contributor to customer satisfaction. Upon further investigation, reveals that the pattern of significant path in this study is similar to the Electronics Industry market segment as in [9] study.

Similarly, this study has received majority of respondents among electric and electronic industry. Furthermore, [9] showed that other than quality of key contact personnel, in electric segments, both product condition and delivery accuracy are also not significant contributors to customer satisfaction. Although not all three variables are the main significant determinants towards customer satisfaction, they still play crucial roles in ensuring timeliness and responsiveness.

III. CONCLUSION

Based on the discussion of the results, literature reviews and overall studies, there are several conclusions drawn from this study. Firstly, most Malaysian manufacturers are generally satisfied with the overall 3PL outbound service quality. Furthermore, this study discovered empirically that most manufacturers are very much sensitive with the capability or the willingness of 3PL to give support and the quality level of 3PL services, especially when executing their job in an urgent situation. The inability of 3PLs to provide responsiveness may easily decreases the satisfaction level, where such conditions may possibly contribute to disloyal customer who seeks for other logistics service providers.

There are others impacts that may arise from poor logistics service quality such as poor image of 3PL services due to customers relating their bad experiences to other manufacturers etc. Second dimension that has high significant positive correlation to manufacturer's satisfaction level is the punctuality of 3PL providers. It includes the timing of task completion and time taken for updating any vital information to the manufacturers. In view of other insignificant variables, insignificance to customer satisfaction may not indicate that it is not important at all. The variables still exhibit high correlation and all three variables which is product condition, quality of key contact personnel, and service delivery accuracy are both significant with responsiveness and timeliness. Failure to fulfil product condition, product accuracy and the quality of key contact personnel may result to low level of both timeliness and responsiveness. Whereby, without fulfilling the three variables, it will be difficult for 3PL providers to deliver responsive and punctual service, thus causing to decrease of customer satisfaction. However, further investigation is required to comprehend the association. Finally yet importantly, the study established its main objectives that are to assess the Malaysian manufacturer's satisfaction level toward 3PL service quality. With the implications expected, it is hopefully that what has been studied may contribute to the growth of Malaysian logistics industry particularly to the manufacturers, 3PL service providers and logistics researchers.

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