

# Predicting the Performance of Small Aquaculture Businesses in Kelantan through Marketing and Logistics Practices

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**Abstract**— *Business performance at production level would influence the overall performance of the aquaculture industry. Many factors can be associated with business performance. It has been argued that a good marketing and logistics practice would lead to a positive business performance. However, it may not be always true for all types of industry, setting and condition. This study examined the effects of marketing and logistics on small business performance in the Kelantanese aquaculture industry. Using a self-administered questionnaire, data were collected from 216 respondents in small aquaculture in Kelantan. The Partial Least Squares Analysis (PLS) was employed to examine the relationship between the marketing, logistics and business performance variables. It was found that only one of the four marketing variables, i.e. place, explained the variation in business performance. But, it had a wrong sign that was negative, instead of a positive sign. On the contrary, two out of three logistics variables (transportation and order processing) influenced the changes in business performance. In the condition of excess demand, marketing did not work, whereas logistics was more important. Thus, a good practice in logistics is more important than that of marketing for small aquaculture businesses.*

**Keywords:** *marketing, logistics, small business, performance, aquaculture, Kelantan.*

## 1. Introduction

Since 1984, global aquaculture production has increased at an average annual rate of 10 per cent; and the significant portion of the increase in fish and seafood was contributed by aquaculture production, and not the capture fisheries[1]. The similar trend of aquaculture production can also be observed in Malaysia. Increased demands from domestic and foreign markets pushed the aquaculture production from 200 thousand metric tonnes or about RM300 million in 2005 to 500 thousand metric tonnes or about RM2,250 million

in 2013[2].

Besides increased population over the years, the increase in domestic demand for aquaculture products is contributed by the Malaysian preference and lifestyle. The Malaysians prefer fish as the main source of protein and the daily diet to other types of animal probably due to inheritable factors. Situated in the middle of the Southeast Asia, Malaysia is abundantly endowed with a good chain of seas, rivers and lakes. This makes Malaysia, a country blessed with natural waters and suitable for freshwater, brackish or saline fish and other aquatic resources for its residents for centuries. Consequently, Malaysia has turned out to be one of the top consumers of fish products in Asia, almost double the average in Thailand and China. It is estimated that an average spending of a Malaysia family on fish is about 20 per cent of their food expenditure; and the consumption index on fish steadily increased from 20kg in 1970, 53.1 kg in 2011, 56.5 kg in 2014 and expected to be 61.1 kg in 2020 [3, 4].

It should be noted that, as applied to other industries, the favourable performance of aquaculture production or supply is mainly contributed by the performance of producers or business entities in the industry. Therefore, studies on business performance are critical to the success of the industry because the findings could be used to improve its players and the industry. Some scholars also argued that identifying factors predicting small business performance is one of the notable areas in small business literature [5, 6]. Many theories have attempted to explain small business performance from various perspectives – individual, firm-specific and environmental factors. Studies on small business performance have also been done in various dimensions, including

economic sector, industry and management (see for examples: [7-9]). Unlike in other industries, small aquaculture business and factors affecting its performance, particularly in Malaysia is extremely limited. Considering the importance of marketing and logistics factors in influencing business performance, this study examined the effects of these two constructs on small business performance of the aquaculture industry.

## 2. Literature Review

Studies on small business have mushroomed for the last few decades due to the ability of the sector to offer socio-economic benefits to the people and the nations across the regions. Until recently, most of the studies on small business and entrepreneurship have devoted to firm growth as the center of their inquiry [10]. The present study also viewed business performance in terms of business growth.

### 2.1 Business Performance

According to [11], business performance is an assessment of the success or failure of a business entity in achieving its goals. To [12], BP is the outcome of a business operation, particularly in the fulfilment of the internal or external objectives related to the business.

BP can be measured quantitatively or qualitatively or both. Similarly, BP can be measured by financial and non-financial indicators [13-16]. As a multi-dimensional construct, BP has several dimensions, such as profitability, image, customer loyalty, product service innovativeness [17] survival, success and competitiveness as well as growth [8]. [18] in their comprehensive literature review found that a firm's performance is determined by individual entrepreneurs, company-specific characteristics and external factors. Recent strategic management studies stress that company-specific or internal factors are more important in determining a firm's performance [19]. Consistent with the Resource-Based View Theory (RBV), this study argued that a business's performance is dependent on internal resources and capabilities [20] or practices of the firm or business. The two internal factors crucial for small business performance are marketing, see for example, [21, 22] (see for instance, [23]).

### 2.2 Marketing

Marketing is important to any business. It has four dimensions, namely price, product, place and promotion (the 4Ps), which could predict BP. In [24] generic strategy typology, marketing

dimensions – cost leadership, product differentiation and market niche – are presumed to have a strong connection with competitive advantages of a firm.

A product is anything that can be offered to a market for attention, acquisition, use, or consumption that would satisfy a want or need [25] of a consumer. A consumer or buyer will consider to purchase a product by looking at its physical appearance, packaging, and tag [26].

As per [27] characterizes price as a cost of creating, conveying and advancing the product charged by a party. Previous studies [28, 29] assert that price is positively associated with business BP. As per [30] reasserted that the price is a strategic marketing variable and an extremely important element in the marketing mix that has the most direct impact on a sales revenue of a firm.

[25] characterize place or distribution as an arrangement of related associations included during the time spent making a product accessible for consumption by consumers. The area covered, openness and channel of product distribution of a business significantly affects BP [21, 29, 31].

Promotion educates customers on the products or services offered in the market [32]. Its activities include publicizing, offering, deals advancement, advertising and direct promoting instruments that the organization uses to meet its publicizing and advertising objectives [27]. [31] found a positive connection between promotion and BP.

Therefore, the 4Ps are predicted to positively impact BP.

### 2.3 Logistics

Logistics covers not only the physical movement of goods, such as procurement, transportation, consolidation, trans-shipment, storage and packaging, but also facilitation of this movement through processing of documents, coordination among participants, monitoring of activities and financing of transactions [33]. Although it encompasses many kinds of activities, this paper considers three most critical logistics activities for small aquaculture business, i.e. storage, transportation and order processing.

Storage functions as the centre for receiving, storing, picking and shipping goods as well as for buffering products, linking the points of origin and the consumers. Previous studies have indicated that efficient storage management can remarkably lower the operating costs of a logistics centre which may translate into higher BP.

Transportation involves the shipping or moving of any goods or products from one place to another, for example, from a supply point to a facility,

warehouse or sales location [23]. [34] confirmed a positive relationship between transportation and business performance. [35] concur that transportation would affect the logistics activities and ultimately production and sale.

[36] also defines order processing as the collective tasks in order to fulfil a customer's order for goods or services. The order processing involves all aspects of managing customer requirements and expectations, including initial order receipt, delivery and invoicing goods or services as well as collection of payment [37]. [38] argues that the order processing is one of the core business processes which could satisfy external customers and hence it adds value as well as enhances BP [37].

Based on the arguments above, it can be hypothesised that storage, transportation and order processing are predicted to positively impact BP.

### 3. Research Method

The three main constructs investigated were marketing, logistics and BP. Marketing (product, price, place and promotion) and logistics (storage, transportation and order processing) variables were measured in a 6-point scale, ranging from 1 (=strongly disagree) to 6 (=strongly agree). Items for marketing were drawn from previous literatures, for example [39]. The respondents were asked about their emphasis on each item measuring each of the marketing and logistics dimension. Items for storage, transportation and order processing were adapted from the past studies [40-42]. BP of the respondents was measured in terms of profitability, level of production and overall performance [43-45]. Based on the statement given: "In the last three years, my business has grown well in terms of profitability, production and overall performance", the respondents were asked to indicate their business performance based on a 6-point scale, ranging from 1 (=strongly disagree) to 6 (=strongly agree).

The respondent or unit of analysis of this study was small-scale aquaculture businesses. The population was located in Tumpat, Bachok, Gua Musang and Jeli, Kelantan. Data were collected using a self-administered questionnaire distributed to 216 respondents who operated their business for at least three years and located in rural areas of the four districts.

Table 1 shows the characteristics of the samples. Giving the challenging nature of the aquaculture

industry, male was the main player in the business (n=93.1%). Most of the respondents received education up to the upper secondary level only. This educational level would probably coerce them to engage in the rural business activity. A large proportion of the respondents were more than 40 years old. However, most of them (77.3%) were relatively new (3-10 years) in the business.

Table 1: Profile of the respondents

Characteristics	Frequency	%
Gender		
Male	201	93.1
Female	15	6.9
Level of Education		
Primary School	42	19.4
Lower Secondary (Form 1-3)	46	21.3
Upper Secondary (Form 4-5)	80	37.0
Pre-University (Form 6, Matric., Foundation)	14	6.5
Tertiary (Diploma, Degree, Higher)	18	8.4
Others	16	7.4
Age of the Owners (Years)		
<30	28	13.0
31-40	39	18.0
41-50	48	22.2
51-60	53	24.5
>60	48	22.2
Age of the Business (Years)		
3-10	167	77.3
11-20	42	19.4
>20	7	3.2

Note: Sample size is 216.

This study aims to predict the relationship between marketing and logistics practices and the performance of small aquaculture businesses. The Smart Partial Least Squares (PLS) Version 3 was applied to analyse the collected data. As proposed by [46] and adopted by [47], this study employed a two-step analytical procedure to evaluate a model using the PLS-SEM, i.e. the measurement model (measuring the relationships between each construct and its items) and the structural model (measuring the relationship between latent variables in the model) with the aim of minimizing the error variance and testing the hypothesis.

### 4. Result and Discussion

The Measurement Model (MM) was employed to evaluate the validity and reliability of latent variables or constructs specified in the model. For this purpose, the convergent validity, as suggested by Hair et al. (2011) was tested using composite reliability (CR) and average variance extracted (AVE). Construct reliability can be assessed by CR or Cronbach’s alpha, but the former is more frequently used over the later for PLS-SEM because its calculation takes into account information on item loadings [48]. The results of CRs, AVEs and Cronbach’s alphas are shown in Table 2. The CRs for all the latent variables exceeded 0.7, indicating its reliability in measurement as recommended by [49]. All the AVEs exceeded the threshold value of 0.5 [48], confirming that the measurement model met the convergent validity assumption. Finally, the Cronbach’s alpha coefficients were more than 0.6, suggesting that the measurement of all the constructs (as proposed by [50]) was reliable.

In the last step, discriminant validity is applied in order to test a measurement model. Discriminant validity can be assessed by comparing the correlations among the constructs and the square root of the AVE for each construct [51]. For discriminant validity to be acceptable, the correlation of each construct with the other construct must be less than the square root of the AVE in the model [48, 52]. Table 3 shows that the model had an acceptable discriminant validity since the correlations for each construct was less than the square roots of the AVEs of the constructs along the diagonal.

Table 2: Results of the Measurement Model

Model Construct and Item	Cronbach’s Alpha	CR	AVE
Business performance (BP)	0.794	0.877	0.703
Product	0.864	0.915	0.783
Price	0.667	0.778	0.260
Promotion	0.895	0.935	0.828
Place	0.668	0.782	0.556
Storage	0.926	0.947	0.818
Transport	0.950	0.959	0.796
Order processing	0.884	0.920	0.741

Table 3: Results of discriminant validity

Constructs	BP	Prod	Price	Prom	Place	Stor	Transp
BP	<b>0.838</b>						
Product (Prod)	-0.377	<b>0.885</b>					
Price	-0.314	0.322	<b>0.51</b>				
Promotion (Prom)	-0.280	0.545	0.271	<b>0.91</b>			
Place	-0.305	0.207	0.162	0.445	<b>0.745</b>		
Storage (Stor)	0.520	-0.422	-0.300	-0.287	-0.222	<b>0.905</b>	
Transport (Transp)	0.210	0.192	0.049	0.295	0.060	0.187	<b>0.892</b>
Order processing (OP)	0.558	-0.383	-0.090	-0.360	-0.216	0.583	0.112

Table 4 shows the results of the structural model and hypothesis testing. Path analysis was adopted to test the hypotheses developed in the research model. Each path coefficient indicates the strength of the relationship between each hypothesized variable, while the R<sup>2</sup> value reflects the prediction power of the model. The R<sup>2</sup> for the full model was 0.463, indicating that the seven variables – the 4Ps and the three logistics variables - explained 46.0 per cent of the variance in BP. In a behavioral research, this R<sup>2</sup> value is relatively high [52].

As shown in Table 4, only place had a significant on BP, but it had a negative sign. In other words, the respondents who had a lesser emphasis on place had a better business performance. Logistics variables, namely transportation and order processing were good predictors of BP. They had significant, positive impact on BP of small aquaculture entrepreneurs in the rural areas of Kelantan.

Table 4: Path coefficient and hypothesis testing

Hypothesis	Relationship	Path Coefficient	T Statistics ((O/STDEV))	P Values	Decision
H1	PLACE -> BP	-0.165	3.427	0.001	Supported
H2	PRICE -> BP	-0.189	1.424	0.155	Not Supported
H3	PRODUCT -> BP	-0.141	1.950	0.052	Not supported
H4	PROMOTION -> BP	0.038	0.560	0.576	Not supported
H5	STORAGE -> BP	0.128	1.715	0.087	Not Supported
H6	TRANSPORTATION -> BP	0.180	2.744	0.006	Supported
H7	ORDER PROCESSING -> BP	0.370	5.026	0.000	Supported

The Stone-Geisser’s (Q<sup>2</sup>) values or the cross-validated redundancy measure should be assessed to determine the predictive relevance of the endogenous variables [53]. Checking the computer

output, the value of  $Q^2$  for the full research model was 0.272, i.e. higher than that of the threshold value of zero as suggested by [49], indicating the presence of a predictive relevance.

All, but one marketing variables were not significant in predicting BP for the small aquaculture industry in Kelantan. Although one marketing variable – place – was significant, it had a wrong sign. Instead of positive relationship as hypothesised, the relationship was negative. By and large, marketing variables were not significant in the studied context. This finding was not consistent with the findings in other studies, which found positive and significant relationships between marketing variables and small business performance [21, 22, 54]. A study on small and medium firms by [55] found that marketing had no influence on competitive advantage of a firm because marketing was not well developed and limited in scope and responsibility as compared to large firms. Adding to this explanation, based on our conversations with the respondents, marketing was not a factor they need to attend to because the industry itself is in the excess demand situation. With a growing number of population and a lower supply of capture fish, the production of aquaculture-related products is not able to be filled up the demand gap. According an officer from the Fisheries Department, freshwater fish is in good demand and short of supply throughout the year. Therefore, the producers and sellers of aquaculture products need not pay attention to marketing aspects.

With regards to transportation, the finding is consistent with [23], who concluded that transportation management is an important factor for firm performance. The emphasis on transportation practices in terms of types of transport used, accessibility of transport to and from the business, loading capacity, cost and time of transport did improve business performance.

The finding on order processing is concomitant with the argument of [56] that the order processing is critical to logistics capability and hence the firm performance. Although, the respondents came from the lowest hierarchy of business organisation, i.e. the rural and small business, those who gave emphasis on pre-order, quality and quantity of customers and diversified methods of payment

would gain higher business performance than that of who did not.

## 5. Conclusion

This study found that marketing variables are not good predictors of BP. On the contrary, logistics variables, namely transportation and order processing significantly predict the variation in BP of the rural small aquaculture industry. The findings provide some implications for the body of knowledge and practitioners. From the management perspective, it provides some support of the RBV that internal capabilities or practices improve business performance. However, the importance of marketing mix (the 4Ps) to BP, is not always true. Under the condition of excess demand, even without proper marketing practices or strategies, firms are able to be well performed. The demand is always there for small entrepreneurs to fulfil. In contrast, good practices of logistics management, particularly in transportation and order processing would lead to greater BP.

Despite providing empirical evidences of the relationship between marketing and logistics variables and BP variable of small aquaculture, this study may have some constraint for generalisation because of its limitations in the study areas covered and the sample size. Therefore, future studies should consider more study areas and a larger sample size including the West Coast of Peninsular Malaysia, Sabah and Sarawak.

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