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Customer Satisfaction Analysis for HydroVac Vaccine (Case Study on Catfish Farmers in Kabupaten Bogor)

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Abstract:
The purpose of this study was to analyze factors influencing customer satisfaction, to analyze the level of customer satisfaction, and to formulate the strategies to improve customer satisfaction HydroVac Vaccine products in BRPBAT. The data were collected from 165 respondents who were customers of HydroVac Vaccine product who used the product at least three times and living in Kabupaten Bogor. Structural Equation Modelling (SEM) and Customer Satisfaction Index (CSI) were used to analyze the data. The results of the study showed that only the product dimension that can influence customer satisfaction. From the estimates of SEM output, the result of CSI for HydroVac Vaccine is 67,85%. The results of the study suggested for managerial implications to increasing the level of customer satisfaction by implementing a marketing mix strategy in product, price, place, and promotion.

Keywords: HydroVac Vaccine, Customer Satisfaction, SEM, CSI.

1. Introduction

The potential of Indonesian aquaculture estimated area is 15,59 million hectares (ha) consisting of potential 2,23 million ha fresh water, 1,22 million ha salty water and 12,14 million ha marine aquaculture. The utilization until now are just only 10,1 percent for freshwater aquaculture, 40 percent for salty water aquaculture, and 0.01 percent for marine aquaculture (Ministry of Marine Affairs and Fisheries, 2011). One of the catfish production centers in Indonesia is West Java Province. Almost all regencies/cities in West Java Province contributes to the production of catfish. Kabupaten Bogor is the area that contributes to the production of catfish in Indonesia's second-largest total of 5578,35 tons in the first quarter of 2010, under the Kabupaten Indramayu that produces 9811,03 tonnes of catfish. When compared with Kabupaten Indramayu, Kabupaten Bogor location where directly adjacent to Jakarta in an effort to give more benefits to help the catfish resource availability for Jakarta and its surrounding region where the nation's largest consumption is at the area (Department of Fisheries and Marine in West Java Province, 2011).

Catfish is one of the freshwater fish species that widely cultivated in Indonesia because it has several advantages, such as easily cultivated and growing faster than any other fish, however in cultivation can not be separated from various constraints such as the most dangerous is disease caused by Bacterial *Aeromonas hydrophila*. *Aeromonas hydrophila* is a bacterial infection causing red spots or also known as Motile Aeromonas Septicemia (MAS), which often attacks freshwater fish and infecting all ages. MAS is an acute bacterial disease, infecting all ages and all types of freshwater fish, can cause mortality up to 100%, and often cause a very significant losses (Wibawa, 2010).

Increased spread of MAS infection on freshwater fish have been prevented by a HydroVac Vaccine produced by Research Institute For Freshwater Aquaculture Bogor (BRPBAT). This vaccine was the first product and the only one in Indonesia for the prevention of MAS infection. Before HydroVac Vaccine was found, the prevention of MAS infection is using products that are not environmentally friendly and harmless in its use.

At present, BRPBAT is the only manufacturer that has an ability to produce vaccines to overcome MAS infection in Indonesia. As a new player in the pharmaceutical industry in fields of fisheries, it is important for companies to gain knowledge of customer satisfaction that is expected to create customer loyalty, and maintain to gain new customers. BRPBAT has sold its products to fulfill domestic demand with distribution channels to major cities throughout Indonesia. At present, HydroVac Vaccine largest consumer is at West Java due to the sales and production is centered in Bogor. In its implementation there are problems in terms of customer satisfaction that includes dimension of product, services, and purchase. The main problem faced by BRPBAT now is

not yet known the level of customer satisfaction while customer satisfaction is considered by the management as the key to creating long-term product success.

The purpose of this study was : (1) to analyze the level of customer satisfaction, (2) to analyze factors influencing customer satisfaction, and (3) to formulate the strategies to improve customer satisfaction HydroVac Vaccine products in BRPBAT.

2. Customer Satisfaction

Many researchers have looked into the importance of customer satisfaction. Kotler*et al.* (2010) defined satisfaction as: "a person's feelings of pleasure or disappointment resulting from comparing a product's perceived performance (or outcome) in relation to his or her expectations". Customer satisfaction is an abstract concept and the actual manifestation of the state of satisfaction will vary from person to person and product/service to product/service. The state of satisfaction depends on a number of both psychological and physical variables which correlate with satisfaction behaviors such as return and recommend rate. The level of satisfaction can also vary depending on other factors the customer, such as other products against which the customer can compare the organization's products.

Customer satisfaction has been a popular topic in marketing practice and academic research since Cardozo's (1965) initial study of customer effort, expectations and satisfaction. Despite many attempts to measure and explain customer satisfaction, there still does not appear to be a consensus regarding its

definition (Giese and Cote, 2000). Customer satisfaction is typically defined as a post consumption evaluative judgement concerning a specific product or service (Gundersen, Heide and Olsson, 1996). It is the result of an evaluative process that contrasts prepurchase expectations with perceptions of performance during and after the consumption experience (Oliver, 1980).

The most widely accepted concept of the customer satisfaction is the expectancy disconfirmation theory (McQuitty, Finn and Wiley, 2000). The theory was developed by Oliver, who proposed that satisfaction level is a result of the difference between expected and perceived performance. Satisfaction (positive disconfirmation) occurs when product or service is better than expected. On the other hand, a performance worse than expected results is dissatisfaction (negative disconfirmation)

Creating customer satisfaction is a defensive strategy and the behavioral objective for defense is customer loyalty (Fornell, 1992). Fornell discussed that customer satisfaction will be influenced if the demand and supply are different. Satisfaction will be low when the customer demand is heterogeneous and the supply is homogeneous. To retain customer, switching barrier and customer satisfaction are the two basic forms which need to be fulfilled. Switching barriers make it costly for customers to switch to competitors and customer satisfaction makes it costly for a competitor to take away another firm's customer. According to Fornell, switching barrier is less effective compared to customer satisfaction. He claimed that high customer satisfaction, reduces the competition in terms of price promotion whereas switching barrier greatly involves in price promotion. This study concentrates on using defensive strategy, particularly customer satisfaction to win customer loyalty. In other words, when the level of customer satisfaction is identical, the level of customer loyalty can vary depending on the magnitude of the switching barrier (e.g., Colgate and Lang, 2001; Jones *et al.,* 2002; Lee and Cunningham, 2001).

Customer satisfaction research has been widely conducted and divided into two categories: service and product. Generally, customer satisfaction research for the category of service are using the Mowen and Minor's 5 dimensions of service quality that includes the tangible, reliability, responsiveness, assurance, and empathy. Examples of studies that using the five dimensions of service quality has been conducted by Qin and Victor (2008), Hu et.al (2010), and Siregar (2007). Qin and Victor (2008) showed that 3 dimension of satisfaction including product, service, and purchase has a significant influence to the relationship of ccustomer satisfaction and behavioral intentions in fast food restaurants. Hu et.al (2010) research showed that by using SEM analysis, 5 SERVQUAL dimensions has a significant influence to the customer satisfaction and loyality of the medical-industry product. Siregar (2007) also using 5 dimension of SERVQUAL in his research about satisfaction and loyality of Cellphone SIM Card in Bogor, by using SEM with 5 dimension showed that satisfaction and loyality are influenced significantly by every variables in SERVQUAL dimension.

While customer satisfaction research for category of product are using the Mowen and Minor's 7 dimensions of product quality which includes the performance, features, reliability, durability, serviceability, aesthetics, and perceived quality. Examples of research that uses 7 dimensions of product quality has been conducted by Subhan (2010), Ayu (2007), Nugroho (2006), and Samuel and Foedjiawati (2005). Subhan (2010) research about relationship of the customer satisfaction to the quality of subsidized fertilizer, using 7 dimension of product quality. Ayu (2007) concluded in her research about customer satisfaction analysis for herb product the service dimension was the highest factor that can influence customer satisfaction than product or purchase dimension. From the estimates of SEM output, Customer Satisfaction Index (CSI) can be analyze and the result showed that CSI for PT LHI is 75,56 percent. Nugroho (2006) concluded if using SEM analysis with 7 dimensions of product quality is not all having significant influence in forming customer satisfaction, while Samuel and Foedjiawati (2005) showed that concluded if using SEM analysis with 7 dimension explain how each dimension showing a different influence to its research.

Based on the previous research, customer satisfaction research are generally using the descriptive methods with survey approach and used a questionnaire. Structure Equational Modeling (SEM) analysis can used to measuring customer satisfaction then completed with Customer Satisfaction Index (CSI) analysis. SEM method is often used in research on customer satisfaction because able to analyze the factors that influence satisfaction and the relationship between the dimensions of the indicator variables or latent variables, SEM is more complete than other tools such as multiple regression analysis, while the CSI is used to explain the percentage of overall customer satisfaction so it can known how far the product have been able to satisfy customers. Studies using these methods has been conducted by Silvestro (2005), Ayu (2007), Subhan (2010), and Nugroho (2006).

Several results of previous studies of satisfaction products and services concluded that the analysis of satisfaction according to Mowen and Minor (1998) that using five dimensions or seven dimensions of service quality of the product quality has a positive

influence on satisfaction, as well as satisfaction analysis based Dutka (1994) also showed that these attributes studied had a positive influence on the creation of both service and product satisfaction.

The uniqueness of this study was examined in terms of objects, using anti-aeromonas vaccine which is one of green products in fisheries industry. Until now there has never been conducted research on fish-vaccines customer satisfaction. Moreover, this study used a product that has no competitors in Indonesia and even in Southeast Asia.
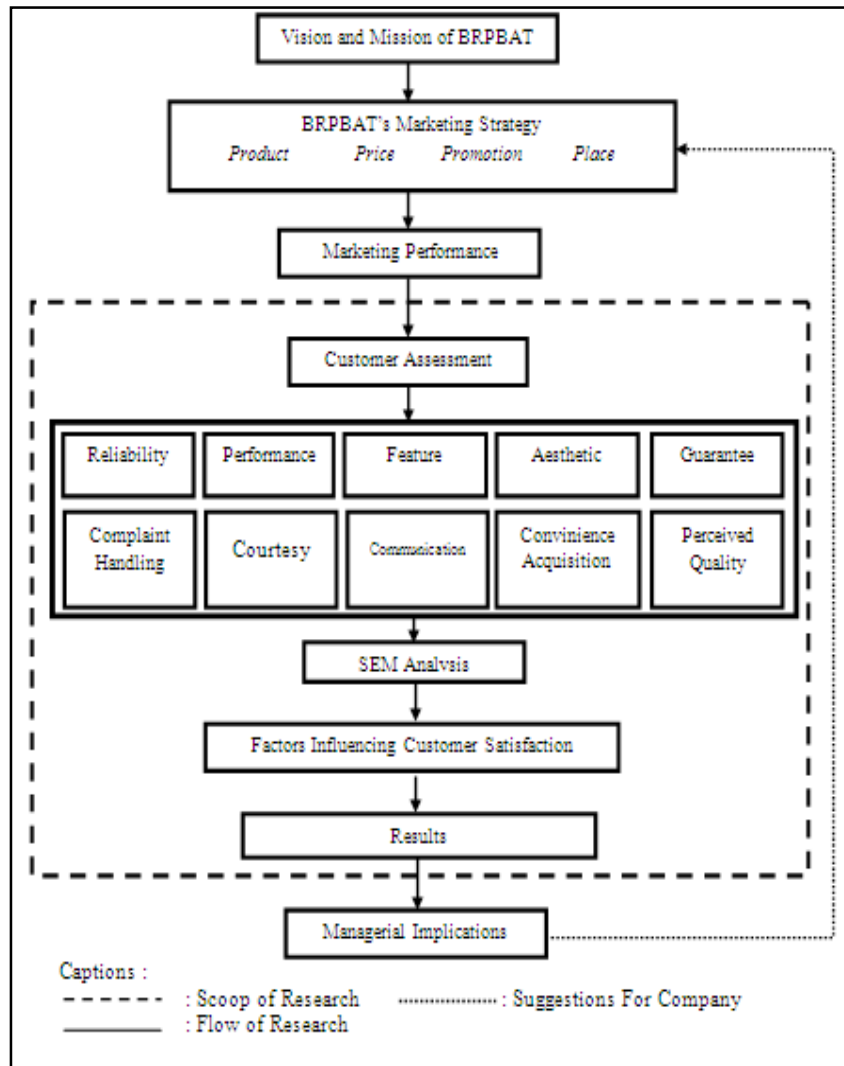

Figure 1: Conceptual Research Model

3. Data and Methodology

Based on previous research studies on customer satisfaction, the conceptual framework of research can be formulated as illustrated in figure 2. The model will be develop from Mowen and Minor's 10 latent variables (reliability, performance, features, aesthetics, guarantee, complaint handling, courtesy, communication, convinience acquisition, and perceived quality)with Dutka's 3 latent variables (product, service, and purchase) which modified according to the conditions of product. Indicator variabels of customer satisfaction attributes is measured using 5 ordinal likert scale with measuring levels from strongly disagree (1) to strongly agree (5), while indicator variables of overall satisfaction is measured using 5 ordinal likert scale with measuring levels from very not satisfied (1) to very satisfied (5). Combination levels of measurement can be performed on SEM analysis, because factors that influence in the data processing is only the meaning of the numbers used in the likert scale, so even though there are different statements of the agreement and satisfaction, during the weighting value of the range 1-5 on SEM analysis data can still be used for further processing except if the statement has a different weighting.
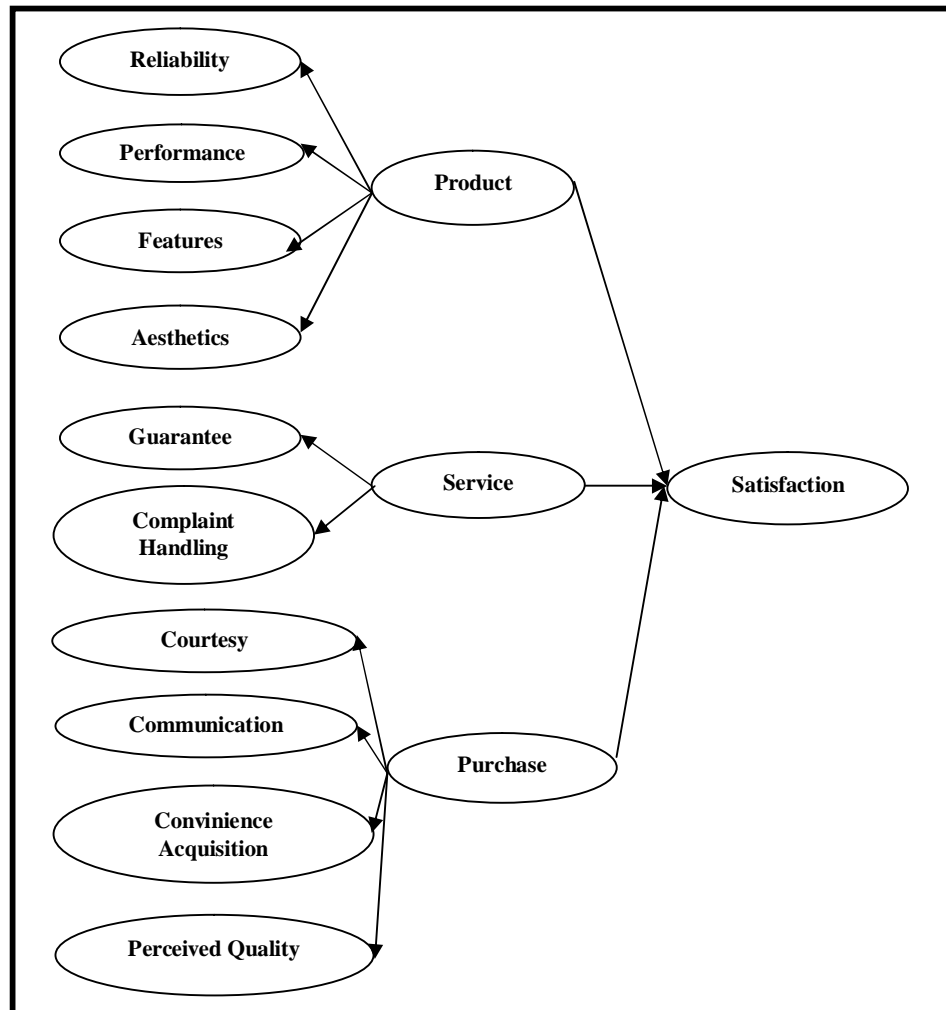
Figure 2: Structural Model

The research was conducted in in Kabupaten Bogor, West Java, Indonesia. Site selection were taken as the location of sampling according to the Ministry of Marine Affairs and Fisheries (2011) statement that four region in Kabupaten Bogor (Kecamatan Parung, Gunung Sindur, Ciseeng, and Kemang) has been projected as the central of catfish cultivation area. Selection of respondents using purposive sampling tehnique who would be appropriate for the study, used primarily when there is a limited number of people that have expertise in the area being researched. The data were collected from 165 respondents who were customers of HydroVac Vaccine product who used the product at least three times for catfish and living in Kabupaten Bogor. Selections of respondents who was interviewed in this study is a head or supervisor of the ponds.

The research was using three analysis such as descriptive analysis, Structural Equation Modeling (SEM), and Customer Satisfaction Index (CSI). Descriptive analysis is a method of research that includes data collection in order to testhypothesis or to answer questions concerning the situation at the present time. Based on structural models that have been proposed in the framework of thought, then to know the value of the coefficient of the model or the contribution of each latent exogenous variables to endogenous latent performed using coefficient prediction approach to SEM, SEM analysis aims to test the statistical model usually in the form of models of causation and have characteristics that are as analytical techniques to further affirm rather than to explain (Suharjo and Suwarno, 2002). SEM analysis is an analysis based on Confirmatory Factor Analysis (CFA), a method that combines correlation analysis, regression analysis, traffic analysis and factor analysis (Suharjo, 2007). CSI can measure the level of overall customer satisfaction to the product and give a percentage of how far the product can meet customer satisfaction, CSI is used to complement SEM because SEM only analyzing the loading factors, relationships, and influence of the latent variables and indicators of satisfaction and not yet able to show percentage how far the product has been satisfying customers.

4. Results and Discussion
Results
4.1. Descriptive Analysis
　　　Demographic data included age, sex, marital status, education, employment, other sources of income, average income per month, average spending per month for fish health operational, and hobbies. More data are described in Table 1.

Characteristics of Respondents	Percentage (%)
Age	
18-26	31
27-35	23
36-44	33
>44	13
Sex	
Male	100
Female	0
Marital Status	
Married	75
Single	18
Widowed	7
Education	
Junior High School	7
Senior High School	54
Academy	19
Bachelor	15
Master	6
Other Sources of Income	
Civil Servants	9
Private employees	22
Another field of entrepreneurship	69
Average Income Per Month (Rp)	
500.000 – 1.000.000	2
1.000.000 – 2.000.000	34
2.000.000 – 3.000.000	23
3.000.000 – 5.000.000	30
> 5.000.000	10
Average Spending for Fish Health Operational Per Month (Rp)	
500.000 – 1.000.000	25
1.000.000 – 2.000.000	39
2.000.000 – 3.000.000	23
3.000.000 – 5.000.000	8
> 5.000.000	5
Hobbies	
Sports	40
Fishing	10
Travelling	22
Culinary	15
Others	13

Table 1: Characteristics of Respondents Based on Demography

Behavioral usage data by respondents related to product usage patterns such as the amount of use, reasons for use, sources of product information, and where to buy. More data are described in Table 2.

Characteristics of Respondents	Percentage (%)
Amount of Use	
3-4	57
5-6	13
7-8	13
> 9	17
Reasons for Use	
Simply trying	9
To cure MAS infection	22
To prevent MAS infection	69
Sources of Product Information	
Brochures/pamphlets	23
Friend	33
Internet	9
Local Department of Fisheries	35
Where To Buy	
Balai Riset Perikanan Budidaya Air Tawar	85
Local Department of Fisheries	15

Table 2: Characteristics of Respondents Based on Usage Behavior

4.2. SEM Analysis

From the model descriptions (constructs) measurement or latent variables that have been described earlier, what is the main indicator of each construct was. This section will discuss the pattern of relationships of all latent variables to obtain a complete picture of how the process happens and how the latent variables affects the customer satisfaction of HydroVac Vaccine. Several measure of overall goodness of fit criteria for the model discussed in this study were Chi-square parameter, probability (p-value), Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI) and Root Mean Square Error of Approximation (RMSEA) which all refer to the goodness of fit rules according to Wijanto (2008). Based on the obtained values, the overall model was built to have an appropriate value so that the models built may explain the empirical information according to data collected. The results of the research model of the overall suitability criteria are presented in Table 3.

Goodness of Fit	Cut off Value	Results	Details
Chi-Square/df	≤ 3,00	0,61	Good Fit
Probability (*p-value*)	≥ 0,05	1,00	Good Fit
GFI	≥ 0.90	0,97	Good Fit
AGFI	≥ 0,90	0,96	Good Fit
RMSEA	≤ 0,08	0,00	Good Fit

Table 3: Goodness of Fit

Path diagram model of customer satisfaction is obtained after processing by software LISREL 8.51 is shown in Figure 3. The test results showed that the exogenous latent variables product has a significant influence in the form of satisfaction variables for the t-test value because each latent variable have a value greater than 1.96. The test results on other latent exogenous variables such as service and purchase are not related and not influencing the satisfaction because both variables having t-test values smaller than 1.96 (Table 4). Both service and purchase latent variable which is not significantly influencing satisfaction will not removed from the model, because all components of these variables is still contributed to build a good SEM models in customer satisfaction analysis for HydroVac Vaccine.

Satisfaction	Construct Coefficient	T-Test
Product	1,14	2,13
Service	-0,76	-1,92
Purchase	0,37	0,49

Table 4: Construct Coefficientand T-TestEndogenous Variables Satisfaction

Product dimension is the only dimension that has a significant influence to satisfaction. This can occur due to the condition in which the customer does not have an alternative choice of similar products apart HydroVac Vaccine that product dimension is highly reliable as the main and most important factor to the customer satisfaction. Customer considers to use the HydroVac Vaccine is how the product advantage in performing its function (reliability), the basic operating characteristics of the product (performance), a secondary or complementary characteristics of the product (features), or the aesthetic of the product itself. At present HydroVac Vaccine is the only vaccines against Aeromonas in the market and not have competitors yet in the category of pharmaceutical products which serve to prevent MAS infection in freshwater fish.

Service dimension has a negative loading factor value in SEM analysis which means decreasing the level of satisfaction than the product or purchase dimension that have a positive loading factor value which means increasing the level of customer satisfaction

(Figure 3). The company should evaluate the performance of HydroVac Vaccine service to increase the product's customer satisfaction. Coefficient estimates and test results can be seen in figure 3 as follows :
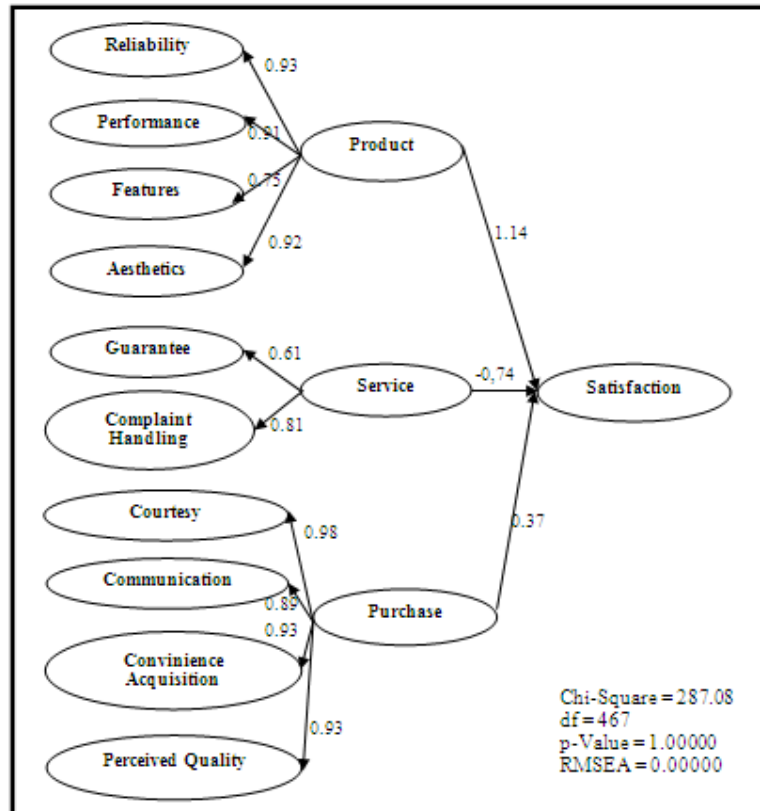

Figure 3: Structural Coefficient Equation Model

4.3. CSI Analysis
CSI analysis has been illustrates that the results of the overall satisfaction in this research are quite high, HydroVac Vaccine overall staisfation was 67.85%. In general, where CSI values were satisfied above 50% it can be concluded that the products has been able to satisfy the customer, otherwise if the CSI is below 50% then the product has not yet been able to fully satisfy its customers. Based on these conditions, the product HydroVac vaccine was able to satisfied its customer 67.85% CSI score and belong to "satisfied" category according to Ihsani (2005).
Based on data obtained from the CSI analysis, with satisfaction levels that are already in a category satisfied the company will still need to maintain existing services and improve the quality of the product because the product has not been extremely satisfied the customer in the category. Attributes that still has a low value needs to obtain an evaluation and special attention from the company so customers are increasingly satisfied with the performance of vaccine the product HydroVac.

CSI Score	Category
81-100%	Very satisfied
66-80%	Satisfied
51-65%	Fairly satisfied
35-50%	Not satisfied
0-34%	Extremely not satisfied

Table 5: Criteria for CSI (Ihsani, 2005)

5. Discussion
Based on the research results, there is several recommendations for BRPBAT related to the customer satisfaction of HydroVac Vaccine. Descriptive analysis provides an overview of general characteristics of the customer at the time of this research was conducted, SEM analysis provides information about the factors that influence customer satisfaction, and CSI analysis provides

information to the companies about level of HydroVac Vaccine customer satisfaction. Based on these three analysis tools have been found the managerial implications which concluded with the 4P marketing mix (product, price, place and promotion) are described in Table 6.

Marketing Mix	Managerial Strategy
Product	Adding information about green products benefit, side effects, storage method, and complaint procedure on the packaging label or the product brochures.
	Finding an innovation by doing research so that the product can be stored without refrigeration for more practical storage.
	Changing the model of packaging design with a more unique and interesting.
	Evaluating the product against complaints from customers
	Extend the product's expiry date.
Price	Maintain a fixed price.
Place	Products are sold through nearest farm/fishing shops.
	Products are sold by internet.
Promotion	Improve promotion through internet and mass media such as agricultural/fishery magazine or newspaper.

Table 6: Managerial Implications

6. Conclusions

From the results of field observations and analysis has been done related to HydroVac Vaccine customer satisfaction, it can be concluded that:

- Overall respondents were satisfied by HydroVac Vaccine products with CSI index score 67.85%.
- Product dimension is the only dimension that has a significant influence in forming customer satisfaction, this dimension is composed of four dimensions: reliability, performance, features, and aesthetics.
- Strategy to increase HydroVac Vaccine customer satisfaction in BRPBAT is able to use the 4P marketing mix (product, price, location, and promotion).

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