



Marketing Information Management System (Research Proposal)

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Abstract: The market keeps on changing and it is becoming a problem for some companies to cope with certain changes. The study aims to provide relevant information that will help decision makers formulate a better marketing mix specifically in the area of pricing and product. The study is achieved by developing a marketing information management system that initially acquires external and internal variables related to the chosen domain. These variables undergo various processes to produce feasible information that is later on used to manipulate plausible scenarios. Reasonable and realistic forecasting techniques are used to give the marketing users some insights. These insights are used to come up with a possible strategic action on the underlying factors that influenced certain variables, which are based on the assumptions that the system has provided. On the other hand, the manipulation of scenarios is not flexible, there are pre-defined scenarios that are manipulated in order for the marketing users to anticipate outcomes and possibilities of the said instances. As from what was deduced from the study and development the most appropriate methodology is the agile methodology. This is due to the fact that during the certain phases of the study and development, the information must be verified and validated before proceeding to the next phase. This is greatly achieved in an agile approach wherein there is continuous data gathering, analysis, and testing. With the use of the information that is produced by the study and the developed system the marketing users can come up with a better marketing mix for their product and price.

Key Words: marketing; information system; decision-making; forecasting; simulation

1. INTRODUCTION

1.1 Background of the Study

A business is an attempt to sell goods, services, and merchandises in exchange for profit. In order to continually sell these, an organization must have a continuous marketing effort in order to find out where to sell, whom to sell, what to sell, and how to sell these.

Marketing is not just about advertising the product or service, it's mainly about understanding the marketing environment the company is in and learning how to use these information as an advantage ("Marketing", 2013). However, marketing does not stop in information gathering.

This information should be processed systematically in order to produce a realistic set of results for a more effective approach.

Nowadays, the market keeps on changing and it is becoming a problem for some companies to cope. Companies need to develop or formulate results better than before to be able to compete and have a competitive advantage against other organizations within the industry. In order to do so, proper managing and analyzing of information is needed to immediately respond to the changing needs. However, this is becoming a problem due to some organizations lacking the needed equipment and tool.



2. METHODOLOGY

An extensive research conducted was about the processes and the components of marketing as well as its integration with technology in order to aid businesses in their decision making that involves the company's sales and advantage towards the company's competitors in the industry. Moreover, a creation of a system that would help companies in their marketing specifically the product and price component of the marketing mix. In order to know the processes of the domain and also consolidate the information that has gathered in the research, there were series of interviews conducted to the domain and also to marketing experts. Through the help of the marketing experts that were interviewed, it will be able to help provide accurate and useful results for the domain

A system design was created through the results of benchmarking from systems used by businesses in order to address the problems that have been discovered. From the designing of the system, the group moves on coding the system strategically through doing it module by module. After completing a working system, the group would let the company users test it to gauge if the system would fit in their company. Agile was the software development methodology adapted by the group. Agile is a methodology that combines iterative and incremental process models with the focus on process adaptability and customer satisfaction by a rapid delivery of the system. Agile is a very realistic approach to develop the system. Through the Agile methodology, the group would be able handle the system needs easily with minimal costs.

3. RESULTS AND DISCUSSION

3.1 Proposed System

According to Freihart (2012), the primary reasons for the need of marketing information management system are competitive pressures, steady increase of customer expectations, and

information revolution. Figure 1 is a graphical representation of how the system will work. Companies need to develop or formulate results better than before to be able to compete with the other organizations. Through the use of a marketing information management system, it will be possible to gather information from external sources from the World Wide Web with the use of a marketing intelligence system. The external factor, will be coming from different reliable sources in the World Wide Web. External data such as foreign exchange rate, gross domestic product, and inflation rate will be gathered through the use of the World Wide Web specifically through RSS as shown in Figure 2 on the dashboard of the proposed system. These external factors shall be automatically updated in the system through Rich Site Summary (RSS). Both internal and external factors gathered from the previous module will then be used in the process information module as shown in Figure 5. The information will then be used by the system to come up with a forecast to help the company in their difficulty in predicting and anticipating changes in price as well as customer demands as shown in Figure 3. In addition, the marketing team can also simulate scenarios with the use of the marketing management science system to identify results of possible changes as shown in Figure 4. This system will act as an aid to help the company make better decisions. Marketing users can change certain variables that corresponds to the what if scenarios.

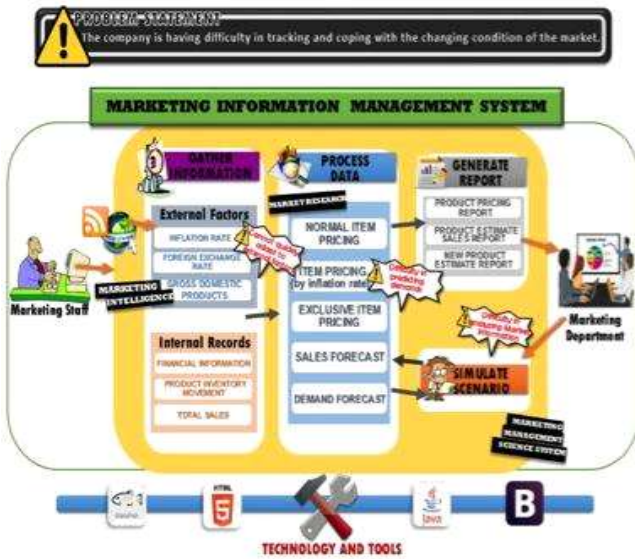


Figure 1. Conceptual Framework



Fig. 2. Dashboard



Fig. 3. Forecast



Fig. 4. Simulate Scenario



Fig. 5. Internal Records

3.2 Forecasting Techniques

3.2.1 Normal Item Pricing

Formula:

$$\text{Cost of Good} = (\text{Actual Cost of Item} \times \text{Foreign Exchange Rate}) + (\text{Duties and Taxes} \times 1.35 \times \text{Foreign Exchange Rate})$$

$$\text{Selling Price} = (\text{Cost of Good} \times 0.35) + \text{Cost of Good}$$

This is the standard formula that the company uses when setting up a selling price for their item. However, due to their slow process there are times that the selling price is too high or too low for that particular item. This is because of the fact that the foreign exchange rates are updated quarterly in their records. The company cannot immediately see the loss or gain that the product is undergoing since this will only be seen in the next quarterly meeting. In this system, whenever there are updates in the foreign exchange rates the



marketing staff can input it in the system and see how this will affect the prices.

3.2.2 Exclusive Item Pricing

Formula:

$$\text{Cost of Good} = (\text{Actual Cost of Item} \times \text{Foreign Exchange Rate}) + (\text{Duties and Taxes} \times 1.35 \times \text{Foreign Exchange Rate})$$

$$\text{Selling Price} = (\text{Cost of Good} \times 0.60) + \text{Cost of Good}$$

The only difference of this formula from the previous one is the percentage of its markup price. Since there are items in the company that are exclusively being distributed, the company takes it to their advantage and places a 60% markup price.

3.2.3 Item Pricing (Affected by Inflation Rate)

Formula:

$$\text{EstimatePrice} = \text{PriceOfItem}(1 + \text{inflationrate})^{\text{Years}}$$

The inflation rate is a huge factor in setting up a price for an item. Inflation rate refers to the purchasing power of money, which means that the money you have now may not be enough to buy the item of the same price anymore. This happens when there is an increase in the inflation rate. As shown in the formula above the P refers to the price of the item, i refers to the inflation rate, and n is the years you want to compute. Placing all these variables, the system can now compute for the more reasonable and estimated price which is Pn. The inflation rate will be gathered from the website of Banko Sentral of the Philippines while the n is set to 5 years since according to the group's expert, forecasting is usually done 2 years back and 5 years forward.

3.2.4 Sales Forecast

Formula:

$$\text{Growth of Sales} = (\text{Current Year's Sales} / \text{Last Year's Sales}) \times 100$$

$$\text{Next Year Sales} = \text{Last Year's Annual Sales} + (\text{Last Year's Annual Sales} \times \text{Inflation Rate})$$

The growth of sales is important since a pattern can be seen from the historical data. The growth can be computed through the use of the

previous records of sales over the last months. This can be done through a continuous computation of a pair of sales. From this computation the marketing staff can see the pattern of the sales whether it is steadily increasing, steadily decreasing, or even a seasonal increase of sales. It is also important to forecast yearly sales so that the company can monitor their improvement over the years as well as setting a target or a goal.

3.2.5 Demand Forecast

Formula:

$$\text{PreviousDemandForecast} + 1 = \text{smoothingconstant} (\text{ActualDemand}) + (1 - \text{smoothingconstant}) \text{PreviousDemandForecast}$$

An exponential smoothing method is a demand forecasting tool which is an averaging method that reacts more strongly to recent changes in demand by assigning a smoothing constant to the most recent data more strongly; useful if recent changes in data are the results of actual.

F t + 1 is the forecast for the next period, D t is the actual demand in the present period which can be gathered from sales and inventory movement, F t is the previously determined forecast for the present period which is based on the historical forecasts made, and a is the weighting factor referred to as the smoothing constant. This can be used by the company anticipate probable shortage and surplus of their products.

3.3 Simulation Techniques

The company is having difficulty in analyzing marketing information; this is why a scenario simulator is proposed. Marketing users can change certain variables that corresponds to the *what if* scenarios; the system will then show possibilities of the changes made. This idea falls under the concept of the marketing management science system. In addition, it has a very strong relationship with the previous module since it will also use the information processed in the previous module. There are different scenarios placed in this module, which follows certain formulas, which



makes it a quantitative approach to certain scenarios.

3.3.1 Market Equilibrium

Formula:

$$SRP = \text{Demand}(\text{Equilibrium}) + \text{Supply}$$

Market equilibrium occurs when the quantity demanded is equal to the quantity being supplied. This enables the marketing user to manipulate variables of price, demand, supply, and equilibrium. With the use of the product inventory record of the company and the historical movement of each product, the use of market equilibrium can determine the right amount of product that should be bought in order to keep up with the demand of the consumers. The market equilibrium also sets the right amount of price that should be given to a product so that it could meet the expected price of the consumers. This model can aid in answering scenarios such as *At what price shall I sell the items with a certain amount of supply to reach a certain demand, If I want a certain price for an item, what will be the demand, and At what point will the demand and supply be equal for me to avoid shortage or surplus*

3.3.2 Regression Analysis

A regression analysis enables its users to formulate sales forecast and also, to determine different what-if scenarios. There are going to be two variables that would be needed in order to do a simple linear regression which are the independent variable, which cannot be affected by any factors that the user is trying to measure and the other variable is the dependent variable which is affected by different factors.

Again, the users would be provided with these various correlated variables. The different data that are needed for the model is the historical sales data, price, GDP, and inflation rate. The correlated variables that would be assessed are the monthly sales and inflation rate, price and monthly sales, GDP and quarterly sales, and inflation rate

and price. After identifying the set of values for the various variable, the set of data that could be produced would be ΣXY , ΣX , ΣY , $\Sigma(X \cdot X)$. The (Y) would signify as the dependent variables and the (X) would be the independent variables. Once acquiring the values of a and b values, it would be used in order to identify the values for the formula for getting the simple linear regression. Calculations are done to the two variables in order to develop a regression equation to forecast or predict the variable that the user desires.

3.3.3 Monthly sales and Inflation rate

A change in the inflation rate could affect the monthly sales of the company which is why this is identified as correlated. In this scenario the, inflation rate would be the independent variable and the monthly sales would be the dependent variable.

When all the summations are done, these variables would be used for the formula for getting the intercept point. The scenarios would be used in order to aid the marketing staff in answering different what-if situations such as *What if the inflation rate changes? If the inflation rate changes, what could happen with the sales?*

Y = MONTHLY SALES & X= INFLATION RATE

$$a = \frac{\Sigma \text{Monthly Sales} \cdot \Sigma \text{Inflation Rate}^2 - \Sigma \text{Inflation Rate} \cdot \Sigma (\text{Inflation Rate} \cdot \text{Monthly Sales})}{n \cdot \Sigma \text{Inflation Rate}^2 - (\Sigma \text{Inflation Rate})^2}$$

$$b = \frac{n \cdot \Sigma (\text{Inflation Rate} \cdot \text{Monthly Sales}) - \Sigma \text{Inflation Rate} \cdot \Sigma \text{Monthly Sales}}{n \cdot \Sigma \text{Inflation Rate}^2 - (\Sigma \text{Inflation Rate})^2}$$

$$y = a + b \cdot x$$

3.3.4 Price and Monthly sales

A change in the price rate could affect the monthly sales of the company, which is why this is identified as correlated. In this scenario the, price rate would be the independent variable and the monthly sales would be the dependent variable.

This scenario would be used in order to aid the marketing staff in answering different what-if



situations such as *What if the price rate changes? How big will the sales be affected with the change of the price.* The next scenario would be the correlation of the price and the monthly sales which the price would be the independent variable and the monthly sales would be the dependent variable. *What could the sales be given this price? What if the price changes in a given amount?*

Y= MONTHLY SALES & X = PRICE

$$a = \frac{\sum \text{Monthly Sales} * \sum \text{Price}^2 - \sum \text{Price} * \sum (\text{Price} * \text{Monthly Sales})}{n * \sum \text{Price}^2 - (\sum \text{Price})^2}$$

$$b = \frac{n * \sum (\text{Price} * \text{Monthly Sales}) - \sum \text{Price} * \sum \text{Monthly Sales}}{n * \sum \text{Price}^2 - (\sum \text{Price})^2}$$

$$y = a + b \cdot x$$

3.3.5 GDP and Quarterly Sales

The scenario would be the correlation of the price and the monthly sales, which the price would be the independent variable and the monthly sales would be the dependent variable.

This scenario would be used in order to aid the marketing staff in answering different what-if situations such as *What if the GDP rate changes? How big will the sales be affected with the change of the GDP?*

Y = QUARTERLY SALES & X = GDP

$$a = \frac{\sum \text{Quarterly Sales} * \sum \text{GDP}^2 - \sum \text{GDP} * \sum (\text{GDP} * \text{Quarterly Sales})}{n * \sum \text{GDP}^2 - (\sum \text{GDP})^2}$$

$$b = \frac{n * \sum (\text{GDP} * \text{Quarterly Sales}) - \sum \text{GDP} * \sum \text{Quarterly Sales}}{n * \sum \text{GDP}^2 - (\sum \text{GDP})^2}$$

$$y = a + b \cdot x$$

3.3.6 Price and Inflation rate

The scenario would be the correlation of the price and the monthly sales which the price would be the independent variable and the monthly sales would be the dependent variable.

This scenario would be used in order to aid the marketing staff in answering different what-if situations such as *how will the inflation rate hurt*

the price of the company? What would happen if the inflation rate changes?

Y= PRICE & X = INFLATION RATE

$$a = \frac{\sum \text{Price} * \sum \text{Inflation Rate}^2 - \sum \text{Inflation Rate} * \sum (\text{Inflation Rate} * \text{Price})}{n * \sum \text{Inflation Rate}^2 - (\sum \text{Inflation Rate})^2}$$

$$b = \frac{n * \sum (\text{Inflation Rate} * \text{Price}) - \sum \text{Inflation Rate} * \sum \text{Price}}{n * \sum \text{Inflation Rate}^2 - (\sum \text{Inflation Rate})^2}$$

$$y = a + b \cdot x$$

4. CONCLUSIONS

Different organizations are doing everything they could in order to gain a competitive advantage among respective competitors. They use marketing as a strategic function to identify and adapt to changes in the market environment. However the amount of information needed by an organization is profound, thus establishing a market information system is needed by the company. According to Robert Harmon (2009), marketing information system provides the information technology backbone for the marketing strategic operations. Which mean this system controls the flow of information required by the decision makers.

According to Dr Sultan Freihat (2012), the primary reasons for the need of marketing information management system are competitive pressures, steady increase of customer expectations, and information revolution. Companies need to develop or formulate results better than before to be able to compete with the other organizations. Inaccuracy of information in which decision is built, results to poor decision taking thus not being able to satisfy the needs of customers. Managing and analyzing of information's becomes a problem due to the multiple sources of information gathered by the organization.

Several advantages occur in establishing a marketing information management systems. There would be an organized data collection wherein multiple information can be collected and then organized in the database thereby improving productivity. With a proper MkIS, the entire



organization can be tracked to analyze independent processes, which helps in establishing broader perspectives in facilitating improvement. MIS helps in avoiding of crisis, by analyzing the past performance of stocks of the organization and predicting future possibilities of the company. It also provides sophisticated analysis of data and has the ability to make recommendations to use as an aid for decision making. Through MkIS, the organization could identify different opportunities on determining what the stand of the organization towards certain merchandise. Among the advantages of developed MkIS in an organization is searching for opportunities unto which merchandise are on the top.

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