



## The MaInMan

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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 system that was developed was based on our proposal last year (Marketing Information Management System: A research proposal). It 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 has been revised several times in order to come up with a better solution through developing the system for the chosen domain. The purpose of this research is to show the progress and development of the system. Inputs from the 2014 congress as well as the opinions of the different marketing experts further improved the validity, and reliability of the data produced by the system. The group has conducted several user acceptance testing (UAT) from the domain and the marketing experts in order to improve the development, functionality, and usability of the system. The paper will show the transition of change given that the opinions and comments of the congress and experts were put into account. The main focus of the system now is the use of forecasting and transpiring the forecast data into either the simulation for price sensitivity or for sales sensitivity tool. Formulas that were used in the process were changed and was lessen as per advised by the different marketing experts in order to improve the reliability of the outputs. This is greatly achieved in an agile approach wherein there is continuous data gathering, analysis, creation of prototypes, testing of the experts and domain, and refinement. With the use of the information that is produced by the study and the developed system the marketing users will be able to come up with a better marketing mix for their product and price

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

## 1. SECTION

### *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

Extensive research about the process and the components were needed in order to come up with an aid to their decision-making that will serve as a the company's means to create more profit. The group conducted researches in order to have a solid concept of the domain. The interviews conducted were not only to the domain but also to several marketing experts in order to consolidate, validate, improve the reliability of the data that will be shown and produced by the system. Inputs and feedbacks from the 2014 congress were also put into consideration.

A system design was created through the results of benchmarking from possible decision support system. From the designing of the system, the group moves on coding the system strategically through module by module. It was more practical for the group to continuously ask the marketing experts for opinions and critique in the design, presentation, and validity of the outputs produced in the system. This was to avoid major revisions or a total change of the system if it were to be critiqued at the final stage of development.

The working system was tested through the help of the main users of the system, which is the domain. The new system was analysed and evaluated by the domain since feedbacks were needed in order to improve their user experience. The main users of the system as well as the experts did user Acceptance Testing. Necessary adjustments in the system were done in order to fit the needs of the domain.

## 3. RESULTS AND DISCUSSION

### 3.1 The System Solution

According to Freihat (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.



Fig. 1. Conceptual Framework

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 and inflation rate will be gathered through the use of the World Wide Web specifically through Web Scraping as shown in Figure 2 on the dashboard of the proposed system.

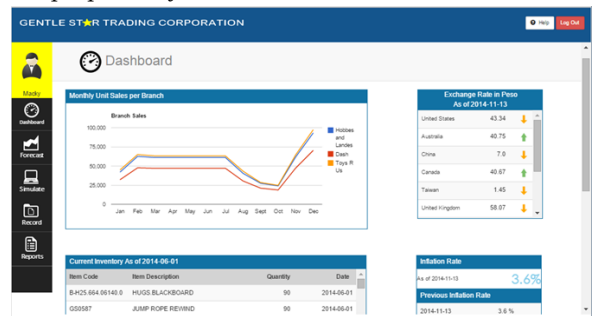


Fig. 2. Dashboard

These external factors shall be update automatically updated in the system. 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, decision making will be easier with the help of the reports and suggestion that the will be generated by the system.

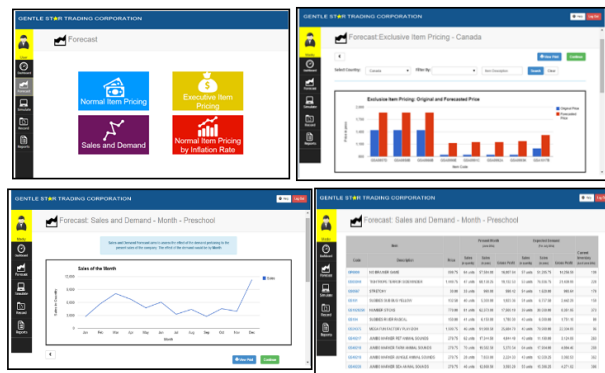


Fig. 3. Forecast Technique

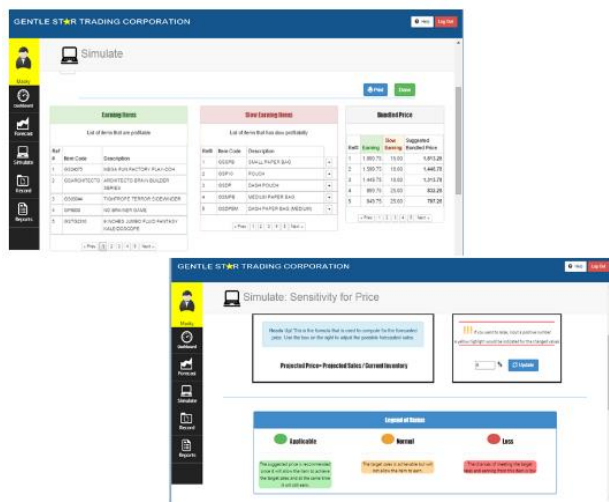


Fig. 4. Simulation Technique

### 3.2 Design Consideration

This paper discusses the transition of change given that the opinions and comments of the 2014 Research Congress participants and marketing experts were put into account. After the group has consulted with their marketing experts, several changes with software design have been revised. Three major areas of the system has been asked by the marketing experts to be redesigned. A more appropriate formula for the pricing by inflation rate was given by the experts, which could be used within two years span of time. A better approach was used for the simulation module of pricing and sales sensitivity, to bring more significance towards the decision making of the users.

For the formula of the pricing by inflation rate, the marketing expert suggested that we use a formula with a fix period. Not to over complicate the data the group have, the formula given by the marketing expert is total price multiply by the inflation rate, then the answer from the equation will be used to add to the total price of the item.

In sales sensitivity, the concept of item bundling was mention to the group, wherein series of items are rearrange depending on the behavior of its sales and then user can match items by items that sells the most together with the items that sells the least. For the price of the bundled item the formula used is price A plus price B which is the total price of both items and then multiply it to 90%. For the price sensitivity, two variables will be used to find the suggested price. The first variable used is the forecasted sales generated earlier by the system and the next variable is the currently inventory which requires user input. This kind of simulation lets the user see if with this much item would the company gain profit from it or not.

The reports such as the non-moving item report and discounted item report were suggested to be combined by the experts. Instead of just listing the items that the company should remove and the other report just suggesting the items that should be on sale, it was just put into one report. The report should enable to see the movement of the items that was not performing well and also should indicate the discounted price in order to attract customers.



### 3.3 Forecasting Techniques

The internal factors coming from the sales and accounting department and the external factors coming from the website of BSP would 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. The forecasts that the system and study aims is to predict and anticipate demands based on the company's past as well as helping them in coming up with rational selling prices based on the changing inflation rate and foreign exchange rate. Forecasting is overlooked by the marketing team and is proposed for the company to have a methodical approach towards anticipating possible market change, which basically covers the concept of a marketing research system. This will also help the company in their difficulty in predicting demands.

#### 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. The foreign exchange rate will be gathered from a credible website which is Banko Sentral of the Philippines or BSP. Other factors included such as the cost of good will be from the internal records of the company as well as the duties and taxes.

#### 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% mark-up price

#### Item Pricing (Affected by Inflation Rate)

Formula:

- $\text{Estimate Price} = (\text{original price} \times \text{inflation rate}) + \text{original price}$

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. The formula shown above is used within the 2 years span of time.

#### Sales Forecast

Formula:

- $\text{Forecast for the next month} = (\text{sum of sales for the past four months}) / (4 \text{ months})$
- $\text{Forecast for the next year} = (\text{sum of sales for the past five years}) / (3 \text{ years})$

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.



### 3.4 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.

#### Pricing Sensitivity

Several scenarios can occur in pricing sensitivity simulation. These scenarios pertain to different approaches whether or not it is advisable to change the price of the items. In order to do so different sets of conditions will be implemented in order to identify whether the system should suggest changing or maintaining the price. The factors that will be considered in the conditions will be the current inventory of the item, and trend of sales. In this module, user could manipulate the change in rate of the sales and be able to see what would be its performance in price. The way to manipulate the data is through increasing or decreasing of the sales by percentages. This percentage of change would determine on how many percent should it increase or decrease. The result shows the user different impact of sales, which could be

#### Sales Sensitivity

With this module, user is given an option to what items they want to pair up in order to sell the items faster. This items consist of items that has shown minimal sales and items that can sell fast by its own. The idea behind here is to make items that are not saleable make a sell by pairing them up to items sells fast. The bundling price for these items are computed by the total sum of the prices of the items and then multiplied by .90. As a result the system provides the user a suggested pair which then can be also paired or match to other items. Other

significant information such as price, cost and the suggested bundling price is seen within the simulation.

### 3.5 User Acceptance

User Acceptance Testing show how the users respond and react with the outcome of the proposed system developed. UAT is used in order for the developers to know if they were able to deliver a satisfying. The UAT can vary to know if the navigation, user interface, design, and the context of the information were delivered. The group produced a user acceptance testing form that will be answered by the users of the system.

The group was able to conduct the User Acceptance Testing to several persons. The UAT was divided into four action categories: general functions, dashboard, forecasting, and simulation. The group used numbers 1 to 5 to rate the actions with 5 being the highest meaning they highly agree with the system output and 1 meaning the user does not agree with the system design. Based on the results gathered from the UAT, as seen on the table 1 UAT Summary List Result, the group sees that these users who were able to perform UAT has rated the system 4 out of 5 in total average, meaning the users were able to agree with the system design and was able to understand how the system work properly. The group also analyzed the different feedbacks given by the different testers of the system. These feedbacks have been beneficial to the group because the group was able improve the usability of the system that would be more pleasing the user. The feedbacks that were in the UAT are issues with regards to the user interface, content, and the functions of the system. The user interface issues involve some images that are broken and the design being bare. In the content part, the feedbacks that the group received are, some pages contains too much information while some contains less information like adding inventory column to the sensitivity for pricing table in order to create better decision making. Last feedbacks were concerned with the functionality of the system, which involves some items not visible in the graph, or the loading of the pages is taking time to load.



#### 4. CONCLUSIONS

During the system development, the group was developing around the different issues encountered by the organization with the general objective of creating a tool that will track and cope with the changing condition of the market in order to formulate better decision-making. The system was able to aid the user since the company does not have a proper forecasting tool. The company's issue with regards to difficulty in adapting to the external factors was addressed through the different forecasting techniques that incorporate variables such as inflation rate and foreign exchange rate. These are updated automatically through extracting the data from the World Wide Web and pushing it into the system. It allows an easier forecast since the variables will not be updated manually by the user. The issue of difficulty in analyzing the market information was solved through allowing the user to simulate data. There are two ways to simulate the data, there is for price and for sales. The sensitivity for price allows the user to know at what price the item should be sold in order to hasten product turnover. Given that variables such as inflation or foreign exchange rate is already incorporated. The user can also simulate target sales and know if it is achievable. Sensitivity for sales on the other hand shows bundling of the highest earning and slowest earning items. These can be simulated through changing the predefined match up and seeing how the cost and profitability of the item will be affected. All information and presentation was validated with the company and with a marketing expert to insure that a decision can be derived. The system also provides suggestion on how they can react to the given information.

Even though the system was able to solve the main problem, there are still areas for improvement. Given that the system acts as a decision support system for the marketing user it can be improved by connecting it to other departments as well as recording the final decisions made by the user. It will be much more convenient for the marketing user to present final pricing of particular items rather than presenting the generated suggested action. Also connecting it other departments involved will also make processing of the information more accurate since it will be almost real time. Currently, the information processed by the system is only uploaded by the marketing user. Meaning if the sales and purchasing department does not give an updated excel file for forecast and projection there will be no updates. The group

believes that these improvements will enhance the systems performance and reliability since the information or data will be centralized and always up to date. Allowing the user to save the final decision for presentation to other departments will be more convenient than presenting the systems suggested action.

#### 5. ACKNOWLEDGMENTS

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