A STUDY ON INSIGHTS INTO SMART RETAIL USING IBM COGNOS INSIGHT

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Abstract: The present study has been undertaken to analyse the application of Cognos insights to Smart retailing. Smart retail uses industry-leading video-analytics technology to allow retailers to optimize operations by responding quickly to customer needs and market trends. Smart retail goes beyond the basic traffic counts of people in and out of a retail store by giving you in-depth analytics to match the data. This paper uses data, part collected and part hypothetical, based on sales record and profit margins to study the shelf space allocation decision in a retail store using system dynamics approach. A world in which nearly everybody now carries around a smart device – i.e., the smartphone – is what has enabled this similar revolution in retail. It can be used to house online stores, as a catalog and directory for 'real' stores, and now increasingly as a direct means of payment for goods and services. The paper sets down a foundation study towards the application of an analytics based system to identify various product categories in a retail store names Shop n Save and allocate shelves appropriately. This will purely be based on the previous history of the product such as sales, profit and profit margin etc.

Keywords: Smart retail, in-depth analytics, smartphone.

I. INTRODUCTION

Smart retail is a leading provider of loss prevention and security tools that will not only guard assets – but alert you to potential risks. Smart retail uses industry-leading video-analytics technology to allow retailers to optimize operations by responding quickly to customer needs and market trends. Smart retail goes beyond the basic traffic counts of people in and out of a retail store by giving you in-depth analytics to match the data.

Consumers go in-store to find the products they want. If they can't find what they're looking for on the shelves, 49 percent will choose a substitute product, 39 percent will leave empty-handed and 12 percent will head to a competitor to meet their needs. In each instance, the retailer, the manufacturer and the customer all lose. Shelf space hence plays a crucial role in the arrangement of the products.

Smart retail is a term used to describe a set of intelligent technologies that are designed to give the consumer a more exceptional, faster, safer, and smarter experience when shopping. A world in which nearly everybody now carries around a smart device – i.e., the smartphone – is what has enabled this revolution in retail. It can be used to house online stores, as a catalog and directory for 'real' stores, and now increasingly as a direct means of payment for goods and services.

II. NEED FOR THE STUDY

The need for this study arises due the fast changing environment in the retail industry. This study will help a company in long run to analyze and understand about its productivity and efficiency. If you start with a strong ecommerce presence, then there's no limit to what you can achieve in terms of the smart shopping experience for the customer. This study aims to identify the customer patterns in buying a product in a retail store and forecasts the predictions based on the history of sales and total profits that have been generated for the company.

III. OBJECTIVES OF THE STUDY

The following are the objectives of this study:

1. To analyse the product categories that have a high selling rate and those that generate the most profit.
2. To allocate appropriate shelf space for fast selling products that have a high profit generating capacity.
3. To create a working dashboard to know in depth sales of each region depending upon different factors.
4. To interpret the sales and demand-supply concept based upon product categories and analyze their selling points in comparison to their cost price.

IV. Research Methodology

For conducting this study secondary data into consideration.

4.1 Research design

This study is an experimental research that is carried on to identity the shelf space for certain products in a retail market.

4.1.2 Data Sources

Secondary Data: data for this part of the project was collected from data sites such as Generate data and Kaggle.
Sample size: The sample data used for our analysis contains 1000 rows and 8 columns.
Tool used: IBM Cognos BI – COGNOS ANALYTICS
Formulas used: FORECAST, COUNT, SUMIF and AVERAGE.

4.2 scope of the study

- The scope of the study is restricted with analysing about 3 product categories such as Health and beauty, home and lifestyle and Food and Beverages.
- This study aims to understand, analyse and create an analytics based system to allocate appropriate shelf space based on the previous sales history and their profit margin and identifying their predicted shelf space for the coming week.

Theoretical framework

As consumers change so must the industry. The retail sector that emerges over the next five to ten years will likely be far different than at the beginning of the century, marked by greater innovation, integration, and responsiveness. In the late 1800s and early 1900s, market was basically covered by the typical townscape of independent specialty or single-product stores (KPMGReport, 2014). That scene gradually changed with the introduction of department stores. Moharana (2010) argued that today's corporate world focus on creating reputation through stronger brand and acceptable figure to get better acceptability of customers and other stakeholders. Shelf space is a limited resource in a retailing outlet which in many cases is expensive as well. There is broad appreciation that better shelf space management has positive impact on an outlet's performance (Desmet and Renaudin, 1998). Similarly, softer factors such as a brand's strategic importance, demographic suitability, and seasonal demand behavior also play important roles in specifying shelf space to a brand (Amrouche and Zaccour, 2007, Hübner, 2011). (Lemonick, 2007, p.52). The other argues that "to capitalize on customer loyalty to certain brands, supermarkets make sure that popular labels, such as Heinz ketchup and Cheerios, are easy to spot and positioned near profitable store brands"(Caplan, 2007, p.52). There are important implications for understanding the way consumers perceive and interpret the information conveyed by shelf space layouts.

VI. DATA ANALYSIS AND INTERPRETATION

FIG.6.1
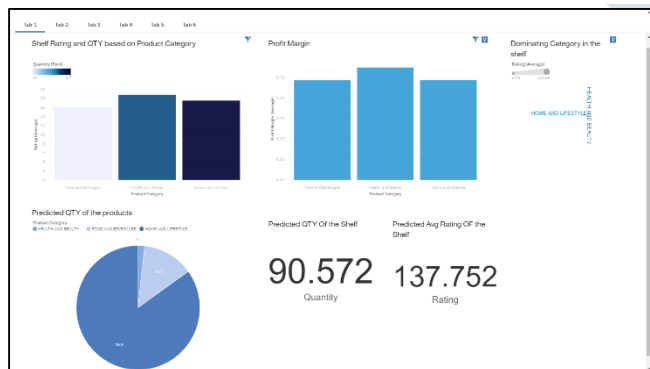
In this visualization, we have categorized the products based the shelf recommendation of FL MID PREMIUM or Front Lower Mid Premium.

The product category excludes no value. The first bar graph is a representation of the shelf rating and quantity based on the product category.

- Food and beverages has an average rating of 16.25 in the quantity of 35.

- Health and beauty has an average rating of 18.818 in the quantity of 134.
- Home and lifestyle has an average rating of 17.564 in the quantity of 177.

In the second representation, we have visualized the data based on the profit margin by taking FL MID PREMIUM products into category.

1. Food and beverages have an average profit margin of 0.24.
2. Health and beauty have an average profit margin of 0.28.
3. Home and lifestyle have a profit margin average of 0.24.

FIG.6.2

In this visualization, we have categorized the products based the shelf recommendation of FM HIGH PREMIUM or Front Mid High Premium. The product category excludes no value.

The first bar graph is a representation of the shelf rating and quantity based on the product category.

- Health and beauty has an average rating of 34,286 in the quantity of 23.
- Home and lifestyle has an average rating of 40,185 in the quantity of 126.

In the second representation, we have visualized the data based on the profit margin by taking FM HIGH PREMIUM products into category.

1. Health and beauty have an average profit margin of 0.39
2. Home and lifestyle have a profit margin average of 0.37

FIG.6.3

In this visualization, we have categorized the products based the shelf recommendation of FT PREMIUM or Front Top Premium. The product category excludes no value.

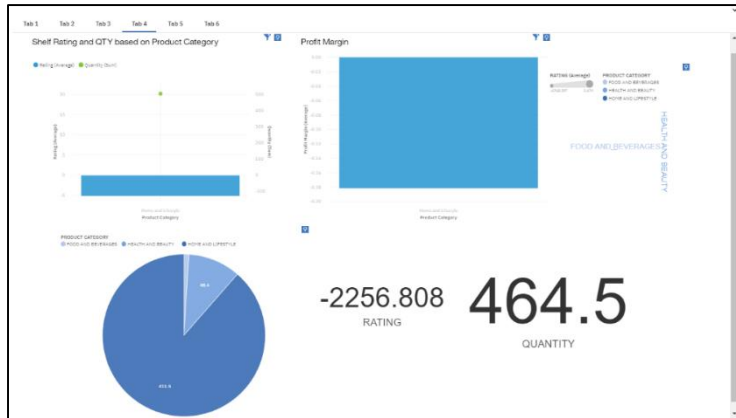The first bar graph is a representation of the shelf rating and quantity based on the product category.

1. Food and beverages has an average rating of 16.25 in the quantity of 35.
2. Health and beauty has an average rating of 18.818 in the quantity of 134.

3. Home and lifestyle has an average rating of 17.564 in the quantity of 177.

In the second representation, we have visualized the data based on the profit margin by taking FL MID PREMIUM products into category.

- Food and beverages have an average profit margin of 0.24.
- Health and beauty have an average profit margin of 0.28.
- Home and lifestyle have a profit margin average of 0.24

FIG.6.4

In this visualization, we have categorized the products based the shelf recommendation of RL LEAST PREMIUM or Rear Lower Least premium. The product category excludes no value.

The first bar graph is a representation of the shelf rating and quantity based on the product category.

1. Food and beverages has an average rating of 10.114 in the quantity of 196.
2. Health and beauty has an average rating of 10.189 in the quantity of 210
3. Home and lifestyle has an average rating of 9912 in the quantity of 3561

In the second representation, we have visualized the data based on the profit margin by taking FL MID PREMIUM products into category.

- Food and beverages have an average profit margin of 0.17
- Health and beauty have an average profit margin of 0.46.
- Home and lifestyle have a profit margin average of 0.24.

FIG.6.5

In this visualization, we have categorized the products based the shelf recommendation of RM MID PREMIUM. Rear mid Premium. The product category excludes no value.
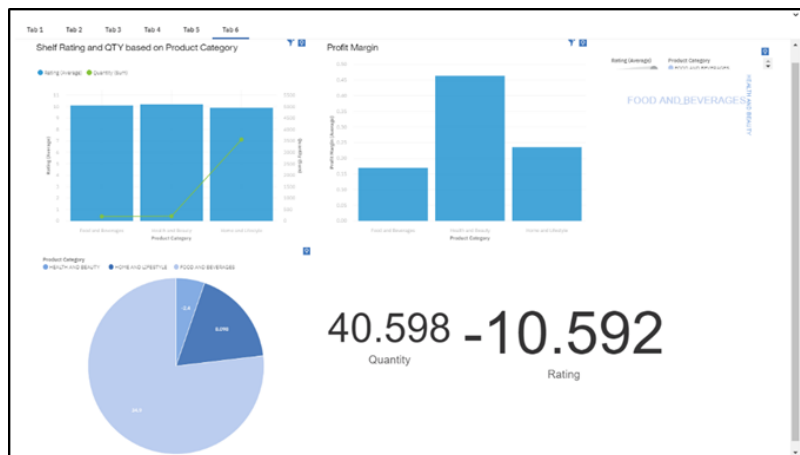The first bar graph is a representation of the shelf rating and quantity based on the product category.

1. Food and beverages has an average rating of 5 in the quantity of 13.
2. Home and lifestyle has an average rating of 4963 in the quantity of 167.

In the second representation, we have visualized the data based on the profit margin by taking FL MID PREMIUM products into category.

- Food and beverages have an average profit margin of 0.08.
- Home and lifestyle have a profit margin average of 0.08.

FIG.6.6

In this visualization, we have categorized the products based the shelf recommendation of RT LEAST PREMIUM or Rear Top Least Premium.

The product category excludes no value.

The first bar graph is a representation of the shelf rating and quantity based on the product category.

1. Food and beverages has an average rating of 10.114 in the quantity of 196.
2. Health and beauty has an average rating of 10.189 in the quantity of 210.
3. Home and lifestyle has an average rating of 9912 in the quantity of 3561.

In the second representation, we have visualized the data based on the profit margin by taking FL MID PREMIUM products into category.

- Food and beverages have an average profit margin of 0.17.
- Health and beauty have an average profit margin of 0.46.
- Home and lifestyle have a profit margin average of 0.24.

VII.FINDINGS

In the **first** visualization, we have included all product categories belonging to Front Lower Mid Premium. This list excludes no value. We have considered three product categories such as Food and Beverages, Health and Beauty and Home and lifestyle.

The predicted quantity of the product in this shelf is that of 76.9 for Home and lifestyle and it ranks the highest. Health and beauty is predicted to be at a value of 1.572 and Food and beverages is at 12.1.

The predicted quantity of the shelf for FL Mid Premium is that of 90.572 with the dominating category being 212.368 for Health and beauty. The predicted average rating of the shelf is 137.752.

In the **second** visualization, we have included all product categories belonging to Front Mid high Premium. This list excludes no value. We have considered two product categories such as Health and Beauty and Home and lifestyle.

The predicted quantity of the product in this shelf is that of 27.8 for Home and lifestyle and it ranks the highest. Health and beauty is predicted to be at a value of 85.

The predicted quantity of the shelf for Front Mid Premium is that of -16.668 with the dominating category being 1189 for Health and beauty. The predicted average rating of the shelf is 137.752.

In the **third** visualization, we have included all product categories belonging to Front Top Premium. This list excludes no value. We have considered three product categories such as Food and Beverages, Health and Beauty and Home and lifestyle.

The predicted quantity of the product in this shelf is that of 17.4 for Home and lifestyle and it ranks the highest. Health and beauty is predicted to be at a value of 1.2 and Food and beverages is at 0.4. The predicted quantity of the shelf for Front Top Premium is that of 8.806 with the dominating category being 24,567 for Home and lifestyle.

In the **fourth** visualization, we have included all product categories belonging to Rear Low Least Premium. This list excludes no value. We have considered three product categories such as Food and Beverages, Health and Beauty and Home and lifestyle.

The predicted quantity of the product in this shelf is that of 411.5 for Home and lifestyle and it ranks the highest. Health and beauty is predicted to be at a value of 48.4 and Food and beverages is at 4.6.

The predicted quantity of the shelf for Rear low least premium is that of 411.5 with the dominating category being 5674 for health and beauty.

In the **fifth** visualization, we have included all product categories belonging to Rear Middle Mid Premium. This list excludes no value. We have considered two product categories such as Food and Beverage and Home and lifestyle.

The predicted quantity of the product in this shelf is that of 3.8 for Home and lifestyle and it ranks the highest and Food and beverages is at -0.4. The predicted quantity of the shelf for Rear mid premium is that of 11.4 with the dominating category being 26.4 for home and lifestyle.

In the **sixth** visualization, we have included all product categories belonging to Rear top least Premium. This list excludes no value. We have considered three product categories such as Food and Beverages, Health and Beauty and Home and lifestyle.

The predicted quantity of the product in this shelf is that of 8/098 for Home and lifestyle. Health and beauty is predicted to be at a value of -2.4 and Food and beverages is at 34.9.

The predicted quantity of the shelf for Rear top least premium is that of 40.598 with the dominating category being 2876 for food and beverages

VIII. CONCLUSION

From the detailed analysis of the data that we had conducted, it can be concluded that, the tools and techniques provided by IBM are exceptionally well, from the time a user enters to analyze and categorize his data, till he makes visualizations to understand them in a better way, till the time he gets his analysis and results completed. We can conclude our research by analyzing the results of our experiment.

We had analyzed three different product categories such as that of Food and beverages, Home and lifestyle and Health and Beauty. With each different product category, we have calculated their profit margin based on their previous sales history and quantity sold and we got the predicted shelf value based on this analysis.

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