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HATCO Corporation designs, produces and services holding and warming equipment for food-service applications. It offers products in the areas of Bain Marie heaters, booster water heaters, built-in food warmers, carving stations, chef LED bulbs, cold shelves, commercial toasters, decorative lamps, drawer warmers, food display lights, fry stations, heated display cases/cabinets, heated shelves, heated wells, holding cabinets, hot/cold shelves, hot/cold well solutions, hot food merchandisers, hot water dispenser, light cooking equipment, nacho chip warmers, pizza warmers, portable food warmers, refrigerated wells/frost tops, sink heaters, sneeze guards, and strip heaters. The company sells its products through a sales representative. HATCO Corporation was founded in 1950 and is based in Milwaukee, Wisconsin.

The analysis being done here is a segmentation study for a business-to-business situation, specifically a survey of existing customers of HATCO. The dataset consists of 100 observations on 9 separate variables. The types of information that were collected, is the perception of HATCO on nine attributes identified in past studies as the most influential in the choice of suppliers. The respondents, purchasing managers of firms buying from HATCO, rated HATCO on each attribute.

The nine HATCO attributes rated by each respondent are as follows:

X1 Delivery speed - amount of time it takes to deliver the product once an order has been confirmed
X2 Price level - perceived level of price charged by product suppliers
X3 Price flexibility - perceived willingness of HATCO representatives to negotiate price on all types of purchases
X4 Manufacturer's image - overall image of the manufacturer/supplier
X5 Service - overall level of service necessary for maintaining a satisfactory relationship between supplier and purchaser
X6 Salesforce's image - overall image of the manufacturer's sales force
X7 Product quality - perceived level of quality of a particular product (e.g., performance or yield)
X8 Size of Firm - size of the firm relative to others in this market. This variable has two categories: 1=large, and 0=small
X9 Usage level - how much of the firm's total product is purchased from HATCO, measured on a 100- point percentage scale, ranging from 0 to 100 percent
X10 Satisfaction level - how satisfied the purchaser is with past purchases from HATCO, measured on the same graphic rating scale as the perceptions X1 to X7
X11 Specification buying - extent to which a particular purchaser evaluates each purchase separately (total value analysis) versus the use of specification buying, which details precisely the product characteristics desired. This variable has two categories:
1=employs total value analysis approach, evaluating each purchase separately, and
0=use of specification buying
X12 Structure of procurement - method of procuring/purchasing products within a particular company. This variable has two categories:
1=centralized procurement, and
0=decentralized procurement
X13 Type of industry - Industry classification in which a product purchaser belongs. This variable has two categories: 1=industry A classification, and 0=other industries

X14 Type of buying situation - type of situation facing the purchaser. This variable has three categories: 1=new task, 2=modified rebuy, and 3=straight rebuy

The company's business had been considered revolutionary in the field of food service equipment. But during the recent past, the company has been facing issues to generate more revenue and increase the product reach. Therefore, the business problem that is being addressed in this analysis is to increase the company's presence not just in the US, but Worldwide. This would in return help the executives to plan for their future direction for the company.

Creating models across these factors becomes strenuous as the process needs to assess each variable individually and also together. The results generated out of the nine factors would be too much to be consumed by any individual. Therefore, the team conducted an exploratory factor analysis on the dataset in order to reduce the dimensions and conduct further research on the factors that have genuinely effect on the problem statement.

The team used Multivariate Analysis of Variance to explore the factors and created a report using SAS software. Multivariate analysis of variance (MANOVA) is a procedure for comparing multivariate sample means. As a multivariate procedure, it is used when there are two or more dependent variables, and is typically followed by significance tests involving individual dependent variables separately.

According to the provided variables, usage level (X9) and satisfaction level (X10) are classified against type of industry (X13) and types of buying situation (X14). In the dataset, the variable X13 and X14 has values that correspond to 0 or 1 and 1, 2 or 3. In X13, 1 means that the type of industry is A classified company and 0 means companies from rest of the industries. Similarly, in X14, 1 means that the type of situation for buying is due to new task, whereas 2 means that the type of situation for buying is due to modified rebuy and 3 meaning that the situation for buying is due to straight rebuy.

We are classifying the variable X9, usage level, and X10, satisfaction level, which is the extent to which a purchaser evaluates each purchase separately based on the usage of the bought products and satisfaction level that the purchaser feels post buying the products from HATCO. In the initial evaluation of X9 and X10 with respect to X14, it was observed that companies whose situation of straight rebuy are highly using the products and maximum satisfied customers. Average usage of products by these customers range up to 55.5% and 5.35 on average satisfaction level. These levels are higher than the other two situations of buying.

A 3-group analysis of GLM was performed on X9 and X10 with respect to X14 using the means of the X14 and model X9 X10 = X14. Four multivariate tests are computed, all based on the characteristic roots and vectors of $E^{-1}H$. These roots and vectors are displayed along with the tests. All four tests can be transformed to variates that have distributions under the null hypothesis. In this case, the multivariate analysis matches the univariate results: there is an overall difference between the different buying situations of products from different usage and satisfaction levels, and the samples from all tests have turned out to be same which shows homogeneous nature of the dataset.

A factorial design analysis of GLM was performed on X9 and X10 with respect to X14, X13 and X14*X13. This approach offers more versatility to the model, but the disadvantage is that it can be less computationally

efficient for large data sets. Through this analysis, it can be inferred be that a significant p-value suggests that the model is good to be used for further process.

Through both the analysis, it can be concluded that there is a significant influence of usage level and satisfaction level by the situations of buying and the industry types that are buying HATCO's products. This provides specific marketing campaigns needs to be designed to attract the new customers and help increase the satisfaction and usage level of the company's products by cross-sell/upsell.