

# Bstract: widgecorps's management team

[Business](#), [Management](#)



ABSTRACT: WidgeCorps's management team had a lack in understand of some of the key multivariate statistical techniques used by many companies to measure how variables react with one another. This paper will discuss how three of these techniques are commonly used and provides a recommendation for the company to use as they move forward with research and development of new products. This paper also compares and contrasts the different multivariate techniques. KEYWORDS: multivariate techniques, Chi-Square Test, multidimensional scaling There are many different multivariate techniques commonly used in businesses across the world.

This paper will compare three commonly used techniques including factor analysis, multi-dimensional scaling, and cluster analysis. Additionally, I will provide my recommendation for WidgeCorp to follow as we move forward and dive into the cold beverage market. To begin, it is important to have a clear understanding about why and how a company will use multivariate techniques as part research. The term multivariate technique is somewhat of a blanket-term which includes many different techniques used by statisticians and researchers in many different fields, (Dayton, 2012).

Multivariate techniques allow for companies to perform research on more than one variable to determine if there is a relationship between them. For many companies, the multivariate techniques are used to effective measure quality and safety, (Yang, 2010). WidgeCrop will be able to use each of the techniques as we move forward with our new business ventures into the cold beverage market. Factor Analysis: Factor analysis is one of the many techniques that can be used in different types of research projects. Factor

analysis is most often used to compare variables which have a correlation to other confounding variables, (Dayton, 2012).

Factor analysis will prove helpful after we have developed our products and are testing the new beverages in different markets. As an example, we could test the hypothesis that WidgeCorp's new line of cold beverages burns more calories than our competitor Gatorade's line of cold beverages. The observed variable would include whatever the ingredient is in the beverage which helps to burn calories. The confounding variable could be the level of activity of those participating in the study. As part of my research for this project, I looked into several companies who use factor analysis as part of their research efforts.

Companies like Twitter, Facebook, and othersocial mediaoutlets have been using factor-analysis to help them find the hottest trend, (Du, 2012). These companies generally use a five-step process to help them find the hottest trends. The first step is initial research used to gather data. The second step involves finding key trends or factors. The third step involves defining and interpreting the latest trends, (Du, 2012). The fourth step involves defining the trends/factors into variables. The final step entails projecting how successful the trends will become.

By using the factor analysis method, social media outlets are able to successful be a part of the most trendy new products and services used by consumers across the globe. Cluster Analysis: Cluster Analysis is another technique that Widgecorp will likely use as part of our cold beverages research. Cluster Analysis lumps groups of related characteristics together, (Dayton, 2102). Cluster Analysis would be most helpful to WidgeCorp as part

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of the beginning stages of the research process. Cluster Analysis uses many different mathematical methods to help determine statistical significance.

WidgeCorp will be able to use Cluster Analysis as we dive into market research. We will use Cluster Analysis to determine what populations of people that we should focus our marketing efforts on. When researching Cluster Analysis for this presentation, I came across a few examples of companies who used the Cluster Analysis technique, (Downes, 2012). The most impressive example came from a market research firm who used Gmail to advertise and market their subscribers. Gmail, a subsidiary of Google is able to track consumer data with every click that a consumer makes with their mouse as they cruise the internet.

Market research firms collect data daily about consumers. They then make note of the buying and internet surfing trends of consumers. They use cluster analysis by putting the clusters or groups of consumers with similar trends together and then marketing new products or services to them, (Downes, 2012). Multidimensional Scaling: Multidimensional Scaling is another multivariate technique WidgeCorp could use while doing research. Multidimensional scaling is the most abstract of the multivariate techniques. While abstract, it was the easiest for me to comprehend.

Multidimensional Scaling has two main objects. The first objective is to find a pattern somewhere in the data collected and presenting it visually for all to understand, (Wilkes, 1977). To visually display the data, Multidimensional Scaling places the data retrieved onto a three-dimensional plain. It is particularly useful when dealing with many different variables and allows the reader to see a visual representation on how they relate to one another.

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Multidimensional scaling is often used to test both the quality and safety of consumer products, (Yang, 2010).

When researching the different multivariate techniques, I found some practical application of the Multidimensional Scaling method. The most interesting application I found was relating to international bank failures. Researchers collected data about 66 different Spanish banks and used the Multidimensional Scaling as a predictor in their financial stability, (Cinca, 2001). The research measured the financial liquidity of banks and compared it to both the banks who failed and the banks that were still in business. Another important Multidimensional Scaling technique I found involved the testing of air fresheners.

Multidimensional Scaling was used by comparing some of the features of the different air fresheners separate while seeing if there were commonalities between different brands. Our group decided that multi-dimensional scaling would be the best method for WidgeCorp to use as we move forward and dive into the cold beverage market. When testing the safety, quality, and consumer likability of a product, it would make the most sense to use the multidimensional scaling technique. Not only will the technique allow us to see the variables as they relate to one-another visually, but we are also able to additional variables to be tested.

We can keep the dependent variables constant and change the independent variables as our research evolves. One of the main reasons Multidimensional Scaling should be used is that it will be easier to understand by people who have not been exposed in statistical research. For many members of our management team, statistics is a foreign concept. By using the <https://assignbuster.com/bstract-widgecorpss-management-team/>

Multidimensional Scaling technique, we will be able to not only research the statistical significance but present it in a manner which will be easily understood by our management team. We can then compare the results of the different tests we have conducted to see what has a stronger statistical significance. For example, we can keep the same basic ingredients in our cold beverages, but just slightly change the color, flavor, or both the color or flavor and measure the consumer's response to the slight changes. While conducting the research, we can collect consumer data such as age, gender, occupation, education, and how often consumers purchase cold beverages. We will be able to create three-dimensional planes to see how different combinations of the consumer data we have collected affect how much they like the color, flavor, or color and flavor of our new line of cold beverages.

By adding a visual component to our research, we will be potentially able to visualize new relationships between the variables we are testing. Hypothesis Testing and Multidimensional Scaling: When in the research and development stage of our new cold beverage line, it is important that we are able to successfully test our hypothesis. We will test our initial hypothesis which states that WidgeCorp's new line of cold beverages helps to burn calories than a competitor's line of cold beverages by use the Chi-Square Test to test our hypothesis.

We can develop this research further by creating a multinomial experiment by testing data in more than two categories, (Bowerman, 2012). We will do many studies to determine how successful our new beverages are in burning calories. We will test it amongst many populations including children, teenagers, and young adults. Our study will also compare results based upon

gender, education, and occupation. We will also factor in levels of activity: no activity, moderate activity, and extreme activity.

Essentially we will be testing how effective our new beverages are in burning calories amongst many different populations. To effectively test our hypothesis, it is important that we have a significant amount of willing participants in the study. We will need to find equal numbers of people willing to participate in the different categories we are testing. If we have too few test subjects, any statistical significance found will be not taken seriously by members of our research team. Additionally, it could harm the integrity of our company and could tarnish our reputation with the general public.

The best way to test our hypothesis will then be to use the Chi-Square Test. The Chi-Square test begins with a contingency table with as many rows and columns as there are variables to test. We can use the contingency tests to test many different variables. Bellow, I have created a basic contingency table which will compare the total additional calories burned after drinking the WidgeCorp and Gatorade. The contingency table below shows females only and would be repeated with males. The data could be combined on the same contingency table or on a different contingency table.

In this scenario, we are testing age, gender, and activity level and comparing it between our beverage and that of our competitors. The Chi-Square test will test the difference between the calories burned by the WidgeCorp beverage and compare it with the Gatorade beverage to determine if it is statistically significant, (Berenson, 2010). The statistical significance will signify two important pieces of information: which of the beverages helps

burn the most categories and if the amount of calories burned is statistically significant. | Calories: WidgeCorp| Calories Gatorade|

Female age 6-12 (sedentary)| | | Female age 6-12 (moderate)| | | Female age 6-12 (extreme)| | | Female age 12-16 (sedentary)| | | Female age 12-16 (moderate)| | | Female age 12-16 (extreme)| | | Female age 16-20 (sedentary)| | | Female age 16-20 (moderate)| | | Female age 16-20 (extreme)| | | Female age 20-24 (sedentary)| | | Female age 20-24 (moderate)| | | Female age 20-24 (extreme)| | | If we are able to prove that our new cold beverage line actually does burn more calories than our competitor Gatorade, we will likely see our competitor attempting to test our hypothesis.

They will likely claim our hypothesis is false and thus test the null-hypothesis. The null-hypothesis will state Widgecorp's line of new cold beverages does not burn more calories than Gatorade. The subsequent alternative hypothesis will state that Widge Corp's line of new cold beverages does burn more calories than Gatorade. Our competitors will use the Chi-Square method to determine if our original hypothesis is false. Once our data has been collected and analyzed, it can be presented in a three-dimensional model to help present and organize the data in a visual manner.

We will be able to see additional relationships when posting all of the data together on the same three-dimensional plane. Commonalities of the Different Techniques: The main commonality I find between all the different techniques discussed in this paper is the fact that they deal with multiple variables and thus are all multivariate techniques. Each method has its place within the realm of research and it is likely that WidgeCorp will use all three.

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All three techniques can use the Chi-Square test to test the validity of the hypothesis they are testing. Differences of the Multivariate techniques:

The major different to note about the different techniques is how the techniques look at relationships between variables. Multidimensional Scaling differs from the other techniques the most in how the data is presented visually. Multidimensional Scaling uses a three dimensional plain to display the relationships between variables. The cluster analysis method looks to see if there are " clusters" or groups of data which are clumped together to denote any commonalities between the results. Factor Analysis looks to compare two different types of variables relate to one another.

Multidimensional Scaling focuses mainly on commonalities, but looks to define the commonalities on a three-dimensional plain. To conclude, while the different multivariate techniques have a valuable place, for our purposes the Multidimensional Scaling technique will prove the most beneficial. While all techniques are similar in that they are working with multiple variables, the approaches differ. Upon reading this paper, the management team at WidgeCorp should have a sound understanding of the different multivariate techniques. References: Berenson, M. , Krehbiel, T. , & Levine, D. (2010). Business Statistics: A First Course. Prentice Hall. Upper Saddle River, NJ. Borgatti, S. (1997). Multidimensional Scaling. Retrieved 09-09-2012 from <http://www.analytictech.com/borgatti/mds.htm>. Cinca. , C. ,& Molinero, C. , (2001). Bankfailure, a Multidimensional Scaling approach. Eurpoean Journal ofFinance. 7(2)18. Dayton, D. , (2012). Multivariate statistics. Retrieved 09-23-2012 from <https://campus.ctuonline.edu> Downes, L. , (2012). Customer intelligence, privacy, and the " Creepy factor". HarvardBusiness Review.

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Retrieved 09-09-2012 from [http://blogs.hbr.org/cs/2012/08/customer\\_intelligence\\_privacy.html](http://blogs.hbr.org/cs/2012/08/customer_intelligence_privacy.html). Du, R. , & Kamakura, (2012). Qualitative trend spotting. *Journal of Marketing Research*. 49(4)22. Keough, M. , & Quinn, G. , (2001). Design and Analysis for biologists. Retrieved from <http://bio.classes.ucsc.edu/bio286/MicksBookPDFs/QK18.PDF>. Yang, Z. , & Yingwei, Z. , (2010). Process monitoring, fault diagnosis and quality prediction methods based on multivariate statistical techniques. *IETE Technical Review*. 27(5)14. Wilkes, R. , (1977). Product positioning by multidimensional scaling. *Journal of Advertising Research*. 17(4)5.