**M8 Portfolio Project: Option #1: Capstone Project—Business Intelligence Solution for U.S. Organization**

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Barnes and Noble is the largest American retail bookstore chain that has played a key role in this industry for several decades. It was originally founded in 1886 by Charles M. Barnes as a small, community bookstore in Wheaton, Illinois, but has since grown to be a nationally recognized brand in the retail marketing world. By the 1970’s, the store chain expanded to offer bigger store space, a wide variety of books, music and even offered a café for shoppers as well. Since 1990, Leonard Riggio revolutionized the brand by expanding it into a super-store type format, expanding the selections, comfortable spaces and coffee shop capabilities to bring in new customers. The rationale I had for choosing this organization in general is my frequent visits to this company’s local storefront in my town. As a fairly regular customer, I began to debate how I would feel if my store were to close due to poor sales and thought it would be an interesting problem to tackle in my final portfolio project. In my original milestone, I hypothesized that the COVID-19 Pandemic drastically decreased their sales as their consumers realized they did not need to leave their house to purchase and consume media and content. The way I chose to examine this problem was to compare sales before and after the pandemic to see if it affected the way consumers shopped at this business over time.

Business intelligence refers to the technologies, processes and tools used to collect, analyze and present business data in ways that can help organizations make more data-driven, informed decisions. Some benefits of using business intelligence for a company, as laid out by Sean Blair in the Ntiva blog, are the following: reduced complexity, improved data access and quality, enhanced productivity, empowered decision-making, lower costs and trend observation and insights (Blair, 2024). The one that will be most relevant to what is being accomplished here will be trend observation and insight as well as improved decision-making. Once Barnes and Noble executives and stakeholders analyze this data, they will be able to determine how to proceed from here to maximize profits, decide between courses of action, and determine what to prioritize from here on out.

I tried to find a dataset with the net sales compiled over a time frame for Barnes and Noble, however, I could not find one. The way I chose to go around this was to compile information from websites about the net sales of Barnes and Noble for several years and use them to create my own dataset that I could analyze. This way the information would still be accurate, and I would still have a dataset that I could plug into RStudio to analyze. The two sources I used for these data points are included in the reference page as well (Words Rated and Stock Analysis). To analyze this data, I chose to use RStudio, which is an open-source statistical analysis tool that uses the R programming language. This tool contains a lot of internal functions that will become useful to analyze the sales data I have.

The first step to analyzing the data was to read in the data set and pull a quick summary. This will give a basic understanding of the data points in this set by giving a minimum value, maximum value, mean, median and percentile values. Knowing this information, it becomes easier to see the possible range that the sales can have over the 10-year span that was chosen. Figure 1 depicts the dataset initial read in and summary pulled while Figure 2 is a zoom in focus on those summary values.

**Figure 1**

*Data Read In and Summary Pulled*

A screenshot of a computer

Description automatically generated

**Figure 2**

*Summary Focus*

A screenshot of a computer screen

Description automatically generated

On an initial look, it seems my hypothesis might initially be incorrect. In this summary value set, we can see that the lowest value recorded in the data was the first year recorded, 2014. Over the course of the rest of the data, every two years seems to set the next summary statistic until 2023, which sets the maximum value of $7 billion of revenue for the year. The important thing to remember about this data set is that each value is in billions. Consider that 2018 is the baseline revenue that Barnes and Noble should be aiming to surpass in value each year following, and assuming the lockdown did in fact hurt sales for at least a quarter or two when consumers were not leaving their houses except for essential shopping, which entertainment does not count as. All these external circumstances should be considered when looking at the data gathered. Figure 3 contains the dataset in full to demonstrate the change in values over time.

**Figure 3**

*Revenue over 10 Year Time Span*

*A screenshot of a computer screen

Description automatically generated*

What can be gathered from looking at it in this form is that while 2019-2020 saw a significant decrease in sales, most likely due to the pandemic and lockdown, after things began to open again in 2021, sales began to rise again. This lines up with what is known about how people felt after lockdown. There was a number of people who were quick to want to return to normal life and go out again on the tail end of the pandemic. A lot of people most likely flooded the stores in need of social interaction and community again and that led to a spike in sales for Barnes and Noble, among other businesses. It is also important to consider that some of these businesses may have temporarily closed altogether for a small amount of time during lockdown which only added to the appeal of being able to visit them when everything opened again, and the risk of sickness was lessened.

Another visualization created for this data was a time series plot. This type of graph is a graph that “displays data points collected in a time sequence” (Arif, 2024). A time series plot is often used in finance and economics to monitor sales over a time period and see the fluctuations, which is exactly what is intended in this case as well. Figure 4 is the time series plot that was created for this purpose. This will help visualize the data in a more visual sense to see the changes over time and how they look overall for the company. This time series plot presents a confirmation of the information stated earlier, that while there was a notable dip during 2019-2020, the revenue per year has been climbing higher since that point. It is also interesting to note once again that the highest recorded revenue value of $7 billion happened in 2019, while the lowest occurred in 2020. This low value makes sense with the explanations given so far. For ease of access, Figure 5 will include a full screenshot of the code used in R to create these representations and statistical analysis tests. Figure 6 will contain the upload to GitHub as well.   
  
**Figure 4**

*Time Series Plot for Data*

*A screenshot of a computer screen

Description automatically generated*

**Figure 5**

*Full Code Used*

*A screenshot of a computer

Description automatically generated*

**Figure 6**

*Upload to GitHub Provided*

References

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