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Project Submission Sheet – 2020/2021

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Date:	17-12-2020

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Business Intelligence and Business Analytics

Specification Report – Group Project

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Abstract—**This document is a report on the Company Nike for the educational purposes of Team 12s Group Project for the module Business intelligence & Business analytics for semester 1 at the National College of Ireland. The report in turn will be a detailed project specification document on the implementation of a full suite of BI and Business Analytics systems for Nike.**

Keywords—Dashboard, Nike, Scope, Database, Marketplace

I. BACKGROUND OF THE COMPANY

Nike is an American worldwide company that was founded on January 25th, 1964 in Oregon, United States by then Track and field coach Bill Bowerman and Phil Knight who was previously a former student of Bill Bowerman's at the University of Oregon [1]. At this time the company itself was going by another alias taking the name of Blue Ribbon Sports. Bill Bowerman was known for his fascination with running shoes to optimize performances in his area of sport and regularly conversed in a strategic debate with local cobblers on how to modify running shoes. It was Phil Knight who was the first to test these modified shoes and Bowerman would also design patterns and detailed sketches onto the shoes as per Knights request. Knight went on to graduate from Stanford immediately travelling to Japan to negotiate a deal of Japan's popular shoe brand Tiger shoe integration into the U.S. This was done because the labour in Japan was much cheaper than in other traditional countries that mass produced shoes like Germany. Bill Bowerman also say the gaping rewards of this deal and entered into a 50/50 split of the Blue Ribbon Sports ownership with Knight on January 25th, 1964. After founding this, the two men started to sell Tigers shoes on a basic street level market, initially upon selling these, demand became increasingly high due to the fact the shoes were maintaining high quality in design and were significantly cheaper than other options like Adidas and Puma who to this day are Nikes biggest rivals in their respected markets but at this time Adidas and Puma controlled the US market.

In 1965 the two men took a shoe design of their own to the management of Tiger Shoes that in their words would change running forever, this show was named Tiger Cortez and in today's world, Nike's most popular and well-known classic shoe is known as the Nike Cortez. Tiger shoes and Blue Ribbon split in 1971 after knock offs of the Cortez was made and blame was thrown between parties. Blue Ribbon Sports was officially called Nike as of that day forward upon settlement in court.

In the present day, Nike's logo can be classed as one of the most recognizable logos ever to exist. The design of this logo was created by Carolyn Davis and is the iconic swoosh, reportedly Davis only received 35 dollars for the logo, although in the next few years she was awarded 500 shares within Nike which today could be valued at around 1.4 Million.

The company just continued to accumulate profit over the years releasing innovative shoes like the waffle trainer resulting in a net worth of 365 million for the company, 1988 the slogan "Just do it" was aired on TV along with several other innovative ads that pushed the boundaries on marketing, especially for a shoe brand.

Figure 1. Nike's First Shop.

What also made Nike so appealing to its customers and the public was another stroke of marketing brilliance. The company was ahead of all its competitors like Adidas and Puma when it came to Celebrity Endorsements and sponsorships especially when it came to athletes that were just starting to become great but still relevantly unknown to a global audience, it was almost like a trade to boost both parties status globally. A prime example of this would be Michael Jordan, the man regarded as the best basketball player signed with Nike before he even made his debut in the Basketball pro league, turning heads in the college leagues, Nike was quick to sign Jordan on a 5-year deal reportedly worth 2.5 million. In 1985 Air Jordan generated a whopping 100 million dollars in revenue whilst also boosting the status of Michael Jordan in the NBA league, over time the partnership deal with Air Jordan has become one of Nikes biggest revenue incomes with new shoes of the brand being released and retro installments being re-released annually, the brand is estimated to have net

2.7 billion just bac in 2018 alone whilst Jordan himself makes around 120 Million a year from this.

Nike over the years though for all its tremendous and innovative designs and marketing campaigns has had its fair share of controversies. In 1991 journalist and activist Jeff Ballinger exposed the corruption of the company in terms of the near enough slave like environment the company had put in place overseas in Asia especially in Indonesian factories where it was reported that the working conditions were taught to be abysmal and that most of the workforce was under the legal working age. This initial report hurt the company in terms of revenue and the company reported a heavy loss in profit for this year, in 1998 Nike came under protest again for the same reasons this time thought the company says fit to raise the minimum age of workers and factory environments were upped to a world health organization standard.

Today Nike stands as the biggest company that is in the market of design, development, manufacturing, and sales of sneakers, clothing, fitness equipment, everyday accessories, and services. The company HQ is in Beaverton, Oregon.

II. VISION & OBJECTIVES

For this project, we are tasked with implementing a BI Dashboard and a business analytics system. Before doing this, we need to look at several factors that will decide how to go about this implementation. When looking at a Business intelligence strategy it is vitally important that clear objectives are outlined early on for progress reports and time management to be handled. For example, in our case study on Nike, a key factor in Nike's success relies heavily on customer service and customer support. This is something to lean on when prompting a new business system and looking at customer-related data and running customer base analysis.

The main goals and objectives for Nike are to preserve their top spot as the number one sports brand in the world which at the moment is very challenging considering all of the big brands in the sports apparel and shoe market, another goal is to design new and innovative products to customers whilst still affordable for customers. Nike currently has a vast range of products that fluctuate in prices, which also helps them branch out to various markets and consumers which in turn, generates a major profit.

One of Nike's major goals for this year is to improve the sustainability of the product, Nike footwear scored 98% in product sustainability, in this market it is vitally important that the company keeps consumers happy with their purchase, this will then create a loyal customer base that will invest in new Nike products have had a good experience with previous purchases [2]. It is very important to focus on customer feedback and understand what the customer wants without straying from giving them the same product over and over again without any real growth. Once a customer is happy with the overall support they will return, and an example of another company that does this very effectively is Apple, usually, once a consumer invests in an iPhone they will rarely switch again to another brand/software of phone because support and product sustainability is so strong. What can also be said about Apple that is relevant with our company Nike is that you can associate Nike to an elite standard of the shoe, a culture around Nike as the "In fashion" brand this can be an accumulation of years of marketing and also celebrity endorsements. Many customers will simply look for Nike products because they want to be seen as in the upper echelon of society.

When we look at strategic systems, the CRM system fits our goals and objectives best for Nike. CRM stands for customer relationship management and is a system used for helping companies stay connected to customers, streamline processes, and improve profitability. The system's main goal is to improve relationships whether that be with existing customers or potential new customers [3].

Figure 2. CRM (Customer Relationship Management)

Integrating this system Nike will be able to reap the benefits of many profitable areas, firstly trustworthy reporting can be used on the data to garner information on such questions like which shoe model is selling the best and shares in these models are increasing. For example, the Nike Jordan 3s could be selling more than the latest sneaker even though they are years older, this could allow Nike to re-release this model in mass production if they know the demand is there for the shoe. This will also save me any acquiring raw materials as different shoes require different materials. This can be easily more affordable and highly profitable by sampling looking at the clear patterns in the data using this system.

Dashboards can be easily made up to display any data needed to make business decisions based on data. An example of how using the information to your advantage using this system is analyzing how long a customer stays on a specific page online before purchasing a Nike product, what route did they take to purchase the item or to even click to the basket, this is extremely beneficial especially in the competitive market Nike finds themselves in with Adidas and Puma being the 2 other big powerhouses when it comes to the athletic apparel.

When we look at Marketplace participation Nike has been at the forefront of revenue in the sportswear market, from the graph below we can see the global revenue of Nike from 2005-2020, as we can see from the Figure 3], revenue was been steadily increasing over the years. It is important to provide new ways for Nike to keep increasing profit.

The footwear market in total is estimated to be worth over 368 billion as of 2020 and is estimated to reach 530 billion by 2027 [4]. In terms of raw materials in this market, leather is the most widely used as well as plastic and rubber, with increasing pressure from the public many of the big companies use eco-friendly materials including recyclable items. Healthcare and fitness awareness have also helped the demand for sportswear and athletic footwear for all age ranges. In terms of strategies, most companies in this market

use social media as a big influencer on their potential customers, sites like Facebook and Instagram have had millions pumped into them to promote adverts and promotions on their sites.
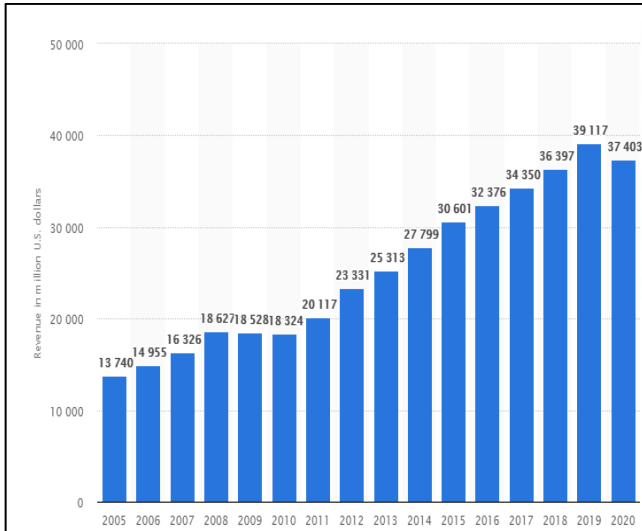

Figure 3. Revenue (In million Dollars) by Year

The Footwear Market can be divided into different stages as seen below.

1. Type: Type of footwear could be stating whether the shoe is athletic or nonathletic.

2. Material: Is the worn leather (most likely) or non-leather.

3. End-User: Who is the end-user buying the product or the desired demographic the company is trying to reach, what age range, man or women, etc…

4. Region: Region in which footwear is sold/distributed. Asia is the biggest market currently.

5. Distribution channel: How the product is sold, could be via the supermarket, outlet, online-only, etc.

The Figure 4] shows these revenue statistics against its two major competitors Adidas and Puma. As seen Nike is well ahead of revenue however, it must be considered that Nike's new system of producing products is more costly compared to its competitors which brings the actual profit closer [5].
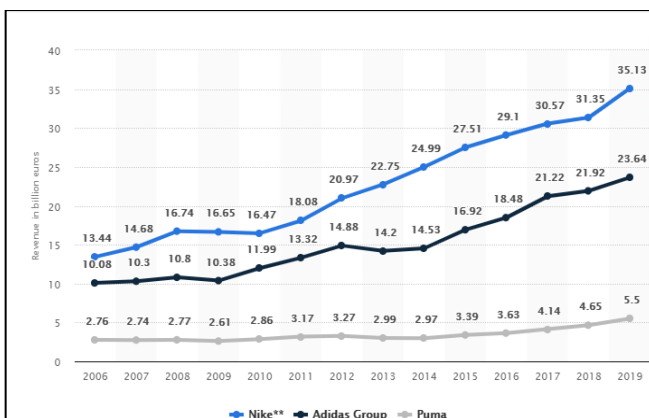

Figure 4. Revenue (In Billion Euros) by Nike, Adidas, and Puma

III. SYSTEM DESIGN
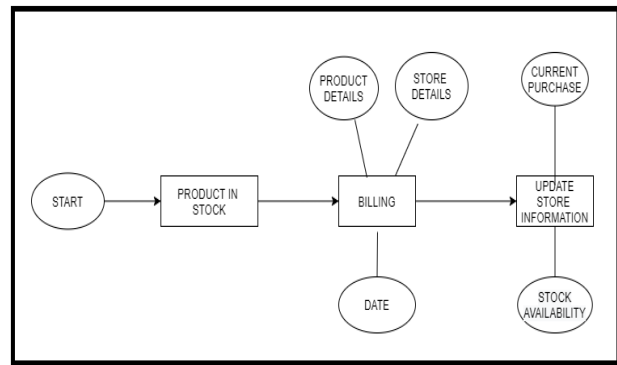
A. Process Flow

Figure 5. The Process Flow Diagram of each stage of the data collection process.

Via Process Flow Diagram, we are trying to explain the stages of our project where we are collecting the data. We already have the information(City, Country, and Store ID) of products that are in stock for different stores in different regions so when a customer turns up to buy anything from any of our stores first we check if the product is in stock then if the customer buys the product, we will store the different type of information of that sale like Customer Age, Customer Gender, the date of sale, Feedback, product ID, Profit, Product name, Store ID and we will store the customer information as well like Customer ID, Customer Age, Customer Gender, Ratings, and Review. Then after the sale, we also update the previously stored information.

Data Capture Points: -

Capture Point	Data
Product in Stock	Details of product that customer wants to buy
Billing	Customer purchase details and store details also.
Update Store Information	Details of stock and purchase also.

Figure 6. Data Capture Points and the description of data collected in the process.

B. Analytical Requirements:

Database of our company has all the details regarding the sale, store, and product. And as we know each block of this data is very important and it somehow helps the company to track and boost its progress bar efficiently.

Creating visualizations from this database is necessary to look at the progress of the company and decide on its future strategies. The analytical requirements for our company would be:

- To identify which product is performing better in the market.

- To identify the condition of the store.

- To identify the revenue generated by the company.

- To compare profits with previous years.

IV. SWOT Analysis:

SWOT analysis is just one of several models that business can use, management can use to assess where their business is positioned both in terms of what its good at its strengths and weaknesses and also factors that are outside of its controls in other words the nature of the external environment. SWOT analysis is quite unusual in the sense looks both at the internal as well as external issues facing the business. The SWOT analysis framework is really simple. SWOT is the acronym that stands for strengths, weaknesses, opportunities, and threats. The key thing to remember about SWOT analysis at the top half of the tables is all about the factors that are internal to the business or the thing which are within the control of the business and whereas the bottom half of the table which is opportunities and threats are all external to the business or in other words they are outside of the control of the business, but the business needs to respond them. When you look at the top half of the table then try to identify genuinely what the business does well so it's a search for where if at all a business has what's known as competitive advantages. These need to be sustainable. If a business doesn't have a sustainable advantage, then it does not sustainable strengths. Hence it is very important to identify three or four key indicators that will help to know the strengths or weaknesses of the business. Key indicators can be market share which gives the idea of the proportion of the market that a business has. Profitability indicates how profitable a business is compared with the competition. Efficiency indicates how a business can operate at a lower unit cost compared to competitions. Brand value, Loyalty, and Reputation are also the key indicators to identify the strengths or weaknesses of the business. Opportunities and Threats are the external factors and one's threat can be another's opportunity. The key to opportunities is how can you exploit them. So, this business has to check whether they have enough resources or does it have a strategy to take advantage of the best opportunities. In terms of threats, the key strategic challenge is how you defend against them or how do you respond.

Figure 7. SWOT Analysis

Nike Inc. is one of the world's biggest companies in the footwear market. A SWOT analysis of Nike will insights into how a manufacturing and retail business can achieve success despite tough competition. A SWOT analysis of Nike will also tell us how their strengths relate to their weaknesses, opportunities, and threats [6].

Nike's Strengths:
- Strong Brand Image
- Rapid Innovation Processes
- Large Global production and distribution market.

Nike's Weaknesses:
- Controversies
- Limitations in product mix
- Limited presence in developing markets

Nike's Opportunities:
- Improve Product mix.
- Increase their presence in developing countries.

Nike's Threats:
- Tough Competition
- Technological Innovation

This SWOT Analysis of Nike Inc. shows that the company has the strengths needed to support its global leadership in the market, but the company must address its concerns regarding competition, Controversies, and patent protection.

V. Database design
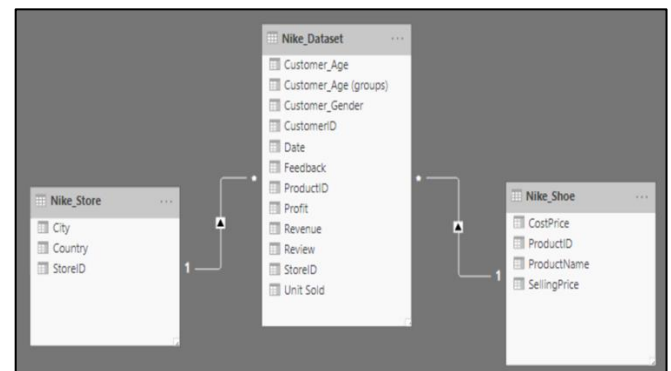
A. Entity Relationship Diagram:

Figure 8. The Entity-Relationship diagram representing the relationships and data collection points in the process.

A database is a collection of information that is organized so data can be easily stored, managed, updated, and retrieved. Entity Relationship Diagram is a visual representation that how the elements of our databases going to interact with each other. The entity in this context is known as a component of data. In other words, the entity-relationship diagram illustrates the logical structure of the databases. At first glance, an entity-relationship diagram looks like a flow chart. An Entity-relationship diagram is a means of visualizing how the information a system produces is related. Power BI creates a relationship between tables automatically based on the field names. We can change or edit this relationship. In our case, we have field name matching so power has established the relationship automatically. One of

the important terms in this diagram is the direction of the relationship. Every relationship has a direction of the relationship. Usually, the direction is from one side of the relationship to the many sides of the relationship. This direction of relationship means the way that filtering applies in Power BI. In our study, Nike_Shoes table can filter out the Nike_Dataset table or Nike_Store can filter out the Nike_Dataset table. A directional relationship is a way how filtering works.

City	Revenue
Drogheda	88475
Berlin	82150
Cork	81870
Dundalk	80845
Leipzig	79085
Belfast	78745
Frankfurt	77885
Derry	77380
Munich	77185
Darmstadt	76415
Dusseldorf	76105
Limerick	75995
Galway	75500
Hamburg	74875
Waterford	74315
Bonn	72950
Stuttgart	72330
Cologne	70875
Dublin	70245
Craigavon	68450
Total	**1531675**

Figure 9. Table of City by Revenue

We will now create a visual which will help to understand the direction relationship. We will use a table visual and then we will import city data from Nike_Store table and revenue data from Nike_Dataset table. We can now see that filtering is quite easy here. The city which is coming from the Nike_Store table is filtering the data in the revenue amount. So, slicing and dicing will happen because of the relationships. If we want to filter out ProductID using City, we will need to modify the relationship. The city can filter our Nike_Dataset entities but Nike_Dataset cannot filter our Nike_Shoe entities. To avoid this problem, we will need to change the relationship between Nike_Dataset and Nike_Store to a bidirectional relationship. But there is a drawback of bidirectional relationship, it is very time consuming, if we initialized all relationship in our model as bidirectional then all processes will slow down. In an earlier version of Power BI default relationships established were bidirectional. So bidirectional relationship comes at a cost and that is a performance issue. To avoid such scenarios, we have to think about how to change our model, how to do modeling differently, we will need to design a proper data model. Now even if we designed the model correctly and still, we need to use a bidirectional relationship so in such case we can use another method which is the Dax function also called a cross filter transmitter function. It can keep the current relationship as single directional but write a measure with a cross filter which only for that measure use this relationship as both directional relationships. It is a much better way rather than establishing the whole bidirectional relationship.

B. STAR Schema:

When star schema is used in power BI it increases the efficiency and performance of the model. Even if we got a flat file that's got all the data in there like products, customers, and everything, we can use such a file in power BI. To use such files and also to remain efficient and also want to give a good experience for the users so the best way is to create a star schema model and then publish it to Power BI. Before understanding the star, the schema model let us just first understand Fact and Dimension. The whole concept of data warehousing and OLAP system is the analysis of data and derivation of meaningful information. So, the Fact is those tables that hold the data which is to be analyzed. For retrieving meaningful information. In our study, Nike_Dataset table is a fact table because all data is stored in the table. Fact tables mainly consist of numerical values. Fact tables consist of two major attributes which are the foreign key of dimensions and measures. The fact table is also defined as a centralized table in a star schema that is surrounded by the dimension tables. So, all the primary key of the dimension tables acts as foreign keys and that defines the grain of fact table. The grain of the fact is very important; it is how you uniquely identify a row in the fact table. Then we have a few measure columns which give us meaningful information. In our study, "Revenue and Profit" in the fact tables are the measures. The dimension table contains the descriptive measures which make the facts meaningful. Fact tables only have the keys of dimension tables. In our study, we have a couple of dimension tables which are Nike_Store and Nike_Shoes. Dimension tables have the details of the location of the store, product name, cost price of each product. There are two terms associated with the dimension table is slice and dice. For example, if we want to know the profit generated by the store located in Dublin then we will need to slice the data. We have StoreID in fact table we will use the StoreID to join with the fact table to get the data. Slicing is also known as filtering the data. Dicing is defined as the aggregation of data and cubing of data. In our study, if a user wants to see revenue generated for a particular city for each month. So, in this case, we are aggregating all the products which have been sold in a particular month in that city. This was done with the help of dimension tables. So, facts and dimension tables go hand in hand in data warehousing. Star schema can be explained as one fact table surrounded by dimension tables. Dimensions are in the denormalized form that means we will have a lot of redundancy and this can sometimes cause data integrity and storage issues. Figure [8] shows the star schema model of our study. As we can see Nike_Dataset is the fact table, Nike_Store and Nike_Products are the dimension tables. Nike_Dataset which is our fact table consist of two foreign keys which are StoreID and ProductID. Apart from foreign keys, Nike_Dataset consists of few measures based on which we do our computation.

Now we will define each entity of our file. The following tables consist of entities and the definition of each entity.

VI. DATA DICTIONARY:

Nike_Store

Attribute Name	Datatype	Description
City	String	City of the store.
Country	String	Country of the store.
Store ID	String/Integer	ID of the store.

Nike_Dataset

Attribute Name	Datatype	Description
Customer_Age	String	Age of Customer.
Customer_Gender	String	Gender of Customer.
Date	Date	Date
Feedback	String/Integer	Feedback of Customer.
Product ID	String/Integer	ID of the Product.
Profit	Decimals	Profit from the sale.
Customer ID	String/Integer	ID of Customer.
Revenue	Decimals	The Revenue from Sales.
Rating	String/Integer	Rating of product from Customers.
Store ID	String/Integer	ID of the store

Nike_Shoe

Attribute Name	Datatype	Description
Cost_Price	String	The price of the Product.
Product ID	String/Integer	ID of the Product.
Product Name	Decimals	Name of the product.
Selling Price	String/Integer	The selling price of the product

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