Module Code: CS3DV20

Assignment report Title: Individual Summative Coursework Project

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Actual hrs spent for the assignment: 40

Assignment evaluation (3 key points):

1. Exploration and evaluation of data
2. Portraying key metrics for use in day to day activity
3. Presentation skills

Contents:

Section 1: Storyboard and Storytelling Reasoning

The aim of the project is to convince the executives of a coffee chain company to adopt business intelligence tools for use in data analytics. The storyboard presentation must point out the shortcomings and oversights present in the current operation, offering a solution in the form of two Tableau dashboards.

The most important measure of a business's success is the degree of profit achieved. Each store in the chain has a budgeted profit target to achieve. The final profit is defined as the final sales of the store, minus the cost of goods and additional expenses.

Exploration of the dataset found that none of the stores had achieved their budgeted profit targets in the first year, and only five of the twenty stores had achieved it in the second. Furthermore, each store had surpassed their budgeted sales targets year on year, indicating the problem instead lay in the cost of goods and total expenses. Through further exploration of the cost of goods, it was made clear that the budgeted target had been exceeded each year. The total expenses are not budgeted for, and as such no comparison can be made, making the excessive cost of goods the culprit. This discovery was explained in the first two sections of the presentation, the current state highlighting the profits and sales, and the second section the excessive cost of goods.

The cost of goods is defined in the coursework document as 'the direct costs of producing goods sold by a company'. As such, it stands to reason that an excessive final cost of goods would be the result of producing too much compared to how much is expected to sell. Despite higher sales achieved than budgeted for, exploration of the data shows that most stores have large quantities of stock sitting in storage, in many cases over ten times the budgeted sales targets. This is a gross failure of the current system as much of that stock will expire before it can even be sold, leading to great wastage. The shelf life of tea can vary between 12-36 months, with even less for loose tea [1], though coffee may last much longer in cold storage [2]. As well as most stores having too much inventory, some stores do not have enough of a particular product, leading to lower profits from lost sales.

With the mismanagement of the inventory identified, the third section of the presentation discusses the forecasts for the business. Though the forecasts indicate positive trends for the profit and sales, uncertainty exists around the cost of goods as the predictions only take into account the data set, not global conditions or events which may affect the production of both tea and coffee. The increasing effects of climate change are thought to be a major threat to crop production, with farms in Africa and South America troubled by harsh weather conditions and events such as landslides and storms [3]. Furthermore, the uncertainty around Brexit and COVID 19 have impacted the UK coffee market, the value of which is expected to fall by 37.5% and not return return to pre-pandemic levels till 2025, according to the executive director of the British Coffee Association [4]. Highlighting this uncertainty is imperative as it stresses the need to seek solutions to the shop's existing problems, helping to make sure they can operate as efficiently as possible in preparation for the future.

The last section of the presentation discusses the importance of adopting the use of the two Tableau dashboards, each one tailored for a specific purpose and user base.

Section 2: Dashboard 1 - Executive Level Profit/Sales

The first dashboard has been designed for use by the company executives, focusing on the profitability and sales of each store. The company executives would desire a summative dashboard that answers the two main questions: are the stores meeting their budgeted sales targets, and are the stores meeting their budgeted profit targets? It would be unnecessary to present other data as the executives are not responsible for the daily running of the stores, presenting more variables would overcomplicate the dashboard and reduce its effectiveness in describing the data in a clear and concise manner.

The first feature of the dashboard is the store map. The store map offers a quick and clear view of which stores are meeting their budgeted profits target and those which are not, as such the map is placed in the top left of the dashboard, utilising the Western practice of reading left to right. Each store is represented by a circle, the size of which corresponds to the size of its profit. This intuitively indicates the importance of each store, a larger store failing to meet its profit target is of greater detriment than a smaller store failing to do so. Each store is also coloured according to whether it has met its budgeted profit target, red for no and green for yes. This makes use of the preconceived notion of red for danger and green for good, as seen on a daily basis in traffic lights [5]. Through this use of colour, the executives can quickly assess how many stores are not reaching their budgeted profit targets, seeking further detail in the expanded tooltips; the tooltips show the profit by product type, as well as budgeted profit, final profit, disparity profit, and the percentage of the total final profit the store accounts for.

Beside the map is a table of each store's final profit and final sales. This provides the means for quick comparison between stores, as well as the states the stores are located within, sorting by final profits or final sales. The table also acts as a filter for the map and the other charts within the dashboard, allowing for a detailed view on a particular store or state.

Beneath the map are two bar graphs, the first representing quarterly final profits and the second quarterly sales. Each graph allows for comparison between quarters, letting the executives study the change in performance over time. The graphs act as filters, allowing for each individual quarter to be selected for description by the other charts. The graphs use the time interval of quarters as this is used in the real world for business reports, compiled and presented to executives on a quarterly basis [6]. As with the map, the graphs make use of red/green colour coding to signify the meeting of each target, with the budgeted profits and budgeted sales clearly shown by the grey target line on each graph. The final vs budget profits/sales are shown as bars against lines on each graph as showing two lines on a graph would make it harder to interpret the trends.

The major feature of the right side of the dashboard is the Profit by Product chart. The bar graph chart features the final profit, marketing, and final sales. The final profit and final sales charts each have target lines for their budgeted values, with the red/green colour coding yet again employed. The bars are oriented horizontally as this makes it easier to compare the volume of profit made, marketing spent, and sales made for each product. The graphs sit aside one another so the executives can identify relationships between the three variables. By showing the profit for each product, any under or over performing products may be identified, allowing the executives to discern why a particular store may not be achieving their overall budgeted targets. Furthermore, by filtering by store or state, the chart is able to show which products are available and how their metrics differ

location to location. The quarterly profit, marketing, and sales are feature beneath the chart, providing a greater breakdown of the performance over time.

The dashboard has a general filter to change the timeframe of the data, allowing for comparison between calendar years as well as a view of lifetime trends. The dashboard utilises a simple colour scheme as to not confuse the user or create visual clutter. The white background makes it easier to see the red/green colour coding and thus the performance of each product and store. The executives would be acting on a tight schedule so it is important to convey the information in a clear and concise manner.

Section 3: Dashboard 2 - Managerial Level Inventory Count/Value

The second dashboard has been designed to track the inventory count levels and the value of the inventory stored, maintaining enough stock to meet the budgeted sales targets while eliminating the wastage identified as the leading cause of the excessive cost of goods. The value of the inventory is derived as the (final profits/final sales) * inventory count. The inventory value indicates how much profit is expected from the complete sale of the inventory. Tracking the inventory value will determine how worthwhile it is to stock a certain product at each store, products which have little value while possessing a high inventory count are not worth selling as much as those possessing high value for a low inventory count. The dashboard is intended for use by warehouse managers and others similarly in charge of the inventory levels for each store.

As with the Executive dashboard, the top left of the dashboard is the store map, indicating the inventory makeup by product type. The size of the circles correspond to the inventory count, indicating where the company's stock is concentrated; the stock managers can divert inventory from areas of surplus to stores in demand, eliminating the practice of overstocking in each store. To the right of the map is the inventory count and value for each store, allowing for comparison between stores and states. The table can be used as a filter for store map as well as the rest of the dashboard charts.

Beneath the map are the monthly inventory target and monthly inventory value target graphs. As with the executive dashboard, the graphs show the inventory count and inventory value as bars against the budget sales and budged profit respectively. Unlike the executive dashboard, the time intervals are mostly as opposed to quarterly. This is because an appropriate inventory supply must be kept for each store during operation, so a more frequent interval would be more beneficial in case of sudden changes; identifying monthly and seasonal patterns is also made easier.

The right side of the dashboard is occupied by the inventory count and value chart as well as the monthly breakdown tables for each. The graph uses the red/green colour coding to signify the meeting of the targets, the inventory count should be monitored and adjusted so that enough goods are maintained to reach the budgeted sales targets without leaving an excess of stock sitting around in warehouses. The table beneath details a monthly breakdown of the inventory count and value and their respective totals.

The dashboard also features a general filter to change the timeframe of the data. Data from each year can be contrasted and compared, as well as the data across all operational years. The product types are colour coded on the map, the coffee and espresso products coded orange and light brown, and the regular and herbal tea products green. Earthy colours have been chosen as the business deals with the sale of

natural grown goods, the product types are only coloured this way on the map as to not complicate the red/green scheme used on the rest of the dashboard.

Section 4: Findings and Analysis

The data provided encompasses two years of the coffee chain's ten year history. It is to be assumed that the missing eight years of data was either deemed unnecessary for the analysis or was incomplete, hence its exclusion. The the business is much larger than it would have been years ago so analysis of its earlier incarnations would not have necessarily have been helpful in diagnosing the chains current problems. Additionally, the state of the coffee market and the economy would have been much different ten years ago, so any problems existing in earlier periods may not have possess the same causes or solutions as they would now.

The exploration of the data set throughout the project shows how key data is in the running of a business. Through mapping the relations between variables, their effects on one another can be assessed and consequently solutions can be sought to any related issues. The failure to meet profit targets can be traced back to the excessive cost of goods, which in turn can be blamed upon the needlessly high inventory counts. Without the gathering and analysis of this data, the business would not be able to grow efficiently, and would more likely than not suffer greatly in the long term.

Through use of business intelligence tools such as the Tableau dashboards, those working at the business can monitor their progress against clearly defined metrics, identifying problems areas and seeking sensible solutions. It is important not to overcomplicate the dashboards or try to cater to too many groups of people. Each dashboard should be created for a specific purpose, in this case, for the executives to monitor which stores are profitable, and for the warehouse managers to maintain appropriate inventory levels. Trying to create all-encomposing dashboards would decrease their effectiveness in conveying information, only the relevant information should be shown to each user group according to their job roles.

Section 5: Conclusion

Overall the project has helped me develop a greater understanding of how to use data, determine key patterns over time, and discern problem areas and their solutions. The skills learnt have great practical usage in the real world, so I am not disheartened that it took me much longer than anticipated to complete the project. Creating the dashboards has made me think of the requirements of different groups within a company, having to decide what data is most important to present. It has also made me think of how to present this data in a clear and concise way, without sacrificing usability or detail. Working on the presentation has also allowed me to focus on picking out the key details which need to be conveyed, in this case to for the purpose of persuading the business to adopt the use of my dashboards. I can see these skills being very useful in the wider world of work.

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