Overview of BI Solution Developed for Walton Supermarket

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TABLE OF CONTENTS

SECTION **PAGE**

1. BACKGROUND AND PROJECT OBJECTIVES (done by Jane McCarthy) 2

2. SOLUTION OVERVIEW (done by Jane McCarthy) 2

3. TECHNOLOGY SELECTED (done by Jane McCarthy) 3

4. SOLUTION DETAILS (done by Jane McCarthy) 4
   - Dashboards
   - Executive Dashboard
   - Sales Dashboard
   - Marketing Dashboard
   - Analytical Exploration Tool

5. INSIGHTS AND RECOMMENDATIONS (done by Jane McCarthy) 11

6. LIST OF REFERENCES (done by Jane McCarthy) 16

BACKGROUND AND PROJECT OBJECTIVES

Walton Supermarket recently engaged McCarthy BI Solutions (MBI) to design and deliver a Business Intelligence (BI) Solution to help the company drive performance uplift. This report provides detail of the solution developed along with some recommendations based on analysis of spend by Walton's loyalty customers over the last 3 years.

Walton Supermarket (Walton's) is a large supermarket chain based in the USA, with retail operations extending to Canada and Mexico. Walton's have a retail presence in a total of 33 cities across the three countries.

Walton's is currently facing a number of sales challenges driven by intense competition from companies like Aldi. Historically, Walton's has enjoyed strong growth and impressive market share, but the economic climate has given budget-oriented supermarket chains a competitive edge. In order to maintain market share and ensure continued growth in this competitive environment, Walton's must now develop new strategies.

Walton's recognise that an effective BI solution is a strategic imperative to help inform future strategies. It would allow them to maintain clear line of sight of business performance, risks and opportunities, and to enable timely, targeted action to achieve business objectives. MBI has therefore been engaged to deliver a BI solution to support this.

Walton's have outlined a number of key objectives for the BI solution, specifically:

- To provide Walton's Executive Team with visibility of sales trends and business performance across all Walton Supermarket stores
- To provide insight into performance drivers and opportunities to improve business outcomes
- To provide insight into Walton Supermarket customers and their buying behaviour
- To inform strategic decisions to drive performance uplift

SOLUTION OVERVIEW

MBI have adhered to best practices in the design and development of a BI solution that will address Walton's key current challenges, as well as enable continued enhancements and expansion over time to ensure sustainable and scalable value generation. The solution will enable data-driven decision-making to improve business outcomes by providing the right information to the right people at the right time and in the right way.

Walton's, like any large organisation, comprises a diverse range of stakeholders with different information needs. In order to ensure the right information is provided to each of these stakeholders in the right way, MBI has developed a multifaceted solution that aligns to the needs of each individual stakeholder and user group.

MBI identified four key stakeholder groups requiring BI capability across the Walton's organisation:

1. Senior Executives
2. Marketing
3. Sales Teams
4. Product Functions

MBI consulted with representatives from each of these areas to understand their key business objectives and how they preferred to consume information. A tailored BI solution was then developed for each group. With the new capability, users in each stakeholder group will have ready access to the information that is most important to their specific business objectives, enabling them to monitor performance and make data-driven decisions to improve future outcomes.

The overall BI solution comprises four key elements, which in combination deliver a best practice BI capability that will enable Walton's to mitigate risks from competitors, drive performance uplift and meet business targets. A summary of the elements of the solution and the key audiences for each is provided in Table 1. More detail about the purpose and content of each element can be found in the 'Solution Detail' section of this report.

Solution	Purpose	Key Audience(s)
Executive Dashboard	At a glance snapshot of business performance, providing visibility of areas of over and under performance and enabling informed strategic decision-making	• Walton's Executive Team
Sales Dashboard	Provide visibility of sales performance and trends by location and product. Enable drill-down to investigate performance within specific geographies and product categories	• Sales Executives • Store Managers • Product Managers
Marketing Dashboard	Provide visibility of performance by customer segment, informing marketing activity and promotional offers	• Marketing Executives • Marketing Teams • Sales Functions • Product Managers
Data Discovery Tool	Enable ad-hoc data discovery by power users to answer key business questions and inform strategic decisions	• BI team • Marketing • Product Functions

Table 1: BI Solution Overview

TECHOLOGY SELECTED

The BI solution has been developed using IBM Watson Analytics (Watson). Watson was selected after careful assessment against a number of key requirements developed by MBI in collaboration with Walton's Executive and Technology teams. As shown in table 2, Watson satisfied all key assessment criteria making it a suitable choice for Walton's BI capability.

Criteria	Assessment	Notes
Ease of implementation		Cloud-based solution enables easy and rapid implementation
Low cost		$80 per user is significantly cheaper than alternative BI tools
Mobile capability		Dashboards and analytical tools are accessible via desktop and mobile devices with no extra development required, ensuring data is available when and where users need it
Ease of use		Intuitive interface ensures even users with no background in data or analysis will be able to use the capability with minimal training
Scalability		Cloud-based solution can be scaled across the organisation
Speed to insight		Cognitive analytical capability delivers insight within minutes of loading a dataset
Future proof		IBM are continuously rolling out enhancements which will ensure Walton's can continue to evolve the BI capability over time

Table 2: BI Capability Scorecard used to assess suitability of Watson Analytics

SOLUTION DETAILS

Dashboards

To cater for senior executives and leaders of Walton's marketing, sales and product functions, MBI have developed a set of dashboards as a key part of the total BI solution. According to Gartner, a leading information technology research and advisory company, dashboards are reporting mechanisms that enable users to examine metrics and KPIs at a glance. Dashboards were deemed the most appropriate BI solution for senior leaders, as these users are typically time poor and need to be able to quickly understand performance and issues to make timely, data-driven decisions.

Critical to the success of a dashboard is tailoring the design to the audience. For this reason, MBI have developed separate dashboards for each key stakeholder group. This ensures all users are able to access the metrics most important to them in order to make timely, fact-based decisions, without being sidetracked by information that is less relevant.

Executive Dashboard

The Executive Dashboard is a one-page overview of business performance across the entire organisation. The objective of this dashboard is to provide Walton's senior executives with a clear understanding of YTD performance at an enterprise level and within high-level geographies and product categories. In line with best practices, all content is displayed in a single screen, ensuring executives can digest the content quickly and easily, without needing to click or scroll.

In consultation with Walton's senior executive team, MBI have identified the most important KPIs for inclusion in the one page executive dashboard, specifically:

- Year to date (YTD) profit
- Profit vs. target
- Sales trends
- Profit by country
- Revenue vs. target by geography and product category

In combination, these metrics provide senior executives with a clear understanding of performance along with visibility of any geographies or product lines requiring immediate attention.

Note that while profit and target figures weren't originally available, MBI has worked with Walton's finance team to calculate them as they were deemed critical metrics to enable performance tracking and assessment. Shareholders are ultimately interested in company profitability hence this metric must be tracked, and targets must be implemented to ensure the executive team area able to measure and assess performance.

Some executives expressed a desire to include additional detail and metrics in the dashboard, however in line with best practices, further detail is not included to ensure the audience does not get sidetracked by less important information. Where necessary, additional information or granularity can be obtained via the Sales and Marketing Dashboards or by using the Analytical Exploration tool.

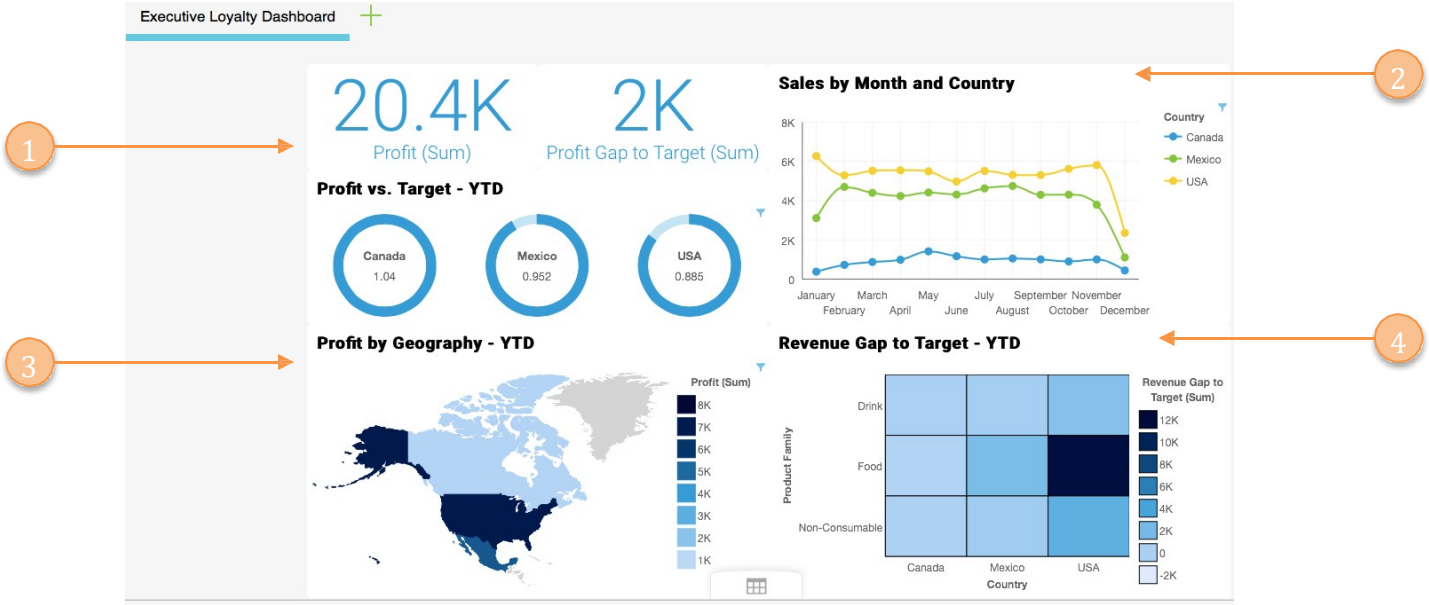

Figure 1: Executive Dashboard

Figure 1 shows a screenshot of the Executive Dashboard. This dashboard consists of four key sections which have been numbered in the screenshot above. Descriptions corresponding to each numbered section can be found below:

1. The top left of the dashboard is reserved for the most important metrics. For Walton's Executive Team, these are YTD profit, the gap between profit and target, and the ratio of profit to target by country. These are the numbers the executive team are most focused on because they provide the best indication of how the company is performing, hence they need to be immediately visibile and digestible.

The large format of these numbers and prominent position ensures this will be achieved.

For the ratio of profit to target, radial charts have been selected as they immediately enable users to see what percentage of their target they have hit. Users will readily understand how far they are from target by looking at the proportion of light blue remaining in the chart. Where there is no light blue, as is the case for Canada, it is immediately clear that they have met their YTD profit target. The number inside the circle provides the numerical value, enabling users to understand the actual variance to target. The combination of visual and numerical values in the radial charts provides all the information required by the audiences to quickly ascertain how each country is performing in terms of profit vs. target.

2. It is expected that the audience's attention will shift from the top left quadrant along to the right, as we typically read left to right. MBI has therefore placed the second most important attributes in this quadrant of the dashboard. For the executive dashboard, this was determined to be sales trends by country in the form of a line graph. This allows the executive team to immediately see how sales have performed over time in each key geography, and to identify specific peaks and troughs. In this dashboard, it is immediately clear that December saw a significant decline in sales in every country.

   The line chart enables quick digestion of a number of factors, including:
   - Relative sales by country (e.g. identifying that USA sales are much higher than other countries)
   - Peaks and troughs in performance (e.g. that for the most recent month all countries saw a decline in sales)
   - Trend of sales over time (e.g. whether sales are trending upwards or downwards).

   This view enables the executive team to readily identify any areas of concern and take prompt action in response.

3. In the bottom left corner a geospatial heat map has been used to display YTD profit by geography. The map enables the audience to readily identify locations of interest (e.g. specific countries or regions), with the shading demonstrating the relative contribution to profit of each country. Here the audience can immediately see that the USA is the highest contributor to YTD profit, followed by Mexico, with Canada contributing the least. Currently the level of granularity in maps is restricted within Watson Analytics, however future enhancements will enable variation by province or city to be visible across all three countries in which Walton's has a presence.

4. The bottom right chart provides a further breakdown of the top KPIs, specifically focusing on the gap between target revenue and actual revenue YTD. Again a heat map is used, but this time in a grid format rather than a geographical map to enable the variation to be seen by both country and product family. This chart type has been chosen as it allows the audience to quickly isolate and compare top and bottom performing product categories in each geography, and isolate areas requiring further attention. For the current period, it is evident that food sales in the USA are outperforming their target revenue by the largest amount, as indicated by the darker shading in this box, with food sales in Canada shaded very lightly

indicating that they are below target. This suggests particular attention should be given to food sales in Canada to drive uplift and meet target.

Sales Dashboard

Figure 2: Sales Dashboard

The Sales Dashboard (figure 2) is aimed at Sales Executives, Store Managers and Product Managers. While again all content is displayed within a single screen, selection boxes have been included on the left hand side to cater for the diverse group of users. This enables users to drill down to particular geographies and products of interest, tailoring the dashboard to the view most relevant to them. This capability ensures a single dashboard can serve a large group of users, reducing the need for multiple views to be created which would cause additional overhead for the BI team. It also enables users to drill down to see more granular views of information in order to isolate key performance drivers.

The key metric sales executives, store managers and product managers are interested in is revenue, with views required by geography, product and time period. To deliver this, the Sales Dashboard is broken into five sections:

1. The selections on the left enable the user to select particular geographies or products as required. For example, a store manager in Mexico can filter to their specific city, and a product manager within Canada can view performance of their product category in Canada, as well as compare performance to that of other product categories or countries.

2. As in the Executive Dashboard, the top left corner of the Sales Dashboard is reserved for the most important KPIs. For sales leaders, these are YTD revenue, the remaining gap to revenue target, and a breakdown of these metrics by country and product. The heat map used allows the audience to immediately understand the relative

performance of different country and product combinations, with high and low performing categories immediately evident.

3. Similarly to the Executive Dashboard, sales trends are included in the top right corner. While it may appear that this is unnecessary duplication as the same information is included in the Executive Summary, this is not the case as the audience for each dashboard is different. The information is included in both dashboards to ensure users can obtain the information they need without having to access multiple dashboards.

4. In the bottom left hand corner users can see the relative revenue contribution from each product type by city. The stacked bar chart has been selected for this chart as it enables both total revenue and product revenue to be displayed concurrently for comparison, and the horizontal bars enable the city labels to be read easily. This chart enables users to understand whether some product categories or cities are over or underperforming, and take swift action where required.

5. The bottom right chart shows total sales by product category and product family. A packed bubble chart chart was selected as it allows the volume of different product types to be understood by the high number of bubbles on the screen, but draws attention to the highest revenue products based on the relative size. Users will immediately understand which products generate the highest revenue, as these are large bubbles with labels. Lower revenue and therefore less important product categories are not immediately apparent due to the smaller bubble size and lack of visible labels, but this information can be accessed by clicking on the bubble of interest. The use of colour enables the contribution by broader product family to be visible as well as the more granular product group. Users can immediately see that globally, food generates the highest revenue, and within that category, vegetables and snack food have the highest YTD revenue.

Marketing Dashboard

The Marketing Dashboard has been designed to assist marketing managers in understanding their customers and to inform marketing activity. Walton's marketing team had already identified a number of customer segments and was keen to understand how they were performing in attracting customers within each of those segments. Based on the loyalty data available, MBI have been able to allocate a large proportion of customers into the segments identified by marketing, with the remainder being classified as 'mass market'. Table 3 provides an overview of each customer segment as classified based on the loyalty data.

Segment	Identifiers
Affluent	Income >= $90k
Budget Conscious/Discount Shoppers	> 50% of spend on staples such as milk and bread or income <= $30k
Busy Families	>50% of spend on ready made meals
Luxury/Lifestyle shoppers	>50% of spend on luxury items
Mass Market	Customers that do not fit any other segment definition

Table 3: Customer Segment classification rules

The marketing dashboard focuses on these segments as this enables marketing activity to be tailored to the individual customers within each segment. It also enables them to prioritise activity towards priority segments to drive maximum sales.

The marketing dashboard is a single screen showing a number of key metrics by segment. Walton's are advised that this dashboard should be used in conjunction with the analytical exploration tool. The dashboard shows key metrics, but users can obtain further detail and get answers to questions relating to specific marketing activity by making use of the analytical exploration tool.

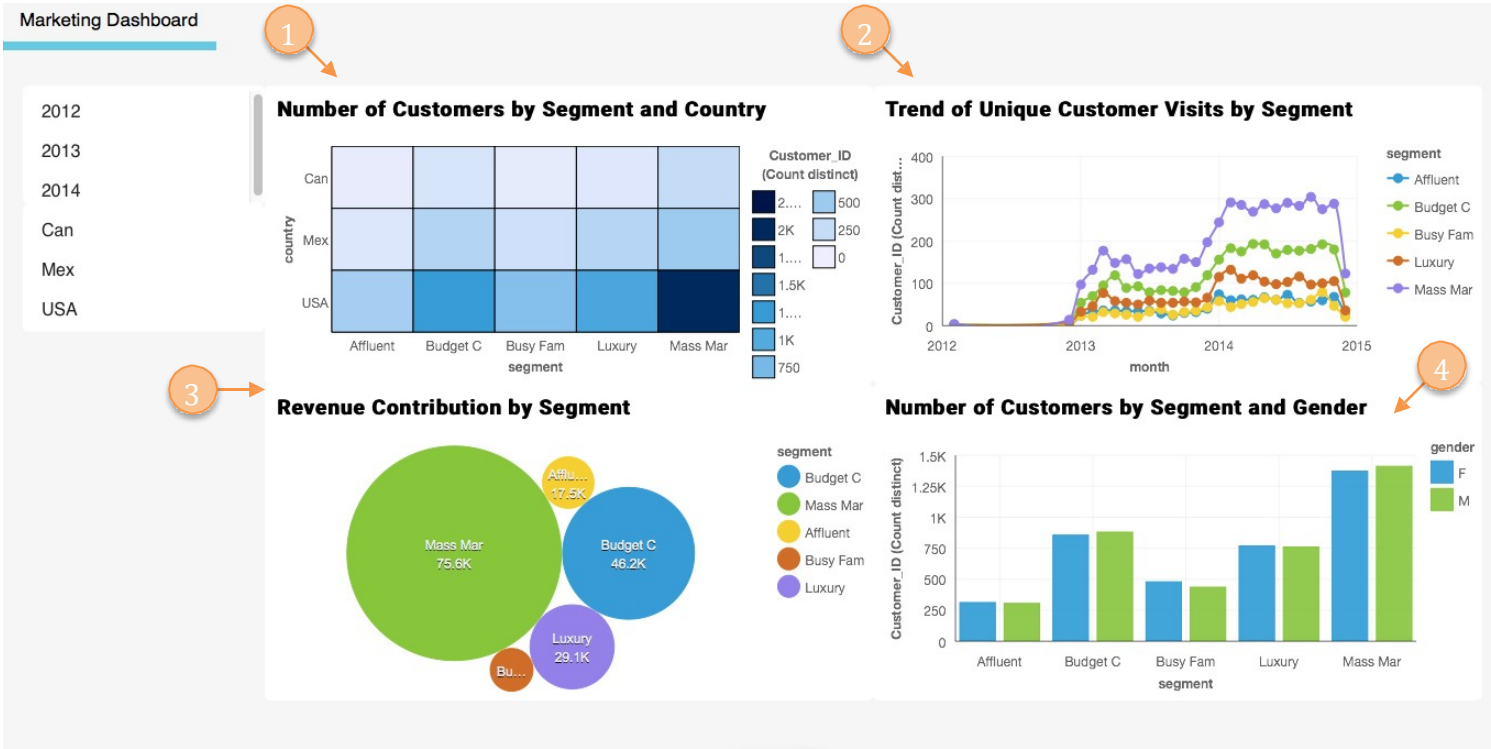

Figure 3: Marketing Dashboard

The marketing dashboard (figure 3) consists of four key sections, with filters available by country and year to support country-specific analysis over different time periods.

1. The heat map allows users to get an immediate understanding of their customers by highlighting the volume of customers by segment, and showing how this differs by country. It is immediately apparent that US stores have a very high portion of customers in the Affluent segment, followed by Budget and Luxury customers. Users can also see that this trend is also evident in Canada and Mexico, though total customer volumes are lower in these countries.

2. The top right chart provides visibility of sales activity over time for each segment, enabling users to see trends over time within each segment, and also identify whether targeted marketing activity has had any impact on total customer volumes.

3. The packed bubble chart allows users to quickly grasp the relative contribution to revenue of each segment based on the size of each bubble. Mass market clearly generates the highest sales volumes, followed by Budget Conscious and Luxury.

4. The final chart shows how customer volumes in each segment vary by gender to enable further tailoring of marketing material to customers. Coloured bar charts enable users to compare volumes within each segment, as well as how this varies by segment. For the most part males and females are equally represented in each category, however females are slightly over-represented in the Busy Families segment, and males are slightly more likely to fit the Affluent definition.

Analytical Exploration Tool

One of the most powerful features of Watson Analytics is its guided analytics and exploration capability. Armed with just a log in and a dataset anyone can use Watson Exploration to gain insight. MBI proposes that this be rolled out across Walton's marketing, product and sales support teams to enable them to self-serve to gain insight beyond what's available in premade dashboards. This will ensure questions can be answered quickly, enabling timely action to deliver the best possible outcomes.

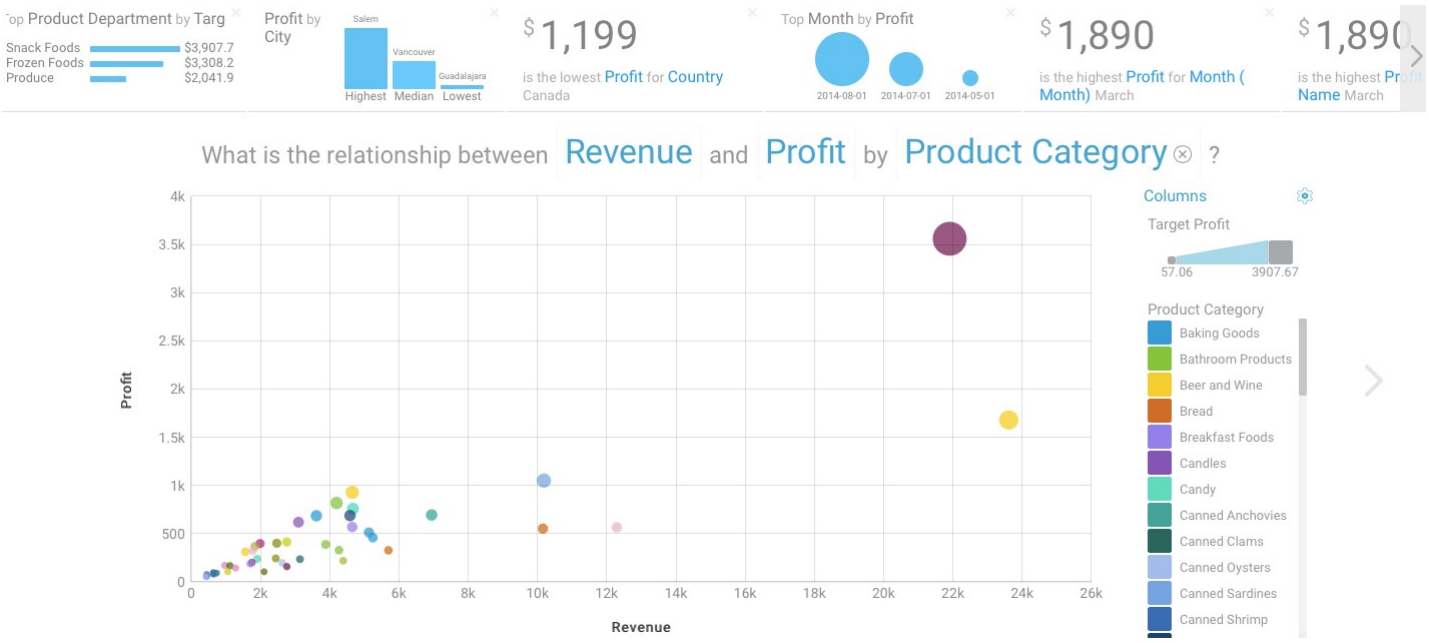

Figure 4: Analytical Exploration Tool

Figure 4 shows an example of the automated visualisations Watson can create, however no pre-canned solution would be rolled out to users as it's simply not required. The data has been loaded and will be loaded regularly ongoing, and users can log in and interact with the data as required, creating visualisations on the fly.

Users can benefit from the exploration capability two key ways:

1. Guided analysis: Watson automatically analyses the data and suggests a number of questions that the user may be interested in. As shown in the screenshot above, the user can then simply select the most relevant question and Watson automatically generates a visualisation to answer the question. It also displays a number of other insights gleaned from the data. The user can then interact with the visualisation, changing the chart type if required, and swapping in different variables to uncover new relationships and trends.

2. Self-guided analysis: As shown in the screenshot below, users can also type a question into the Watson search box and Watson will return a selection of relevant options for the user to view. This enables the user to focus on specific metrics of interest, but still benefit from Watson's automated analytical capability. Users may define all the metrics they want to look at, or follow Watson's prompts to examine different views and relationships with other metrics in the data set.

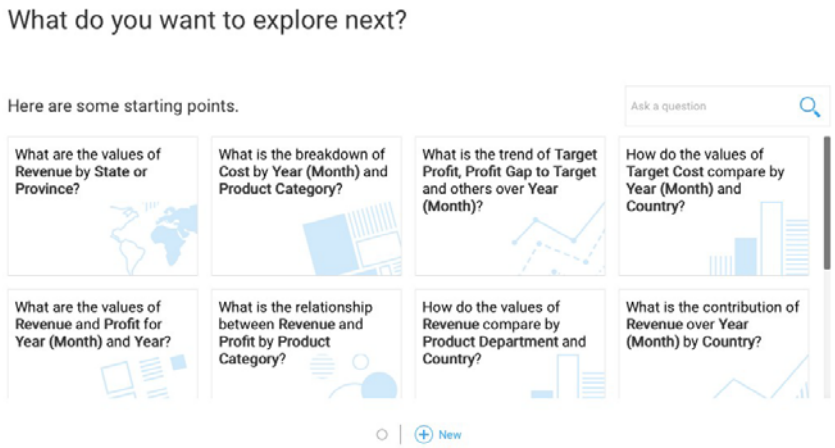

Figure 5: Example of Watson Analytics guided-analysis capability

In both scenarios, users are able to continue to explore the data set and examine different combinations of metrics in different visualisations. This enables users to generate new hypotheses and investigate them on the fly, uncovering new insight and enabling swift action when opportunities or risks are identified.

INSIGHTS AND RECOMMENDATIONS

In addition to developing a BI solution for ongoing monitoring and analysis of business performance, MBI have analysed historical sales information provided by Walton's and identified a number of key insights and recommendations.

Recommendation 1: *Test margin increase on staple perishable products and continue to drive sales of high margin snack foods*

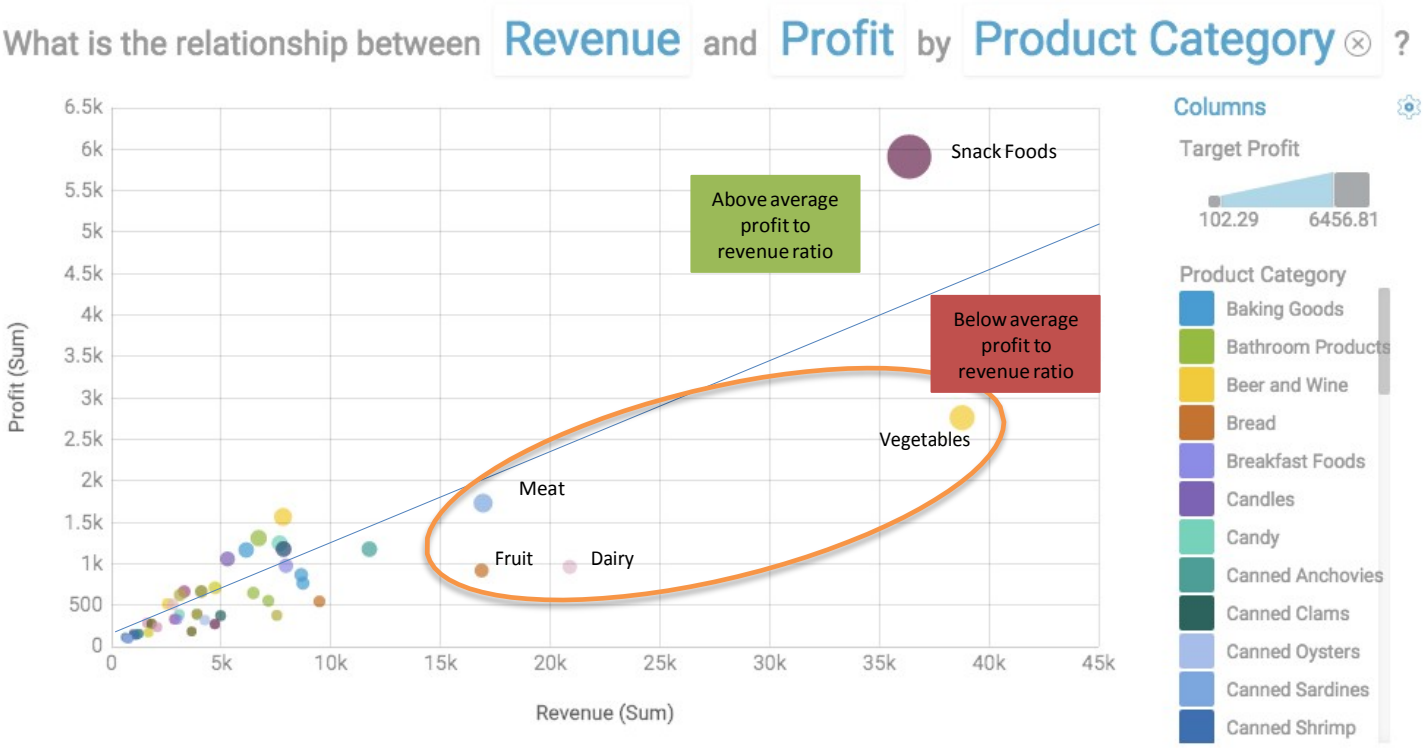

Figure 6: Relationship between profit and revenue by product

The chart above shows the relationship between revenue and profit for each product category, where profit has been calculated in consultation with Walton's finance team. The chart shows that dairy products, meat and vegetables deliver high revenue but generate disproportionately lower profit. As these products are perishable, the costs are higher and therefore margins are lower. Given these products are staples in most households, consumers may be willing to pay more for them so MBI suggests testing higher margins on these products to improve profitability without sacrificing revenue.

Snack foods on the other hand are lower cost and generate disproportionately high profit. Continuing to focus on sales of these high margin products will have a positive impact on Walton's bottom line.

Recommendation 2: *Offer a loyalty bonus to drive customer visits*

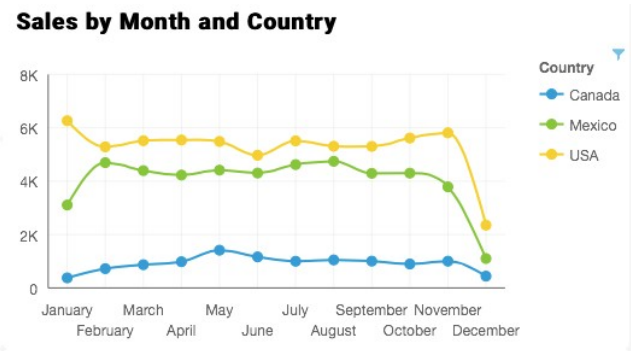

Figure 7: Monthly revenue from loyalty members by country

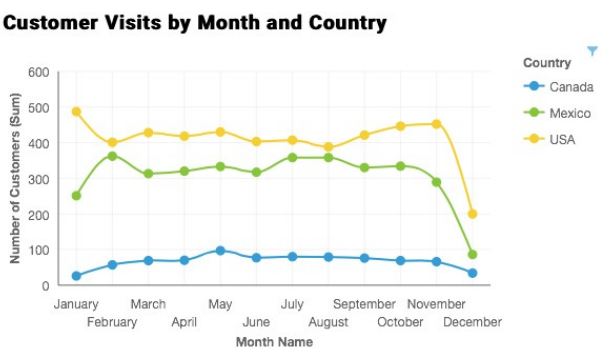

Figure 8: Number of unique customer visits by loyalty members by country

Figure 7 that sales in all markets dropped sharply in December 2014, particularly in the USA and Mexico. Canada had a lower drop, however this was off a lower base. Figure 8 shows that the drop was not restricted to a single category, but occurred in each product family.

While the cause of this December decline in loyalty customer sales cannot be determined conclusively from the data, MBI suggests two potential drivers:

1. Aggressive marketing and incentive offers by competitors such as Aldi may have enticed customers away from Walton's in December. If this was the case, Walton's could be expected to have seen a similar drop in visits by non-loyalty members, however MBI does not have access to the data to determine whether this occurred.
2. Lack of loyalty offers in December at Walton's may have resulted in fewer loyalty members swiping their Uncle Sam loyalty card as there was no incentive to do so. They may still have been shopping at Walton's, but their spend will not be linked to their loyalty cards and therefore is not able to be tracked. If the decline in sales volumes seen among loyalty members was not seen by non-loyalty members, this could be assumed to be the likely cause.

While MBI can't identify which of the above scenarios is true based on the data available, for either scenario the recommended action is to quickly respond with loyalty member incentives to encourage continued customer loyalty. Walton's should also consider broader marketing activity and pricing offers outside of the loyalty program if scenario 1 is identified as the cause of the decline. This would ensure market share is retained among both loyalty and non-loyalty customers, with customers incentivised to shop at Walton's rather than competitors.

Recommendation 3: *Focus marketing activity on Affluent, Luxury and Mass Market Customers*

Segment	Average Monthly Revenue per Customer, 2014
Affluent	$15.75
Luxury	$15.28
Mass Market	$15.20
Budget Conscious	$14.80
Busy Families	$14.24

Table 4: Average Monthly Revenue per Loyalty Customer by Segment

While declines in sales were seen across the board in December and therefore large scale marketing activity should be undertaken, MBI proposes paying particular attention to Affluent, Luxury and Mass Market customers as these segments generate the highest revenue per customer (as shown in Table 4). Attracting and retaining customers in these segments would therefore generate higher total sales.

Recommendation 4: *Develop a tiered loyalty membership offering based on total spend and spend in particular categories*

MBI has shown that Affluent and Luxury segments generate the highest revenue per customer. Walton's have already identified that these customers are more likely to respond to incentives related to status or invitations to special events. In order to attract more of these high value customers and encourage ongoing loyalty, MBI recommends that Walton's

make changes to their Uncle Sam Card loyalty programby introducing a points based loyalty scheme with Bronze, Silver and Platinum tiers, as outlined in table 5.

Loyalty Tier	Eligibility Criteria	Incentives available
Bronze	Customers will automatically be allocated Bronze status when they sign up for Walton's loyalty program	Loyalty members are the first to know about special offers, and also receive exclusive offers only available to loyalty members
Silver	Customers will automatically be upgraded to Silver status when they earn a certain amount of points in a three month period. Points are earned based on spend, with bonus points awarded for spend on select luxury items. Customers must continue to earn a certain amount of points each year to retain Silver status.	As per Bronze status, with additional special offers and discounts available to Silver members.
Platinum	Customers will automatically upgraded to Platinum status after earning a certain amount of points. Once earned, Platinum status is retained for life.	Platinum members receive all the incentives available to Bronze and Silver members, however they also receive exclusive pricing offers on luxury items as well as exclusive invitations to events.

Table 5: Proposed loyalty program structure

MBI proposes this tiered loyalty membership offering as a way of incentivising customers in the most profitable target markets to shop at Walton's, and importantly, to continue to do so. The additional discounts and offers available to members of higher loyalty tiers are expected to entice customers to visit Walton's, and to spend more each visit in order to generate sufficient loyalty points to progress to higher tiers. MBI proposes that once attained, customers should retain Platinum membership for life as this will act as added incentive to earn enough points to become Platinum members, driving spend among lower tiered customers.

Recommendation 5: *Evolve BI capability over time to continuously improve decisions and business outcomes*

MBI have extracted a number of actionable insights from the loyalty data available and these will enable Walton's to immediately respond to the competitive environment and drive uplift in sales and profitability. This data, however, represents only a fraction of the potential data available to Walton's for analysis and insight. MBI therefore recommend that Walton's expand the breadth of data captured to enable further insight to be extracted. Table 6 outlines the key data elements Walton's should consider for future integration into the BI capability.

Data Element	Benefits
Sales data from non-loyalty members	Tracking total sales rather than just that of loyalty members would provide a holistic view of business performance. While customer demographic information won't be able to be obtained for non-loyalty members, sales by location and product type should be available so this should be included in reporting. The loyalty members may not be representative of the entire customer base therefore tracking total sales is important to ensure informed decisions can be made.
Customer Satisfaction	Satisfied customers are more loyal than dissatisfied customers, hence monitoring and driving customer satisfaction will enable Walton's to ensure they are meeting customer needs and encouraging them to continue shopping at Walton's. This is particularly important in a competitive environment to mitigate the risk of dissatisfied customers switching to competitors.
Market share	Monitoring share or revenue in different markets will enable Walton's to identify areas in which competitors may be making inroads and enable targeted and timely action to mitigate the risk.
External market information	Following the implementation of this new BI capability, Walton's now have a good understanding of their loyalty customers and target demographics. Obtaining information about the broader population in each geography such as number of people by age and income would help inform decisions such as store location and marketing, providing an external view of the market to supplement Walton's knowledge of existing customers.

Table 6: Recommendations for additional data elements to be introduced into Walton's BI reporting

As well as capturing additional data, MBI advises Walton's to continue to enhance the BI solution as the capability of Watson Analytics improves over time. While the existing capability has a number of advanced features, such as guided analytics, in some regards the application is limited. For example, bullet charts are not available and in some cases, such as visualising the gap between actual and target profit in the Executive Dashboard, these would be the most appropriate chart type to use. It is also anticipated that additional drill down capability may be developed down the track, which would provide additional functionality and value for some users.

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