

# Final Project Report: Dunkin Donuts- Leveraging BI for Innovation

## Team: 2

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### Introduction

Dunkin' Donuts, a dominant coffee and baked goods chain, faces challenges in today's competitive market. Their current reliance on basic reporting and siloed data hinders their ability to optimize operations and compete effectively. It started as a single shop called Open Kettle in 1950, but soon rebranded itself to Dunkin' Donuts as coffee and donuts became its specialty. The company grew rapidly through franchising, reaching a global presence with over 13,200 locations today. To reflect their menu diversification beyond donuts, they even dropped "Donuts" from their name in 2019. This report explores how implementing a robust Business Intelligence (BI) system can address these issues.

A centralized data warehouse, gathering information from various sources like loyalty programs and social media, would provide valuable insights. Tailored dashboards for different teams would allow for data-driven decision making in areas like marketing campaigns, product development, and sales forecasting. By leveraging data analytics, Dunkin' Donuts can gain a competitive edge, improve customer experience with personalization and healthy options, and ultimately achieve its strategic goals which reflects on their mission and vision stated as leading provider of beverages and baked goods in a convenient, friendly environment.

### The Proposed BI Solution

Business intelligence (BI) systems collect data from various sources (internal & external), store it centrally (data warehouse) or departmentally (data marts), and analyze it to uncover trends. These insights are then presented visually (charts, graphs) for clear communication. BI systems can also monitor key metrics and trigger alerts when something goes off track. Finally, data governance ensures the accuracy and security of the data used.

So, relative to this, there are opportunities for Dunkin Donuts including IT professionals, data analysts, and business users. Data from point-of-sale systems, loyalty programs, market research, and even social media can be integrated and analyzed. This comprehensive view would provide insights into customer behavior, market trends, product performance, and marketing effectiveness. Ultimately, BI-generated data visualizations would guide strategic decision-making across the organization.

### Business Intelligence Framework

A BI framework is a structured plan to collect, store, analyze, and visualize data. It guides building a BI system for an organization's specific needs. Key components include:

- Data sources (internal & external)
- Data storage (warehouse/mart) with star schema model for efficient analysis
- Data analysis to uncover trends and insights

- Data visualization through dashboards for clear communication
- Monitoring key metrics and setting up alerts for critical situations
- Data governance to ensure data accuracy, security, and reliability

Dunkin' Donuts can leverage a BI framework to gather valuable insights. External market research and social media analysis would inform expansion strategies and brand perception. Internally, point-of-sale data and customer loyalty program information would be integrated into a star schema data mart. This structure allows for customer segmentation, market basket analysis, sales trend analysis, and marketing campaign measurement. Data visualization through dashboards would then communicate these insights in a clear way. Sales performance, customer demographics, and marketing campaign effectiveness would all be visually represented.

Additionally, the BI system can monitor key metrics and trigger alerts for situations requiring attention. Finally, strong data governance policies would ensure the accuracy, security, and reliability of the data used. By implementing a BI solution based on this framework, Dunkin' Donuts can gain valuable insights to support data-driven decision making for market expansion, product development, and marketing strategies. This can lead to improved customer targeting, operational efficiency, and a competitive advantage in the marketplace.

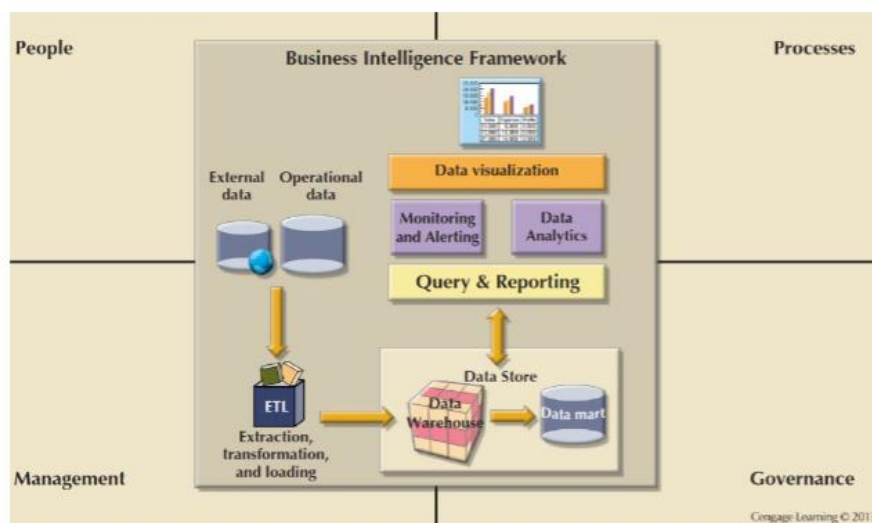


Figure 1: BI Framework

## Three Use Cases/Prototypes

### 1. Customized Donuts on the Go

- **Challenge:** Customers crave variety in donut flavors but lack time for extensive personalization.
- **Solution: Dunkin' DIY Stations:** Install self-serve stations with a wider selection of toppings, base alternatives, and sizes. Customers choose their base and customize it using touchscreens for automatic dispensing.
- **BI Integration:**
  - Analyze point-of-sale data to identify top-selling donuts, popular toppings, and base preferences by location.

- Segment customers to tailor topping and base options at each station based on local demographics and trends.
- Implement dynamic pricing for custom donuts based on topping selections (premium toppings cost slightly more).
- Recommend upsell options on the touchscreen based on customer selections and top selling ingredients recommendation based on the POS sales data.
- Monitor ingredient levels in real-time and trigger alerts for restocking.

#### **Benefits:**

- Faster customization with minimal wait time.
- Increased customer satisfaction through personalization.
- Data-driven insights to optimize product offerings and pricing strategies.

## **2. Attracting New, Health-Conscious Customers**

- **Challenge:** Dunkin' Donuts' sugary image deters health-conscious consumers.
- **Solution: Menu Expansion with Healthier Options & BI Integration:**
  - Offer a wider selection of healthy breakfast and snack options alongside classic donuts (protein boxes, oatmeal bowls with fresh fruit, yogurt parfaits).
  - Provide clear nutritional labeling for all menu items.
- **BI Integration:**
  - Analyze market research data to identify popular healthy breakfast and snack choices in target markets.
  - Analyze customer feedback from surveys and social media to understand health-conscious customer preferences.
  - Track sales performance of healthy menu options.
  - Launch targeted marketing campaigns promoting healthy options to relevant customer segments.
  - Conduct A/B testing of different menu configurations and marketing messages for optimal results.

#### **Benefits:**

- Attract new customer segments interested in healthy options.
- Enhance brand image by catering to diverse dietary needs.
- Data-driven insights to optimize the healthy menu based on customer preferences.

## **Implementation**

### **Using BI to Gain Actionable Insights: Prototypes and Analytics**

This section delves deeper into how Dunkin' Donuts can utilize a BI system beyond conceptual ideas. We will explore two prototype dashboards and a data analytics example to highlight the practical value of BI.

## Action Item

**Gather Data:** To create the following prototypes and conduct data analytics, Dunkin' Donuts would need to gather relevant data from various sources. This could include:

- Point-of-sale (POS) data: Transaction details, product sales, customer demographics (if collected at purchase).
- Customer loyalty program data: Purchase history, preferences, loyalty program tier.
- Social media data: Sentiment analysis of online brand mentions, customer feedback on new products.
- Market research data: Consumer trends, preferences for healthy options in target markets.

### 1. Sales Performance Dashboard (Target Audience: Sales & Marketing Teams)

**Goal:** Gain insights into sales performance across different product categories, locations, and periods.

#### Managerial Questions Answered:

- Which donut varieties are the top sellers in each region?
- How do sales of seasonal offerings compare to regular menu items?
- Are there any locations experiencing a decline in sales?
- What is the impact of marketing campaigns on specific product categories?

#### Dashboard Functionalities:

- **Interactive Map:** Visually represents sales performance by location using color-coded pins on a map. Clicking a pin drill down to detailed sales data for that specific location.
- **Sales Comparison:** Compare sales performance before and after the launch of a new marketing campaign.
- **Sales Targets:** Set and track progress towards established sales targets for different product categories and locations.

## 2. Customer Segmentation Dashboard (Target Audience: Marketing & Product Development Teams)

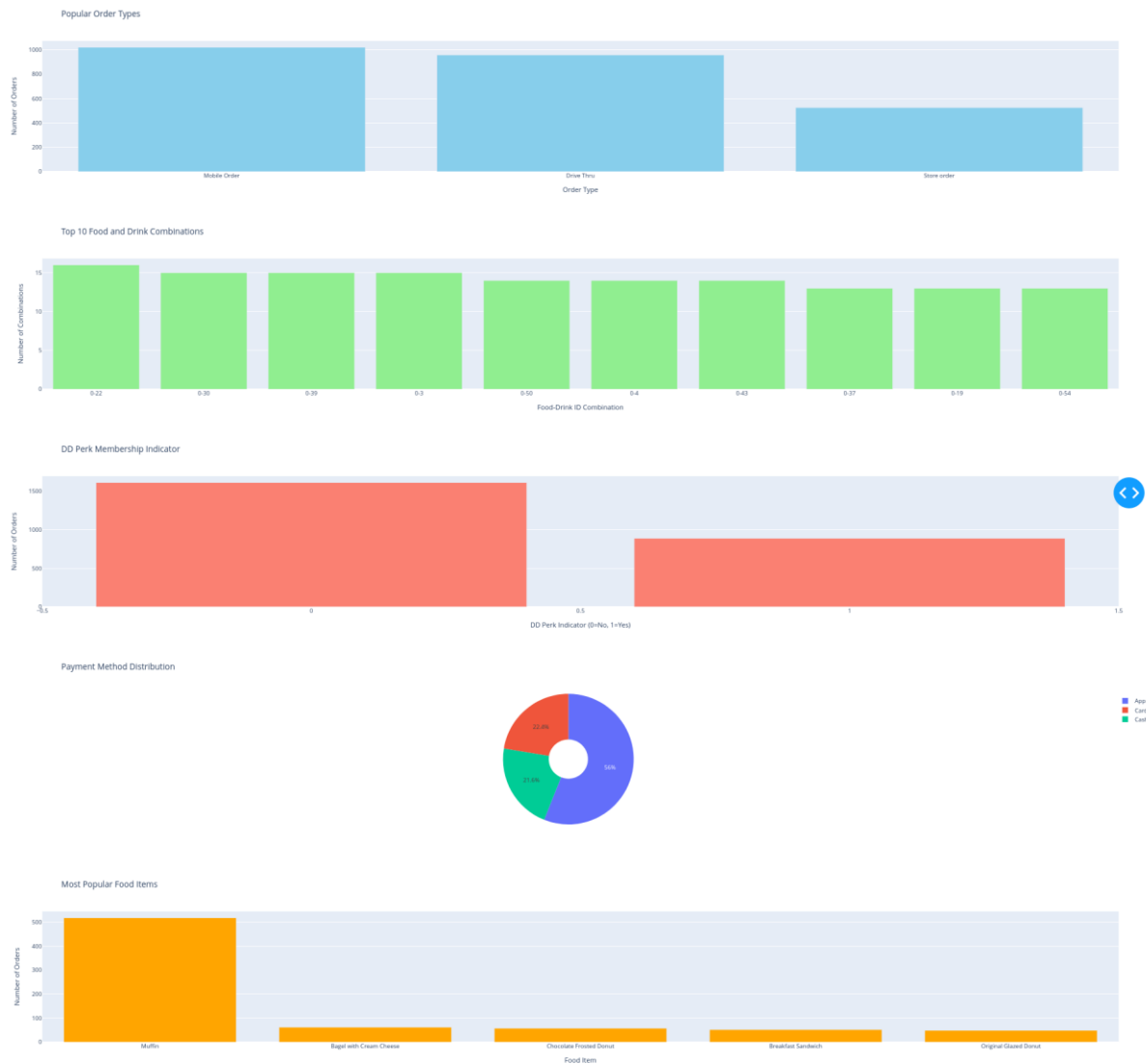
### Donut Ingredients Dashboard by Region



#### Top 4 Ingredients by Category

Category	Ingredients
Dough Type	Vegan, Classic, Cake, Gluten-Free
Icing	Chocolate, Vanilla, Maple, Strawberry
Glazing	Sugar, Honey Glaze
Filling	Custard, Boston Kreme, Jelly

## Dunkin' Donuts Data Analysis



The most popular food item for which a healthier version could be released is: Muffin

**Goal:** Understand customer behavior and preferences to inform targeted marketing and product development strategies.

### Managerial Questions Answered:

- Who are our most frequent customers, and what are their buying habits?
- Are there distinct customer segments with unique preferences?
- How effective are our marketing campaigns at reaching different customer segments?
- What types of healthy menu options would resonate best with our customers?

### Dashboard Functionalities:

- **Customer Segmentation:** Segment customers based on demographics, purchase history, and loyalty program data. Visualize these segments using bar charts or pie charts.

- **RFM Analysis:** Analyze customer behavior using RFM (Recency, Frequency, Monetary Value) analysis to identify high-value customers and potential churn risks.
- **Product Affinity:** Identify which donut categories are frequently purchased together, suggesting potential upsell opportunities.
- **Campaign Performance by Segment:** Track the effectiveness of marketing campaigns for different customer segments based on click-through rates and conversion rates.
- **Customer Feedback Integration:** Integrate a section to display recent customer feedback (positive or negative) from social media or surveys, categorized by customer segment.

### 3. Social Media Sentiment Analysis (Target Audience: Marketing & Brand Management Teams)

**Goal:** Analyze customer sentiment expressed on social media platforms to understand brand perception and identify areas for improvement.

#### Data Analytics Techniques:

- **Social media listening tools:** Utilize tools to collect and analyze customer mentions of Dunkin' Donuts on various social media platforms (e.g., Twitter, Facebook).
- **Sentiment analysis:** Analyze the collected data to categorize customer sentiment as positive, negative, or neutral towards Dunkin' Donuts, specific products, or recent marketing campaigns.

#### Analysis Outputs:

**Sentiment Reports:** Generate reports that summarize the overall sentiment towards Dunkin' Donuts on social media. Track trends in sentiment over time and identify potential areas of improvement.

- **Customer Persona Development:** Leverage social media insights to refine customer personas and tailor marketing strategies to resonate with specific customer segments.

#### Benefits of Data Analytics:

- **Identify Emerging Trends:** Social media analysis can help Dunkin' Donuts stay ahead of emerging trends and customer preferences.
- **Improve Brand Reputation:** By responding to negative sentiment and addressing customer concerns, Dunkin' Donuts can proactively manage their brand reputation.
- **Develop Targeted Marketing Campaigns:** Utilizing social media insights allows for crafting targeted marketing campaigns that are more likely to resonate with specific customer segments.

### 4) K means Segmentation Analysis

**Goal:** Perform customer segmentation analysis for Dunkin' Donuts using their customer interaction data to better understand demographics and behavior, enabling refined marketing strategies.

#### **Data Analytics Techniques:**

- **Data Encoding:** Utilize LabelEncoder from sklearn to transform categorical data like 'Gender' and 'Order Type' into numeric codes, preparing it for analysis.
- **Feature Selection and Scaling:** Standardize key attributes (Age, Gender, ZIP Code, Order Type) using StandardScaler to ensure data uniformity for clustering.
- **Clustering Application:** Apply KMeans clustering to segment customers into five distinct groups based on their standardized features.

#### **Analysis Outputs:**

- **Customer Segments:** Define and assign descriptive names to each customer segment such as "Young Urban Females" and "Middle-aged Suburban Males", reflecting their demographic and behavioral characteristics.
- **Segmentation File:** Save the segmented customer data to a new Excel file, 'Customer\_Segments\_For\_Dashboard.xlsx', facilitating integration into business dashboards for strategic use.

#### **Benefits of Data Analytics:**

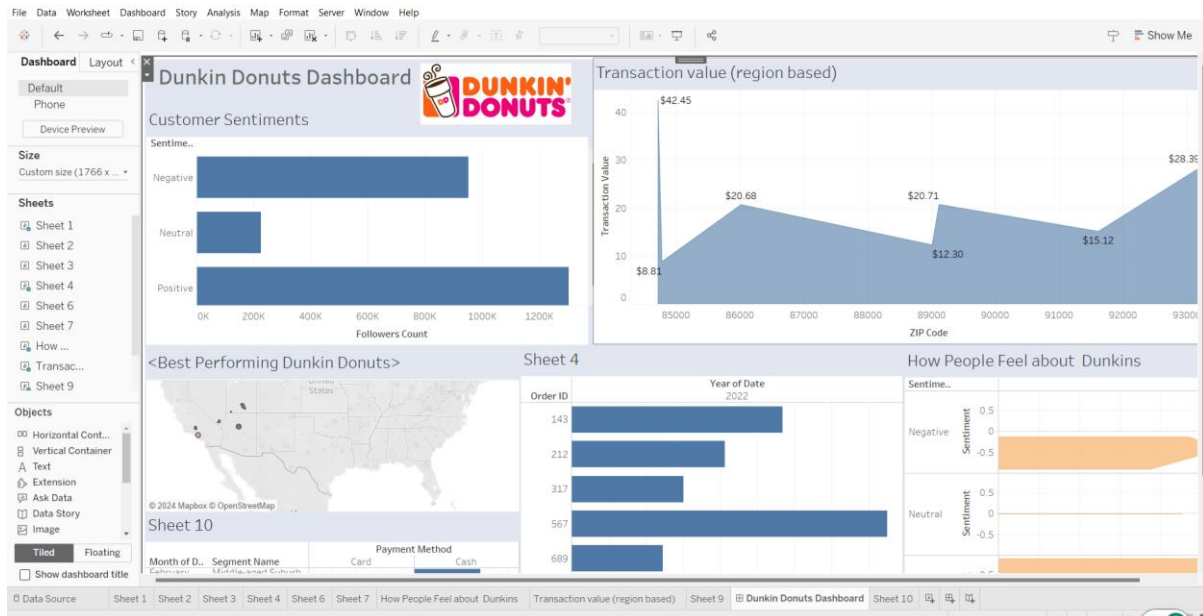
- **Enhanced Marketing Precision:** By understanding customer segments, Dunkin' Donuts can tailor marketing campaigns more effectively to meet the specific needs and preferences of different customer groups.
- **Improved Customer Insights:** Segmentation helps in identifying distinct patterns and preferences within the customer base, informing product development and promotional strategies.

#### **Kotter 8 step model**

Dunkin' Donuts outlines a clear 8-step plan to address challenges and achieve success. They'll assemble a strong team, focus on customization and health options, keep it affordable, communicate effectively, empower employees, celebrate wins, leverage momentum, and solidify the new approach in company culture.

#### **Dashboard Overview**





The Dunkin donut's dashboard tracks customer sentiment, transaction value by region, and follower count over time. Below is the breakdown of the elements in the dashboard:

- **Customer Sentiment:** This section breaks down customer sentiment into three categories: positive, neutral, and negative. It shows the number of customers in each category, along with the total amount of money they spent. For example, there are 40 positive customers who spent a total of \$42.45.
- **Transaction value (region based):** This section likely shows the total amount of money spent by Dunkin' Donuts customers in different regions.
- **Follower Count:** The graph in this section shows Dunkin' Donuts' follower count over time. This could be tracking the number of followers Dunkin' Donuts has on social media, or the number of people following their email list.
- **Payment Method:** This project shows the payment method used for purchases in February and March. It appears that most customers paid with a card, rather than cash.

Overall, this dashboard is designed to give Dunkin' Donuts a quick view of their customer sentiment, sales figures by region, and social media following. It can help them to identify areas where they are doing well, and areas where they can improve.

### Actionable Insights for Dunkin' Donuts

By implementing a comprehensive BI solution and integrating it across the proposed solutions, Dunkin' Donuts can unlock a wealth of actionable insights to:

- **Optimize product offerings:** Identify top-selling donuts and popular topping combinations to inform product development and menu optimization. Analyze sales data from the grocery section to understand customer demand for fresh produce and tailor offerings accordingly.
- **Personalize customer experience:** Utilize customer segmentation data to personalize marketing campaigns and promotions for different customer segments.

Offer recommendations for customized donuts or healthy menu options based on a customer's loyalty program data or past purchases.

- **Improve operational efficiency:** Leverage real-time ingredient level monitoring at the Dunkin' DIY Stations to prevent stockouts and optimize inventory management. Analyze sales data to predict demand for grocery items and ensure efficient ordering and stocking practices.
- **Make data-driven decisions:** Move beyond intuition and rely on data-driven insights to inform strategic decisions regarding new product launches, marketing campaigns, and revenue diversification strategies.

These examples highlight the power of BI in transforming Dunkin' Donuts into a data-driven organization, enabling them to adapt to changing market dynamics, enhance customer satisfaction, and achieve long-term success.

### **Ethical Challenges for Dunkin' Donuts' Transformation**

Dunkin' Donuts' new initiatives raise several ethical concerns. Food waste from customization could be reduced through smaller portions, better forecasting, and donations. Staff training is crucial for smooth customization. Transparency is key for healthy options, with clear labeling and truthful marketing that focuses on genuine health benefits. With delivery and contactless pickup, Dunkin' Donuts should prioritize worker safety, fair compensation, and clear communication. Finally, value-priced options shouldn't compromise quality or transparency regarding ingredients.

### **Meeting Notes and Team Contributions**

The project was propelled by consistent efforts from team members Anusha, Bhavya, Felix, and Poorajith, Stephanie. The team held multiple strategy sessions and took proactive steps to redistribute tasks, ensuring timely completion of the project. The collaboration and commitment of the team members have been instrumental in overcoming challenges and achieving the project objectives.

### **Conclusion**

The integration of BI tools into Dunkin' Donuts' operational strategy has poised the company to maintain its competitive edge and continue its growth trajectory. Our BI solutions facilitate informed decision-making and foster a deeper connection with our customers, reinforcing our market position. The implementation of these models has provided Dunkin' Donuts with a clearer understanding of customer demographics, purchase patterns, and potential sales drivers. Initial tests indicate a significant potential for cost reduction and sales improvement.

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