

**BUAN 6337.001**  
**PREDICTIVE ANALYTICS FOR DATA SCIENCE**

**GROUP PROJECT PROPOSAL**  
**ON**  
**CONAGRA FOODS**

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## Market Research

### Overview

The meat substitute market has been growing rapidly, driven by rising health concerns, environmental awareness, and the increasing appeal of plant-based diets. Companies like Beyond Meat, Impossible Foods, and Conagra Brands have popularized plant-based alternatives by creating products that mimic the taste and texture of traditional meat.

Growth projections are strong, with the market expected to expand as more consumers and foodservice providers adopt these products. Factors driving this growth include advances in food technology, wider distribution channels, government support for sustainable food production, and increasing consumer demand for healthy, ethical, and environmentally friendly options.

The global meat substitutes market size was valued at USD 6.42 billion in 2023 and is projected to grow from USD 7.06 billion in 2024 to USD 17.79 billion by 2032, exhibiting a CAGR of 12.25% during the forecast period 2024-2032. Moreover, the meat substitutes market size in the U.S. is projected to grow significantly, reaching an estimated value of USD 4.23 billion by 2032, driven by the rising vegan population in the country who are interested in exploring exotic vegan or meat substitute products such as sausage, burger, and others.

### Introduction

We have been presented with multiple datasets from Conagra on various Meat and Seafood categories and substitute meats in the frozen and refrigerated sections. We were also provided with panel data which included data about the different groups in society purchasing other brands. We have access to repeat buyers as well. We aim to increase Conagra's sales in the substitute meat categories. After going through the datasets we arrived at a couple of questions that we think might help to boost Conagra's sales in the Substitute Meat category.

### Market Dynamics

**Drivers:** Increased health consciousness, environmental concerns, and ethical motivations drive the market.

**Restraints:** Challenges include strict regulations, consumer skepticism about taste and texture, and competition from traditional meat producers.

**Trends:** Innovations are enhancing product appeal, strategic partnerships are expanding distribution, and targeted marketing highlights the health and sustainability benefits of meat substitutes.

### Competitive Landscape

Major players like Beyond Meat, Impossible Foods, and Quorn lead the market through product quality and innovation. Strategic partnerships and effective marketing campaigns are key differentiators.

### Market Segmentation and Regional Analysis

The market includes products like burgers, sausages, and nuggets, primarily made from soy, pea, and wheat proteins. Europe leads the market, driven by health-conscious consumers, while North America and Asia-Pacific are experiencing rapid growth due to rising demand and urbanization.

Consumer Insights

Consumers prioritize taste, texture, and nutritional value when choosing meat substitutes. Millennials, Gen Z, and flexitarians are key demographics, motivated by health, environmental, and ethical reasons.

Future Outlook and Recommendations

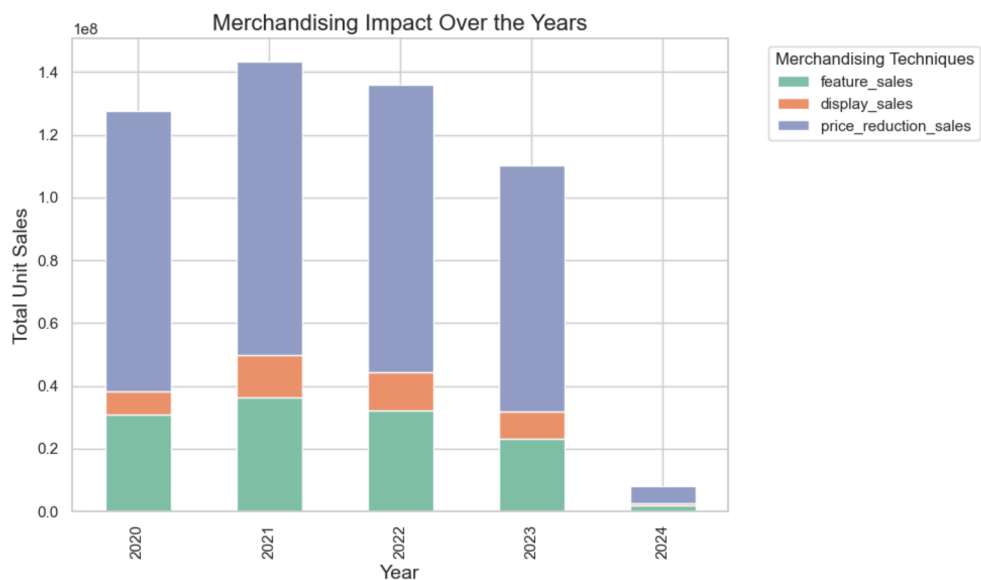
The market is poised for continued growth, with opportunities for Conagra Brands to innovate, expand product lines, and form strategic partnerships. Challenges include regulatory compliance and consumer skepticism, but these can be addressed through proactive strategies and strong marketing.

Recommendations

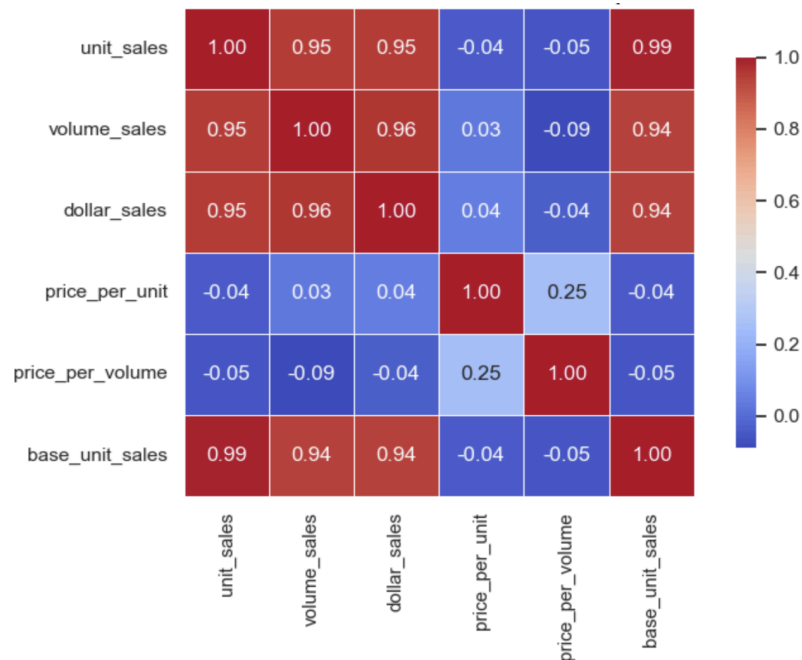
Conagra should invest in product development to meet consumer demands, create targeted marketing campaigns, and form strategic partnerships to expand distribution and strengthen its market position.

Key Data Patterns

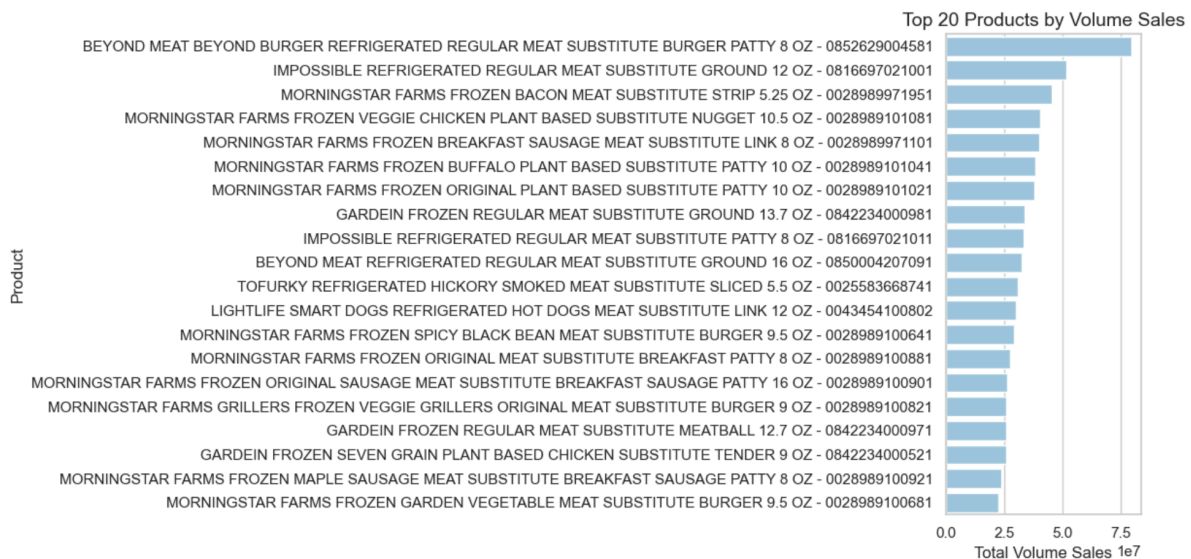
- This stacked bar chart displays the effectiveness of three different merchandising techniques: feature sales, display sales, and price reduction sales.
- Price reduction sales (blue) consistently show the highest impact across all years.
- 2021 showed the strongest overall merchandising performance.
- There's a notable decline in effectiveness of all merchandising techniques from 2021 to 2024.
- By 2024, merchandising impact has dramatically decreased, showing minimal activity across all techniques.



## Heatmap and Correlation Matrix:

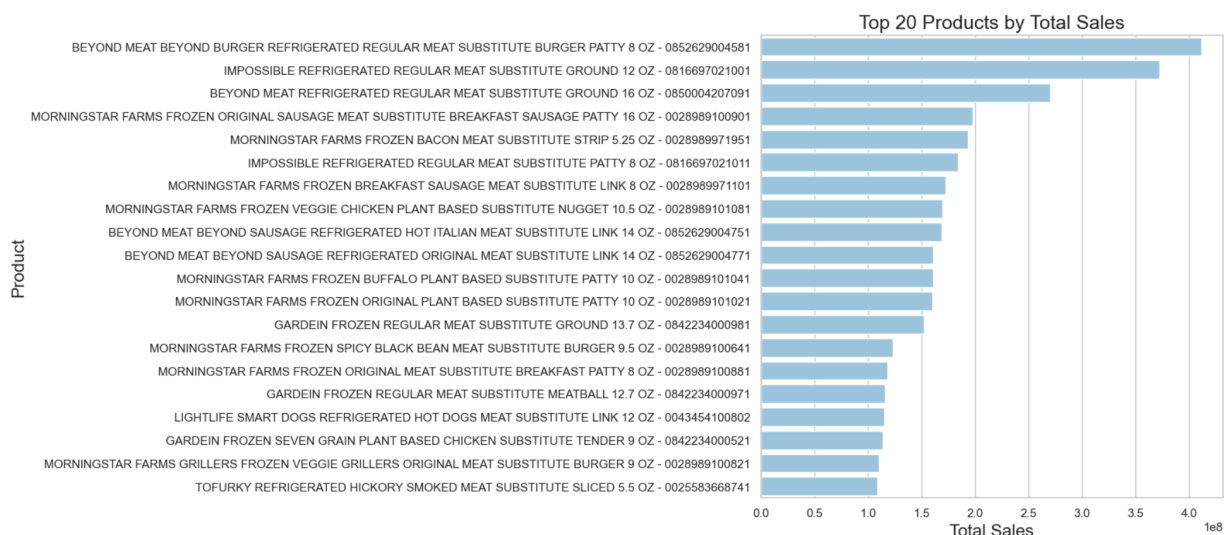


- This horizontal bar chart shows the volume sales of top products.
- Beyond Meat Beyond Burger (8 oz) leads in volume sales with approximately  $7.5 \times 10^7$  units.
- Impossible Foods' 12 oz ground product ranks second in volume.
- MorningStar Farms' bacon strips show strong performance in volume sales.
- The chart demonstrates that frozen products (particularly from MorningStar Farms) perform well in volume.
- There's a mix of burger patties, ground products, and breakfast items in the top volume sellers.

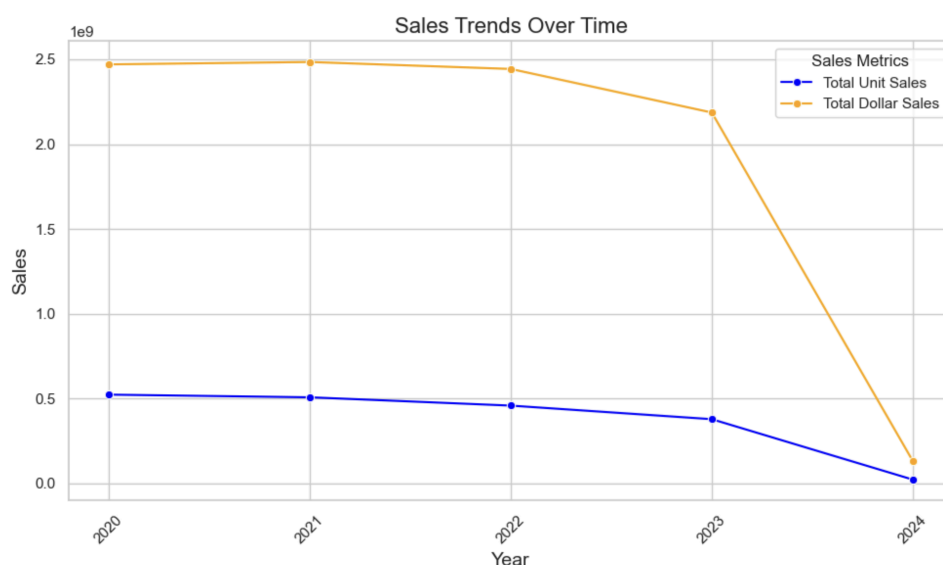


- This horizontal bar chart ranks products by their total dollar sales

- Beyond Meat Beyond Burger (8 oz) leads the category with approximately 4.0e8 in sales
- Impossible Foods' ground product (12 oz) ranks second
- Beyond Meat's 16 oz ground product holds third position
- MorningStar Farms products appear frequently in the middle rankings
- The chart shows a clear dominance of burger patties and ground meat alternatives over other formats

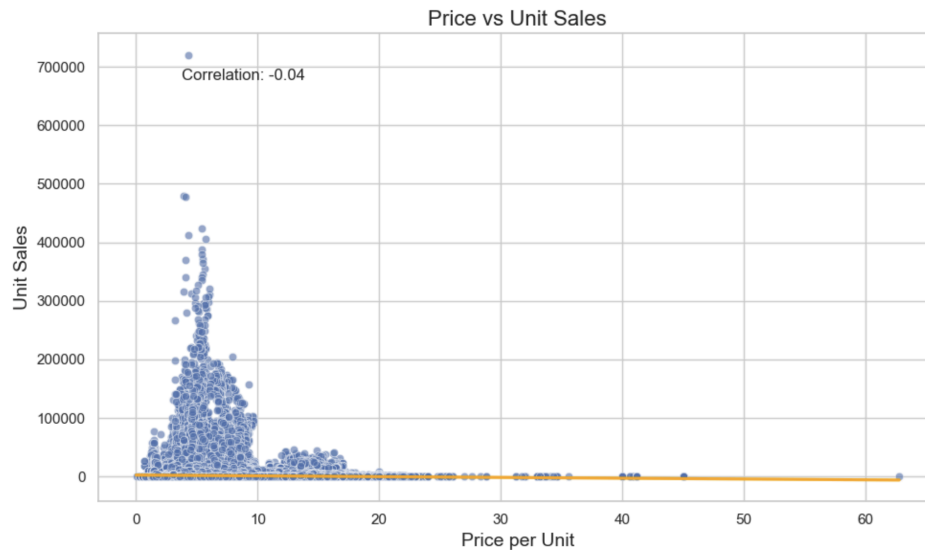


- This line graph shows the trends of both Total Unit Sales and Total Dollar Sales from 2020 to 2024.
- Both metrics show a concerning downward trend, particularly accelerating after 2022.
- The dollar sales (orange line) dropped from approximately 2.5 billion in 2020 to less than 0.5 billion in 2024.
- Unit sales (blue line) show a similar declining pattern, falling from about 0.5 billion units to nearly zero in 2024.
- The steepest decline occurs between 2023 and 2024, indicating a significant market challenge.



- This scatter plot shows the relationship between price per unit and unit sales

- The correlation coefficient is -0.04, indicating almost no linear relationship between price and sales
- Most products cluster in the price range of 0-10 dollars
- The highest unit sales occur in the lower price ranges (below 10 dollars)
- There are some outliers with very high unit sales (around 700,000 units)
- The pattern suggests a price threshold above which sales dramatically decrease



### Proposal:

To improve growth in the Meat Substitutes category, it's essential to examine various factors that influence sales and market competitiveness. This report outlines the key questions we intend to explore and suggests potential strategies for developing solutions.

### Key Questions and Proposed Approaches

**1. What effects do various promotion methods (such as price reductions, display, and features) have on the additional unit and dollar sales of meat substitutes during significant holidays and periods of high demand?**

### Approach

- Data Exploration
  - Examine the dataset to understand the distribution and completeness of variables related to promotional methods, unit sales, dollar sales, and time periods (e.g., holidays).
  - Identify key variables such as "Price Reductions," "Feature Displays," and "Special Packs" and how they relate to sales metrics.
- Descriptive Analysis
  - Analyze overall sales trends during significant holidays and high-demand periods, comparing promotional activity to periods without promotions.

- Summarize sales metrics (unit and dollar sales) to highlight variations associated with different promotional methods.
- Segmentation Analysis
  - Segment data based on promotion types, product categories, and time frames to evaluate their individual impacts on sales.
  - Assess differences in sales responses based on demographics or geographic factors, if applicable.
- Correlation Analysis
  - Calculate correlation coefficients between promotional methods and sales outcomes to identify relationships and strengths.
  - Specifically, focus on how promotional tactics correlate with increases in unit and dollar sales during holiday periods.
- Comparative Analysis
  - Compare sales performance during promotional periods against non-promotional periods to quantify the effectiveness of each promotion method.
  - Use metrics such as sales lift to assess the impact of promotions on sales.
- Statistical Testing
  - Conduct hypothesis tests (e.g., t-tests or ANOVA) to evaluate whether observed differences in sales are statistically significant across different promotional tactics and periods.
  - Determine if certain promotional methods yield significantly higher sales than others during key times.
- Visualization
  - Create visual representations (e.g., line graphs, bar charts) to illustrate trends in sales and the impact of promotional methods over time.
  - Use visualizations to highlight sales performance differences during holidays compared to regular periods.
- Actionable Insights
  - Draw conclusions from the analysis to recommend specific promotional tactics that effectively boost sales during holidays and peak periods.
  - Identify best practices for implementing promotions based on successful historical data.
- Predictive Modeling
  - Develop predictive models to forecast future sales outcomes based on historical promotional methods and sales data.
  - Use machine learning techniques to identify which promotional strategies are likely to yield the best results.



- Report Finding
  - Compile the findings into a comprehensive report, summarizing insights, recommendations, and proposed promotional strategies for future campaigns.
  - Share insights with stakeholders to guide marketing strategies and improve promotional effectiveness.

## **2. What effects do price per volume and price per unit have on dollar and unit sales in various geographic areas? Do price changes have a more noticeable impact on sales of substituted meat in any particular region?**

### **Approach**

- Data Exploration
  - Explore the dataset to identify and understand the variables related to price per volume, price per unit, unit sales, and dollar sales.
  - Examine geographic variables to determine how the dataset is structured geographically (e.g., regions, states, or cities).
- Descriptive Analysis
  - Summarize sales performance across different geographic areas, focusing on how dollar and unit sales vary with price changes.
  - Analyze average prices per unit and volume across regions to identify any notable differences.
- Segmentation Analysis
  - Segment the data by geographic area to assess how price per unit and price per volume impact dollar and unit sales within each region.
  - Identify specific regions with distinct pricing behaviors or sales responses.
- Correlation Analysis
  - Calculate correlation coefficients to quantify the relationship between price per unit/volume and sales metrics (both dollar and unit sales).
  - Focus on regional differences in correlation to see if certain areas exhibit stronger relationships between price changes and sales.
- Comparative Analysis
  - Compare sales trends and price elasticity between regions to determine if price changes have a more pronounced effect in specific geographic areas.
  - Assess the magnitude of sales change in response to price adjustments in different regions.
- Statistical Testing
  - Use statistical tests (e.g., regression analysis) to evaluate the impact of price changes on sales while controlling for other variables (e.g., seasonality, promotions).
  - Conduct region-specific analyses to understand if the effect of pricing is statistically significant in certain areas.
- Visualizations

- Create visual representations (e.g., scatter plots, heatmaps) to illustrate relationships between pricing and sales metrics across different regions.
- Use visualizations to highlight regional differences in pricing strategies and sales performance.
- Elasticity Analysis
  - Calculate price elasticity of demand for meat substitutes in different regions to determine how sensitive sales are to price changes.
  - Identify regions where consumers are more or less responsive to price adjustments.
- Actionable Insights
  - Draw conclusions about the pricing strategies that are most effective in different geographic areas based on the analysis.
  - Make recommendations for pricing adjustments tailored to regional consumer behaviors and preferences.
- Report Findings
  - Compile the findings into a comprehensive report, summarizing the effects of pricing on sales across various geographic areas.
  - Share insights with stakeholders to guide pricing strategies and enhance sales performance in different regions.

### **3. In areas with high versus low distribution coverage, how do total dollar sales for substituted meats relate to ACV Weighted Distribution?**

#### **Approach**

- Data Exploration
  - Examine the dataset to understand the variables related to total dollar sales for substituted meats and ACV (All Commodity Volume) Weighted Distribution.
  - Assess the definitions and calculations of ACV Weighted Distribution within the dataset to ensure accuracy.
- Descriptive Analysis
  - Summarize the total dollar sales for substituted meats in areas with high versus low distribution coverage.
  - Calculate descriptive statistics (mean, median, range) for both total dollar sales and ACV Weighted Distribution to identify trends.
- Segmentation Analysis
  - Segment the dataset based on distribution coverage (high vs. low) to compare dollar sales across these groups.
  - Identify specific regions or stores classified as high or low coverage based on ACV metrics.
- Correlation Analysis

- Calculate correlation coefficients between total dollar sales and ACV Weighted Distribution for both high and low coverage areas.
- Analyze how strong the relationship is in each segment and if there are any notable differences.
- Comparative Analysis
  - Compare the average dollar sales in high distribution areas against low distribution areas to determine how distribution affects sales.
  - Investigate whether higher ACV Weighted Distribution correlates with significantly higher sales.
- Statistical Testing
  - Conduct hypothesis testing (e.g., t-tests) to evaluate whether the differences in dollar sales between high and low coverage areas are statistically significant.
  - Perform regression analysis to understand the predictive power of ACV Weighted Distribution on dollar sales while controlling for other variables.
- Visualizations
  - Create visualizations such as bar charts or scatter plots to illustrate the relationship between dollar sales and ACV Weighted Distribution.
  - Use box plots to show the distribution of dollar sales in high versus low coverage areas.
- Distribution Analysis
  - Analyze the impact of distribution coverage on sales performance, focusing on whether greater distribution correlates with higher sales volumes.
  - Explore factors that may influence the effectiveness of distribution coverage, such as promotional activity or local market conditions.
- Actionable Insights
  - Develop insights based on the analysis, such as identifying optimal distribution strategies that enhance dollar sales for substituted meats.
  - Recommend actions to improve distribution coverage in areas with lower sales performance.
- Report Findings
  - Compile the results and insights into a comprehensive report, summarizing the relationship between dollar sales and ACV Weighted Distribution.
  - Share findings with stakeholders to inform distribution and sales strategies for substituted meat products.

**Conclusion:**

The meat substitutes market offers significant opportunities for Conagra Brands to capitalize on the growing demand for plant-based protein sources. With a projected CAGR of 42.4% from 2024 to 2030, Conagra can leverage its expertise in food manufacturing and marketing to enhance its offerings in this category.

By investing in innovative product development and forming strategic partnerships with retailers and influencers, Conagra can expand distribution channels and increase brand visibility. A systematic analysis of promotional tactics and product attributes impacting Gardein's Dollar Sales will be crucial for refining marketing strategies.

Understanding effective promotional methods, such as price reductions and in-store displays, will allow Conagra to tailor its marketing activities to align with consumer preferences. These insights will drive revenue optimization and strengthen Conagra's competitive position in the meat substitutes market, ensuring sustained growth and success.

**Reference:**

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3. Regulatory Guidelines for Meat Substitute Products, Food Safety Authority.
4. <https://www.fortunebusinessinsights.com/industry-reports/meat-substitutes-market-100239>