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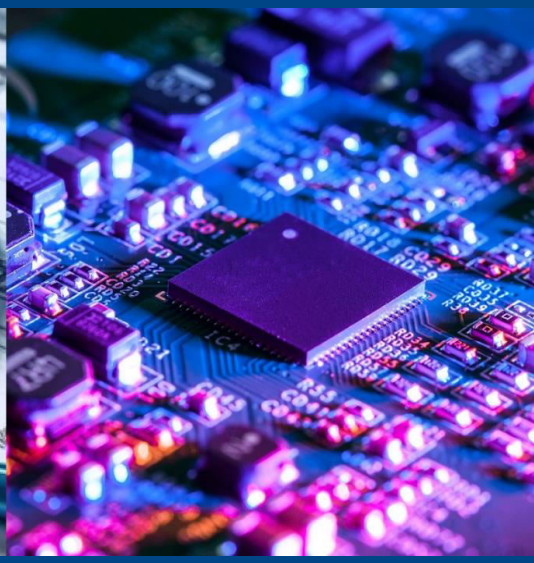

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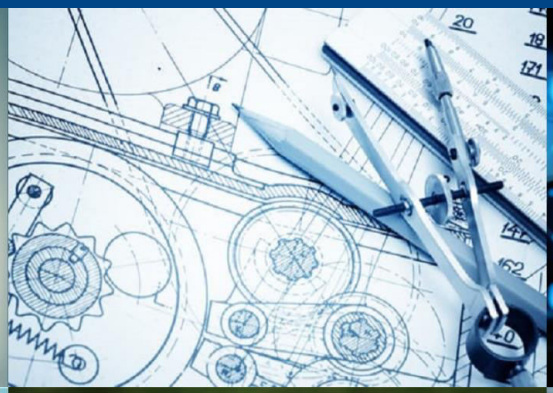

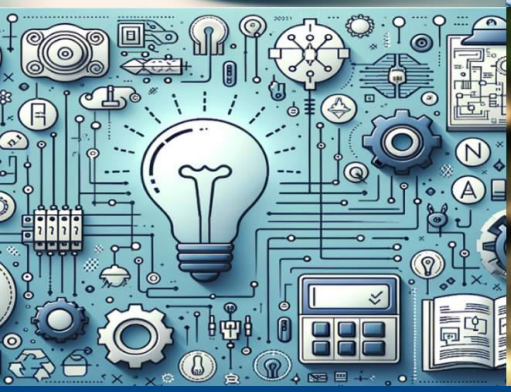

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Harnessing Occasion-Centric Sales Data in Saree Retail: Actionable Insights from Business Analytics

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ABSTRACT: This study effectively highlights the pressing importance of data-driven decision-making in niche retail sectors by exploring how occasion-based sales analytics can optimize performance for Vannaval, a leading online saree retail brand. By harnessing historical sales data segmented by festivals, wedding seasons, and routine periods, this research adopts a rigorous business analytics framework. We conducted structured data extraction using SQL, followed by meticulous cleaning and validation in Excel. Advanced statistical analysis was performed with Python, while Looker Studio was employed to create dynamic, interactive dashboards for impactful data visualization. The analysis concentrated on critical metrics, including sales volume, product category performance, time-based trends, and customer purchasing behavior, enabling us to reveal demand cycles and preferences. By applying sophisticated analytical techniques descriptive, diagnostic, and trend analytics we evaluated sales fluctuations and established strong correlations between occasion tags and specific saree types as well as price segments. The insights gained from this analysis offer actionable strategies to enhance stock planning, optimize promotional timing, and refine demand forecasting. This study emphasizes the powerful potential of integrating cutting-edge business analytics tools to transform raw retail data into strategic insights, thereby significantly boosting operational efficiency and minimizing inventory risks in the dynamic landscape of seasonally driven ethnic fashion retail.

KEYWORDS: Saree Retail, Business Analytics, Sales Data, Occasion-Centric, Demand Forecasting, Inventory Management, Actionable Insights, Ethnic Fashion.

I. INTRODUCTION

The Indian saree retail industry stands poised for a groundbreaking transformation, propelled by the explosive growth of digital commerce platforms. In this vibrant landscape, online retailers like Vannaval are not just adapting, they are thriving. With their expertly curated collections of traditional and occasion-based sarees, they are captivating a diverse customer base across their official website and lively social media channels, including WhatsApp, Instagram, and YouTube. Despite this promising environment, the market reveals a fascinating yet complex reality: consumer purchasing behavior fluctuates dramatically in tune with cultural festivals, wedding seasons, and local celebrations. Understanding these occasion-specific demand shifts is not just beneficial, it's essential for effective retail management. Yet, even with a wealth of transaction data at their fingertips, many niche segments of the ethnic fashion industry have fallen short in harnessing advanced analytics to transform raw sales data into powerful strategic insights. This study aims to change the game. We offer a comprehensive, analytics-driven investigation into occasion-based sales patterns and customer demand fluctuations within the online saree retail sector. Our mission is clear: to go beyond mere transaction recording and uncover the deeper drivers behind saree purchases, specifically how significant occasions shape consumer choices. To achieve this, we employ an integrated and robust analytical framework, leveraging historical sales data from Vannaval's digital platforms. Our systematic approach involves precise data extraction and filtering using SQL, meticulous data cleaning and foundational analysis in Excel, and robust statistical modeling and trend analysis with Python utilizing ANOVA for significance testing, correlation analysis for relationship mapping, and clustering for market segmentation. The culmination of this research will be dynamic, interactive dashboards created in Looker Studio, revealing insights that are as enlightening as they are actionable. We focus on pinpointing high-demand periods, assessing product performance during pivotal occasions like Pongal and Diwali, and uncovering nuanced purchasing trends across various timeframes. By correlating occasion tags with specific saree types, price segments, and customer behavior, our study aspires to deliver invaluable intelligence. Our ultimate goal is to empower retailers to

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make data-driven decisions that optimize inventory, enhance demand forecasting accuracy, and strategically align product offerings and promotional efforts with the real-time needs of the market. In conclusion, this research highlights the revolutionary potential of modern business analytics in driving efficiency, reducing inventory risks, and crafting a formidable competitive advantage for digital-first businesses in the culturally rich and seasonally vibrant realm of ethnic fashion. By embracing these insights, retailers won't just meet customer expectations they will exceed them, paving the way for unparalleled growth and success in the industry.

II. LITERATURE SURVEY

The review of literature explores prior research, academic works, and industry reports related to occasion-based market segmentation, customer buying behavior in the ethnic apparel sector, and the application of Business Analytics in digital retail environments. These studies provide a theoretical foundation and justify the use of analytics-driven strategies in understanding and optimizing saree sales during festivals and special occasions.

Kotler and Keller (2016) emphasize in Marketing Management that "occasion-based segmentation" allows marketers to tailor their offerings and communication strategies based on temporal factors such as festivals, holidays, and special events. This approach is especially effective in culturally diverse markets like India, where clothing choices are strongly influenced by religious and seasonal festivals such as Diwali, Pongal, Eid, and wedding seasons. These events not only trigger an emotional connection but also elevate the demand for traditional ethnic wear like sarees.

According to the India Brand Equity Foundation (IBEF, 2021), the apparel sector experiences a surge of 45–60% in sales during major Indian festivals. The report attributes this trend to a combination of emotional buying, social gatherings, and cultural practices. This spike underscores the importance of occasion-based planning in inventory, marketing, and customer engagement strategies for apparel retailers operating online.

Chaffey and Ellis-Chadwick (2019), in their work on Digital Marketing, highlight the critical role of social media platforms in shaping consumer preferences and purchasing decisions. Instagram and Facebook, in particular, have emerged as leading channels for influencing buying behavior in the fashion segment. This is especially true during festive campaigns, where visually appealing product showcases and influencer collaborations drive higher engagement and conversion rates.

A Statista (2022) report shows that India's social commerce sector is expanding at a rate of 50% annually, with ethnic wear being a major growth driver. Platforms such as WhatsApp, Instagram, and Facebook are not just promotional tools but have evolved into integrated sales channels. This trend supports the growing relevance of digital platforms for saree retailers who operate exclusively online.

Davenport and Harris (2007), in their seminal work Competing on Analytics, argue that data-driven decision-making provides businesses with a substantial competitive edge. Their research demonstrates that using descriptive, diagnostic, and predictive analytics enables businesses to detect demand patterns, understand customer preferences, and respond to market fluctuations effectively. This analytical framework is especially valuable for retailers selling occasion-specific products like sarees.

Laursen and Thorlund (2016) reinforce the notion that Business Analytics (BA) empowers retail managers to move beyond intuition. By leveraging tools such as data mining, regression analysis, and customer segmentation, businesses can uncover hidden insights and make evidence-based decisions that align with customer demand cycles.
Evans (2017) further clarifies the distinction between descriptive and diagnostic analytics in retail environments. Descriptive analytics provides a historical view of sales performance, while diagnostic analytics delves into the underlying reasons behind observed trends, such as a spike in saree sales during festive periods. Tools like variance analysis and correlation matrices enable deeper insight into consumer patterns, making it easier to identify the drivers of occasion-based demand.

Sharda, Delen, and Turban (2018) in Business Intelligence and Analytics argue that predictive modeling based on historical data allows businesses to forecast demand during high-sales seasons accurately. For online ethnic wear retailers, this capability ensures optimal inventory management, efficient promotional scheduling, and better customer satisfaction.

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Imhoff and White (2011) advocate the integration of visualization platforms like Power BI into Business Analytics practices. These tools help in visually tracking KPIs, mapping seasonal spikes, and performing real-time monitoring of multi-channel sales data. The authors also stress the importance of structured data querying using SQL, especially when businesses handle large datasets spread across digital platforms.

Mishra and Mishra (2019), writing in the International Journal of Business Analytics, observe that small and medium-sized enterprises (SMEs) benefit significantly from Business Analytics adoption. For saree retailers, using tools like Excel and SQL facilitates cost-effective yet impactful data analysis to detect sales trends, manage occasion-specific inventory, and refine marketing efforts.

Das and Kumar (2020), in Procedia Computer Science, elaborate on the role of Business Intelligence (BI) tools in the retail sector. Their findings confirm that tools like Power BI, Excel, and SQL enhance the ability of businesses to monitor real-time performance, conduct occasion-based trend analysis, and ensure optimal allocation of marketing and logistical resources during peak seasons.

III. METHODOLOGY

This study utilized a robust quantitative research design, predominantly leveraging secondary data analysis to meticulously examine occasion-driven sales patterns within the online saree retail sector. Our approach was structured and data-centric, progressing through the stages of data collection, processing, analysis, and visualization to extract actionable insights that empower strategic decision-making.

Data Collection

The foundation of this project was built on a comprehensive analysis of historical sales records and transactional databases from Vannaval Online Saree Shop, specifically spanning the period from October 2024 to March 2025. We extracted vital variables, including product details (name, material, price), transactional data (quantity, sales volume), and customer demographics (age, gender). This rich dataset provided an ideal framework for analyzing seasonality and its significant impact on sales volumes and customer preferences.

Data Analysis Techniques

Our analytical approach employed a multifaceted strategy that seamlessly integrated exploratory and advanced analytical methods:

Exploratory Data Analysis (EDA):We initiated the process with thorough data preprocessing (addressing missing values and inconsistencies) and descriptive statistics (mean, median, frequency distributions) to encapsulate the data. Extensive visualization techniques—such as histograms, bar charts, and scatter plots—enabled the identification of critical patterns and structures.

Advanced Analytical Techniques:

1. Time Series Analysis: Delved into the intricate dynamics of temporal sales and seasonality.
2. Regression Analysis: Quantified the influence of key variables, such as price, on sales volume.
3. Clustering Analysis: Distinguished unique product segments based on material, design, and price.
4. Hypothesis Testing (e.g., ANOVA): Validated the relationships between variables with rigorous statistical precision.
5. Product Performance Metrics:Evaluated key performance indicators (KPIs) across various saree categories to assess market potential.

Business Analytics Tools

Our analytical framework strategy incorporated a suite of cutting-edge tools: SQL facilitated seamless data extraction and querying; Python (utilizing Pandas, NumPy, Matplotlib, and Seaborn) served as our primary environment for sophisticated data manipulation, statistical analysis, and custom visualizations; Excel was employed for initial data examination, basic cleaning, and preliminary summaries; and Looker Studio was instrumental in crafting interactive dashboards and intuitive visualizations, making insights not just accessible, but also engaging for stakeholders.

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Domain-Specific Data Interpretation

The analytical findings were continuously interpreted through the lens of traditional Indian saree categories, seasonal festivals, and the social occasions pertinent to Vannaval's clientele. This alignment ensured that our statistical insights were transformed into meaningful and strategic business recommendations that resonate within the ethnic fashion retail landscape.

Ethical Considerations

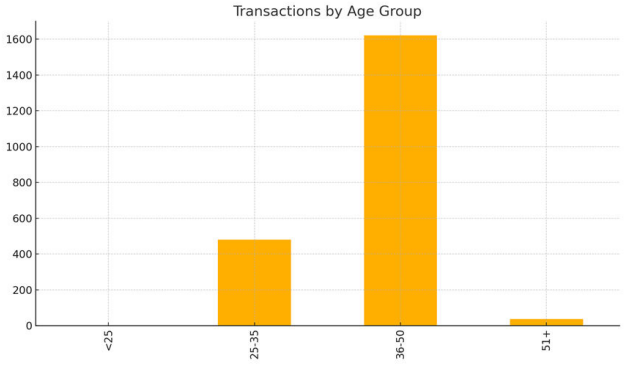
Upholding ethical standards was a cornerstone of our research, with a strong emphasis on protecting customer data privacy and confidentiality, tackling potential biases and fairness issues in our models, and ensuring that all derived insights were utilized with transparency and responsibility in full compliance with data protection regulations.

IV. RESULTS AND DISCUSSION

The data collected from 200 respondents and historical sales records were analyzed using Descriptive Statistics, Chi-square tests, Anova and correlation analysis.

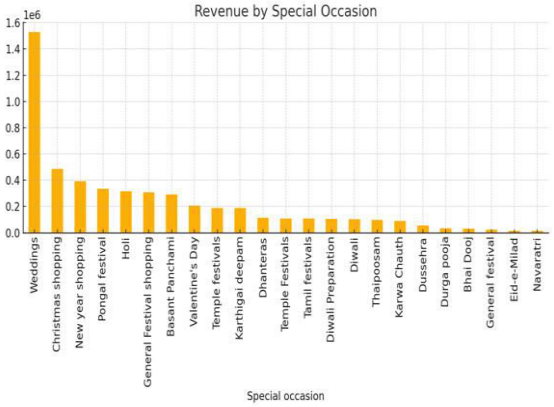
Demographic Analysis:

The analysis strongly suggests that the majority of saree retail transactions are driven by middle-aged customers (36-50), followed by younger adults (25-35). There's a clear opportunity or challenge, depending on strategy, in engaging the younger (<25) and older (51+) customer segments more effectively, potentially with tailored product lines or marketing approaches.



Analysis of Festival/Event Correlation:

Weddings overwhelmingly drive saree revenue at INR 1,527,669.73. Christmas shopping (approx. INR 0.48 million) and New Year shopping (approx. INR 0.39 million) follow as significant contributors. Key Indian festivals like Pongal (approx. INR 0.33 million) and Holi (approx. INR 0.31 million) also show notable spikes. The impact of events is highly varied, with some, like Diwali in this dataset, appearing relatively lower.



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Analysis of Saree Material Demand:

Semi silk (378 units) and Soft tissue (314 units) are the most demanded saree materials by quantity, dominating the market volume. Mid-tier popularity includes tusser (approx. 230 units), another semi silk entry (approx. 200 units), Soft tusser (approx. 180 units), and cotton (approx. 170 units). Lower-volume, potentially niche materials like silk (approx. 150 units), Semi cotton (approx. 120 units), Punam material, and Soft silk (both below 100 units) are also sold, with some, like pure silk, potentially commanding higher price points despite lower quantity.

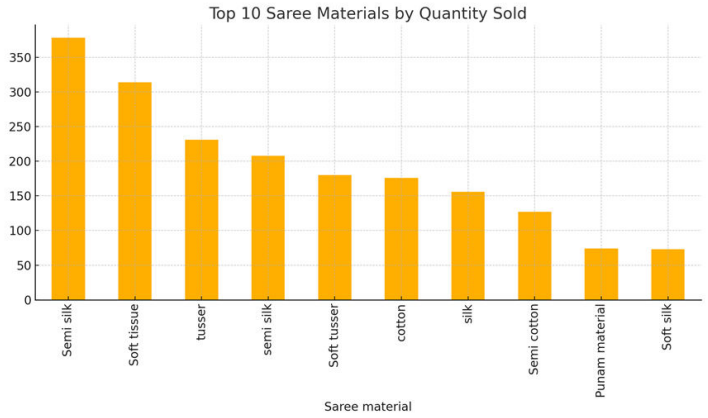
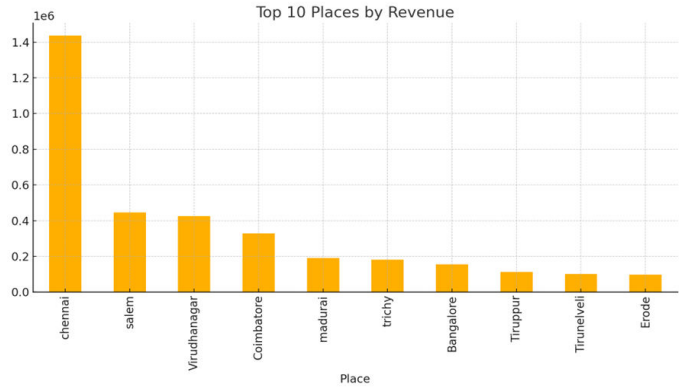


Chart Regional Preference



Chi-square test (association analysis):

- **Null Hypothesis (H0):** There is no association between Saree material and Special occasion. They are independent.
- **Alternative Hypothesis (H1):** There is an association between Saree material and Special occasion. They are not independent.
- **Interpretation:**Our calculated Chi-Square statistic ($\chi 2=8094.38$) is significantly **greater** than the critical value (1994.31). Furthermore, the p-value (0.0) is much **less** than the chosen significance level ($\alpha=0.05$).

Anova (Analysis of Variance):

- **Null Hypothesis (H0):** The mean 'Quantity Sold' is the same across all 'Saree material' types. (i.e., $\mu 1=\mu 2=\cdots=\mu k$)
- **Alternative Hypothesis (H1):** At least one 'Saree material' type has a different mean 'Quantity Sold' than the others.
- **Significance Level (α):** 0.05
- **Interpretation:** The calculated F-statistic (11.23) is **greater** than the critical F-value (1.88). More importantly, the **p-value (0.000) is much less than our significance level of 0.05**. Based on these results, we **reject the null hypothesis (H0)**.

Correlation analysis:

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- To determine the strength and direction of the linear relationship between the 'Quantity' of items sold and their 'Unit Price'. Quantity: The number of items sold in a transaction. Unit Price: We will use 'Price (without shipping charge)' as the proxy for the unit price for each item or type of item in your sales data.
- **Interpretation:** The calculated Pearson correlation coefficient of approximately **-0.9601** signifies a **very strong negative linear relationship** between the 'Quantity' sold and the 'Unit Price'.

V. CONCLUSION

This project at Vannaval Pvt Ltd effectively utilized business analytics tools, including descriptive statistics, ANOVA, correlation, and clustering, to comprehensively analyze occasion-centric saree sales data. This analysis provided a deep understanding of customer demographics as well as the relationships between material, design, pricing, and purchase quantity. It revealed critical insights into customer preferences and natural product segmentation within Vannaval's extensive saree portfolio. The actionable insights gained from this analysis are poised to significantly enhance strategic decision-making at Vannaval Pvt Ltd. By better understanding customer profiles and the impact of material and design on pricing and quantity, as well as the strong inverse relationship between unit price and volume, the company can refine its pricing strategy, optimize inventory, and develop highly targeted marketing campaigns. The identified product clusters will enable a more granular approach to merchandising and customer engagement, ultimately driving sales and strengthening Vannaval's competitive edge.

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