Journal of Business and Management Studies
ISSN: 2709-0876
DOI: 10.32996/jbms
Journal Homepage: www.al-kindipublisher.com/index.php/jbms

JBMS
AL-KINDI CENTER FOR RESEARCH AND DEVELOPMENT

| RESEARCH ARTICLE

Predictive analytics U.S. Global Marketing Competitiveness using AI

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| ABSTRACT

The competitiveness in global marketing is gradually being driven by the use of data-driven decisions and the capability of businesses to foresee the consumer needs in dynamic market conditions. The United States is well-established in the global trade and marketing segment, but there are leading-edge applications of artificial intelligence (AI) and predictive analytics emerging around the globe, and which require more facilitation of digital transformation in order to maintain and augment this leadership. What this study aims to explore is how predictive analytics using AI can help the U.S. become more competitive in the global market, by considering consumer purchasing behavior and decision-making patterns in relation to marketing. Based on the available dataset related to consumer behavior and shopping habits, obtained on Kaggle, the research examines the demographic factors, how often people buy a product, the type of product, seasonal patterns, sensitivity to discounts, and satisfaction with the review to determine the main marketing drivers. Classification models and clustering are used as machine learning methods to forecast consumer-related outcomes like the high-value spending behavior and the likelihood of loyalty. Categorical encoding, normalization, and the exploratory analysis are the steps of data preprocessing that guarantee the model accuracy and generalization. The results show that pricing, promotional involvement, and product type preferences play a major role in determining purchasing decisions and age and frequency of shopping are good predictors of high value customer segments. The information based on the segmentation of consumers and predictive patterns shows that marketing activities in the U.S. can be enhanced by focusing on localized customer requirements, better personalized marketing of products, and product positioning strategies. The paper finds that the adaptation of predictive analytics allows American companies to become more competitive in the global market due to better consumer satisfaction, more revenue-generating possibilities, and the maintenance of a strategic position in the market. The future research can incorporate more international data sets to generalize competitiveness study on international consumer markets. This study offers a viable and evidence-based method of using AI-based predictive analytics to promote the strategic development of American companies in competitive global markets.

| KEYWORDS

Predictive Analytics, Artificial Intelligence (AI), Consumer Behavior, Global Marketing Competitiveness, Machine Learning and U.S. Market Strategy

| ARTICLE INFORMATION

ACCEPTED: 02 July 2024 **PUBLISHED:** 11 July 2024 **DOI:** 10.32996/jbms.2024.6.4.23

1. INTRODUCTION

A. Background of the Study

The US remains a top player in international trade and the marketing of the world because of its sophisticated economic setting, strong brand image as well as exceptionally innovative business environment. Nevertheless, accelerating development of

digital technologies, changing consumer demands, and increasing competition in the world have also provoked the desire to have more precise and effective decision-making techniques. With markets being more and more data-driven, organizations are likely to use technology to understand consumer needs, preferences and buying behavior better. The use of predictive analytics, facilitated by Artificial Intelligence (AI), has turned out to be a disruptive technology that enables companies to predict consumer demand, trends in the market, optimize prices, and maximize customer satisfaction using both historical and real-time data. AI-based predictive analytics helps to make better-informed marketing decisions, which can help to grow and be competitive by revealing hidden behavioral patterns, and relationships between large datasets. The need to embrace sophisticated analytical skills in the context of the U.S. economy has become core in maintaining the performance of international marketing, especially as the competition increases amid increasing integration of AI in business sectors in other countries. In the retail and e-commerce industries of the United States, especially, the volume of consumer data generated can be analysed to reinforce promotion campaigns, customer segmentation, and positioning of products. Thus, predictive analytics allows the U.S. corporations to personalize marketing strategies in order to achieve consumer expectations in the local and international markets. This paper examines the relevance of predictive analytics based on AI in improving the global marketing competitiveness of the U.S. by studying the consumer behavior patterns of the shopping data. The study highlights the importance of using machine learning models to emerge with insights that can assist businesses to create more competitive and demand-led marketing strategies. This paper will present a case of how AI can improve the agility of business and reinforce the international footprint of U.S. organizations in an increasingly digitally competitive world through evidence-based conclusions.

B. *Problem Statement*

Despite having access to large volumes of consumer data, U.S. businesses continue to employ the use of traditional and reactive methods of marketing as opposed to predictive methods. With international competition growing, inability to foresee the changes in markets may have adverse impacts on the product demand, customer retention and competitiveness in the world. U.S. companies will face the threat of losing competitiveness with other companies around the world operating at a faster and more intelligent pace of conducting marketing activities, given that they are utilizing AI to make their marketing decisions. Insufficient and inefficient implementation of predictive analytics into marketing strategies results in missed capitalization opportunities, low profitability, and poor brand positioning in international markets. This paper deals with the possibility of AI-based predictive analytics to fill this gap and improve U.S. international marketing performance.

C. *Research Objectives*

The paper will examine the role of predictive analytics based on AI in enhancing the global marketing competitiveness of the United States and how it enhances consumer-driven decision-making.

- To assess the impact of AI-based predictive analytics on global marketing competitiveness of the U.S.
- To determine significant consumer behavior determinants in buying.
- To determine how machine learning models are capable of forecasting premium patterns of customers.
- To test the role of predictive analytics in improving marketing performance and customer relationships.
- To establish the role of consumer data insights in enhancing stronger brand positioning around the world.
- To offer advice that will enhance the marketing efforts of U.S. companies in order to succeed internationally.

D. *Research Questions*

This study aims to analyze how predictive analytics can enhance the U.S. global marketing competitiveness and how it can comprehend essential drivers of consumer behaviour.

1. How is predictive analytics contributing to the U.S. global marketing competitiveness?
2. What are the consumer behavior variables that have a significant impact on purchasing?
3. What can AI predictive models do to enhance marketing strategies of U.S. businesses?

II. Literature Review

A. *Marketing competitiveness in the world*

Global marketing competitiveness is the ability of a country or an entity to position its products and brands in a favorable position in the global market and attain a sustainable superiority over the global competitors. The capacity to innovate and adapt to the evolving market forces, in addition to interacting with customers with attractive value propositions in various cultural settings, determines this competitiveness. The United States has a long history of being a strong international marketer because of its high digital infrastructure, international brands, high technological capabilities, and robust research and development. The

accelerated globalization and digital transformation have increased competition as the emerging economies aggressively use data technologies to boost market performance. The old fashioned marketing strategies that are based on massive segmentation are failing to meet the needs of the consumers who find a more personalized, quicker, and smooth shopping process. To stay competitive, American companies need to address the shifting demands of the world's customers based on the actionable insights generated by the massive data in order to find the new market trends and the threats. Decision-making has turned into a pressing issue in which the companies have to effectively predict demand, manage product supply, and provide a personalized marketing message both online and offline. Digital trade across borders has widened the competitive scope, implying that businesses need to know what to provide to the regional taste and meet international consumer needs with the help of marketing intelligence provided by analytics. The predictive behavioral change and providing customer-oriented approaches are huge benefits in maintaining brand loyalty and enhancing market growth results. The ability of organizations to embrace modern analytics and transform data into strategic value is becoming more and more important in maintaining market competitiveness as an organization of global marketing. This guarantees increased agility, resiliency, and customer responsiveness in a setting where the rate of innovation is a determining factor of market success. Predictive analytics are, thus, a baseline need of the U.S. companies to maintain a global presence, greater market penetration as well as gain a competitive edge in the ever-changing world economy.

B. *Marketing Predictive Analytics*

Marketing Predictive analytics is a marketing technique where sophisticated statistical methods, data mining and machine learning algorithms can be used to examine past data and make predictions about future consumer behavior so that a company can cease its reliance on guesswork in making decisions and instead rely on evidence to make strategic choices. Predictive analytics will allow businesses to discern patterns of consumer behavior, predict the cycles of product demand, gauge the success or failure of marketing campaigns, anticipate customer churn, and better allocate resources by targeting individuals with high value and the greatest likelihood of converting. Predictive analytics allows marketers to use raw consumer data to create actionable intelligence, which can be used to address individual preferences and behaviors by personalizing communication, optimizing pricing models, and providing products based on individual tastes and behaviors. It assists the segmentation whereby customers are grouped based on their purchasing patterns, purchasing power, and probability of engaging and thus facilitates the organization to focus their marketing programs accurately. In addition, predictive models enable companies to determine the price elasticity, promotional responsiveness as well as improve the discount strategy in order to maximize profitability. The emergence of digitalization, especially in e-commerce has expanded the amount and type of consumer information that is being generated and predictive analytics is necessary to manage complex and rapidly changing market conditions. Firms that are purely descriptive may find themselves responding too slowly to the changes in consumer preference. Predictive analytics offers strategic visibility through identifying the early indications of behavior and new trends in the market so that companies gain a competitive advantage over their competitors who follow a more reactive approach. Based on the predictive insights, the businesses are able to enhance customer lifetime value and boost brand loyalty by providing the value-driven interactions on a continuous basis. With the growing competition on a global scale, predictive analytics has emerged as an essential functionality that can help companies to improve the effectiveness of marketing, minimize operational risks, and stay strategically ahead. Their role will only increase in the global competitiveness as more companies realize that the ability to know what consumers are going to do next is one of the strongest assets in the contemporary marketing environment.

C. *Consumer Behavior Analysis and Artificial Intelligence*

The study of consumer behavior has been transformed by artificial intelligence to conduct automated interpretation of large and complicated data that identify behavioral characteristics, purchase patterns, emotional expression, and decisions made in real-time. Artificial intelligence, machine learning, neural networks, and deep learning can enable the marketer to discover less visible consumer relationships that can be determined based on their characteristics and purchasing patterns which might not be evident by using traditional tools. As AI is increasingly able to forecast customer behaviors like repeat purchases, product affinity, brand loyalty, and so on, companies can develop unique experiences to resonate with personal expectations, increasing customer satisfaction and reducing customer-company dissatisfaction. The existence of personalized recommendation systems that are adopted by major digital platforms is also a vivid example of AI impacting purchase decisions by showing users options that best match user interests and behaviors, as well as reading history. AI sentiment analysis of product reviews and social media discussions can give an organization instant feedback on how a product is perceived so that a company can make its products better and respond to negative perceptions in time. Besides enhancing marketing precision, AI also increases operational efficiency by automating customer insights, decreasing the use of manual tasks, and facilitating the fast strategic reactions to market dynamics. With the advancement of e-commerce and online shopping platforms all over the world, AI is crucial in decoding real-time consumer behavior in terms of clickstream analytics, dwell-time, and cart actions that can be used to understand their underlying motivations and obstacles to buying. With smart segmentation and dynamic learning, AI-oriented modeling remains a dynamic feature that aligns with consumer behavior and thus marketers can predict their future needs even before they can state them.

The capability to comprehend, educate, and forecast the buying conduct provides companies operating AI with a considerable benefit in the national and international markets. In turn, AI-driven analysis of consumer behavior is identified as a core force behind their competitiveness, which creates more responsive, personalized, and strategically oriented decision-making based on the emerging digital consumer expectations.

D. *Marketing Competitiveness in the U.S. in the Digital Age*

The digital age has radically transformed the competitiveness in U.S. marketing as there is increased access to international consumer markets. At the same time, competitive pressure is being exerted by international competitors who aggressively embrace new technological innovations. Despite the fact that U.S. companies are still at the forefront of most issues relating to innovation and digital marketing, there is a new level playing field, which is data-driven marketing strategies in the newer economies. Digital transformation has created a shift of power to consumers seeking to have customized, convenient, and smooth shopping experience in the online and mobile platforms. The change forces U.S. businesses to keep adapting complex analytics, automation, and AI-guided decision-making processes into the marketing processes to stay competitive in the global environment. The growing importance of e-commerce, omnichannel retailing, and digital payment ecosystems highlights the fact that companies need to implement predictive tools to allow them to properly predict demand, engage with consumers in real-time, and gain dynamic adjustment to the market. Responsiveness is not a choice anymore in the current competitive world, companies that do not anticipate and act swiftly to consumer demands will lose market share to the fast moving ones. The way to improve U.S. marketing competitiveness is thus based on the holistic approach of digital transformation where machine learning and predictive analytics will improve marketing personalization, pricing intelligence, and promotion targeting and customer retention. AI solutions can contribute to the improved market expansion decisions by utilizing insights into the high-potential global segments and altering the strategies according to the cultural and regional behavioral patterns. In order to remain at the top of the world, the United States should make sure that it continuously innovates its technology, creates organizational cultures that are data-driven, and leads in consumer analytics innovation. By achieving a strategic use of AI and predictive analytics, the U.S. companies can enhance marketing performance, retain customers, and increase international strength, yet the necessity to increase efficiency in global markets and satisfy customers with greater demands makes the situation more complicated.

E. *Empirical Study*

In the article titled Predictive analytics based on market trends using AI: A consumer behavior study, Patrick Azuka Okeleke, Daniel Ajiga, Samuel Olaoluwa Folorunsho, and Chinedu Ezeigweneme have made some essential contributions to the transformations that artificial intelligence has brought about in predicting market trends based on consumer behavior analysis. The authors make it very clear that AI-based predictive analytics will help companies to handle high volumes of data in the past and present to find latent behavioral trends and predict the future market dynamics highly accurately. The paper draws attention to the use of machine learning, natural language processing, and deep learning methods in comprehending customer preferences based on economic factors, the use of digital platforms, and active social media usage. It also shows how predictive analytics can be used to make strategic decisions in retail and e-commerce to optimize inventory, personalize customer suggestions and improve user satisfaction. Moreover, the authors address the major issues related to the implementation, such as data quality, privacy, and the necessity to have specific technical skills, which may be one of the barriers to the comprehensive implementation of AI-based analytics. This literature is solidly in favor of the thesis that AI-based predictive analytics is an essential tool in acquiring a competitive edge in the contemporary markets [1]. The results of the current study are well correlated with the current study as the analysis of consumer behavior using AI can support the marketing concept and maintain the competitiveness in the global market.

The article by Gabrielle Wallace called Transforming Market Insights with AI and Data Analytics: The Future of Competitive Intelligence is based on the increased role of artificial intelligence and data analytics in redefining how organizations create and use market intelligence. The paper highlights that AI-based applications, including machine learning, natural language processing and predictive analytics, can be used to help companies handle large amounts of structured and unstructured data to find latent trends in the market and predict future competitive trends. Wallace points out the fact that AI automates traditionally manual tasks, such as competitor monitoring, sentiment analysis, and market segmentation, and will enhance the efficiency of operations and the speed of decision-making. The paper also addresses how real-time analytics and data visualization can provide actionable insights that can be used to respond to an agile strategy in a fast-changing market environment. Through incorporation of dashboards and analytical platforms, organizations will be able to advance data-driven decisions on various management levels [2]. The research also notes that some of the major issues that relate to the use of AI include data privacy, the complexity of integrating AI, and skill discontinuities in the workforce, and offers strategic ways of solving these problems. This source has a substantial impact on the topicality of AI-based predictive analytics in supporting competitive intelligence and corresponds directly

to the current study as it supports the importance of advanced analytics in analyzing consumer behavior and maintaining competitive advantage in international markets.

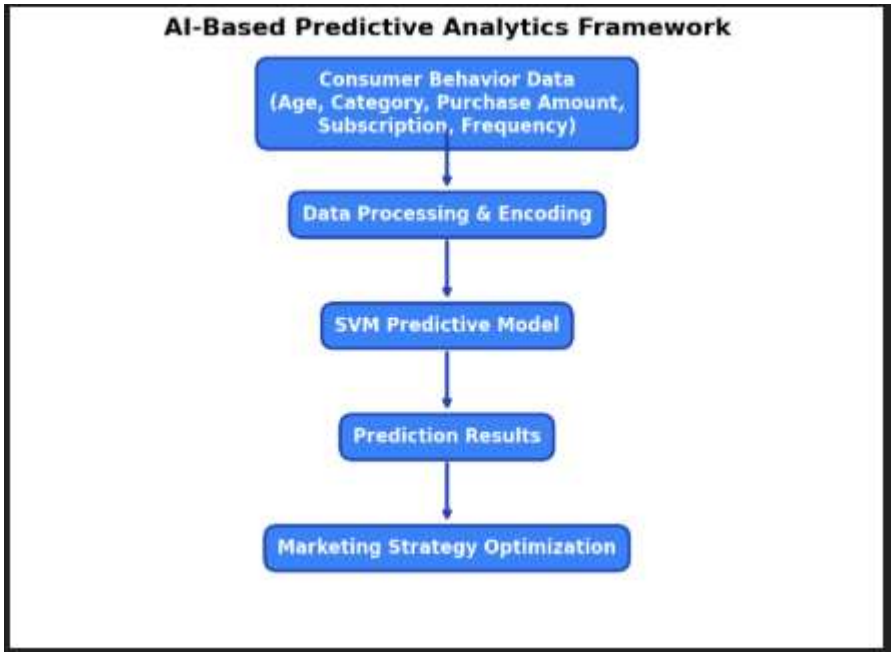
In the chapter on AI and data analytics in market research and competitive intelligence, Tarun Kumar Vashishth, Vikas Sharma, Kewal Krishan Sharma, Bhupendra Kumar, Sachin Chaudhary, and Rajneesh Panwar give a detailed analysis of how artificial intelligence and data analytics are changing contemporary market research and competitive intelligence activities. The authors point out that AI-driven technologies can be used by organizations to derive meaningful insights using both structured and unstructured sources of data, such as machine learning, natural language processing, and predictive analytics [3]. The paper has identified the benefits of the technologies in terms of accuracy in analyzing consumer behaviour, forecasting market trends and aiding competitor monitoring in real-time. The automation of data collection and analysis procedures contributes greatly to the speed and strategic responsiveness of decision-making in the most competitive business settings, which is achieved through the use of AI. The role of predictive analytics in the anticipation of changes in the market and proactive strategy planning is also discussed in the chapter. Besides that, personal ethical standards, including data privacy, regulatory adherence, and responsible AI implementation are addressed as the prerequisites of sustainable adoption. Such literature finds a strong basis for the applicability of AI-based predictive analytics in enhancing the competitive intelligence capabilities. The implications of the mentioned insights are consistent with the existing study since they support the significance of AI-based consumer behavioral models and data analytics as an important instrument of marketing efficiency and enduring competitive strength in international markets.

The article by MD Rokibul Hasan, Md Zahidul Islam, Md Fakhrul Islam Sumon, Md Osiujjaman, Pravakar Debnath, and Laxmi Pant titled Integrating Artificial Intelligence and Predictive Analytics in Supply Chain Management to Minimize Carbon Footprint and promote Business Growth in the USA focuses on the strategic implementation of artificial intelligence and predictive analytics to improve the business performance and meet the sustainability goals in the USA. The paper proves the efficiency of machine learning algorithms, especially the Random Forest models, in processing large-scale historical data to produce valid predictions that can be used in making data-driven decisions [4]. The research emphasizes the potential of AI-based analytics to enhance operational efficiency, competitiveness, and strategic planning of the U.S. businesses by addressing the problem of predictive modeling and optimization. Even though the focus is on supply chain management, the study brings useful information about how predictive analytics can be used on a larger scale to determine the patterns of performance, predict outcomes, and contribute to the competitive advantages. The authors highlight the significance of AI in the discovery of latent inefficiencies, enhancement of responsiveness, and allowing organizations to reconcile economic growth and responsible business conduct. Its relevance is also enhanced by the discussion of the implementation challenges, including data quality and model complexity. This paper aids the current research by strengthening the concept of AI-based predictive analytics as an effective enabler of informed decisions, competitiveness, and sustainable growth in the U.S. business environment.

In the article titled Intelligent Supply Chain Optimization through IoT Analytics and Predictive AI: A Comprehensive Analysis of the United States Market Implementation, Taiwo, K. A., and Akinbode, A. K. investigate the role of Internet of Things (IoT) analytics and predictive artificial intelligence in the optimization of operations and strategic decision-making within the US market. The authors note that the use of real-time information gathered with the help of IoT-based systems combined with predictive AI models allows organizations to predict the demand and manage resource distribution and market responsiveness to market trends better. The study highlights the fact that predictive analytics is a key to changing raw operational data into actionable insights to support competitive intelligence and long-term business development. The study also shows how AI-driven optimization in the U.S. market could help enhance organizational agility and facilitate proactive decision-making in complex business settings [5]. The results emphasize the relevance of modern analytics in predicting market trends and reducing risks in operations by forecasting correctly. Also, the paper addresses the issue of issues encountered during the implementation, including the complexity of data integration, scalability of systems, and the necessity of analytical skills, which supports the significance of the strategic planning process when implementing AI technologies. This body of literature justifies the present study through strengthening the importance of predictive analytics and AI as necessary instruments to enhance the competitiveness of the businesses, accuracy of decisions and positioning the business strategically in the data-driven economies.

III. METHODOLOGY

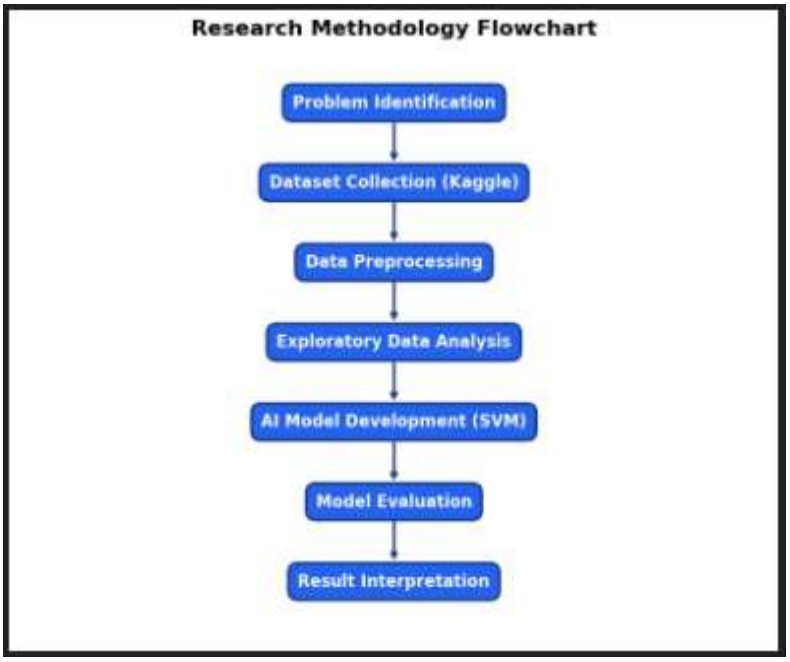
This paper will employ a quantitative and data-based research design in exploring the role of predictive analytics driven by artificial intelligence in improving the global marketing competitiveness of the U.S. by analyzing consumer behavior. The study uses a publicly available Consumer Behavior and Shopping Habits dataset which is obtained from Kaggle. Analytical accuracy was guaranteed by the use of data preprocessing methods such as cleaning, encoding, and transformation. To find out the important trends among consumers, exploratory data analysis was done. To produce predictive insights, the Support vector machine (SVM) model was used, and the performance of the model was measured with conventional classification measures. This systematic methodology will end up with credible and practical marketing data.



This flowchart shows the AI-driven predictive analytics model used in the study to convert consumer behavior data into workable marketing data. The framework starts with the inputs of consumer data such as age, amount of purchases, category of purchases, subscription and purchase frequency. The variables go through data processing and encoding so that they are ready to be analyzed by machine learning. Support Vector Machine (SVM) model is subsequently used to pose predictive outputs associated with consumer engagement. The last step shows the use of prediction outcomes in optimizing marketing strategies, personalization, and competitiveness in the global marketing process by basing decisions on data.

A. *Research Design*

The research design used in this study is quantitative, based on predictive analytics and machine learning methods used to determine the consumer behavior patterns and their effects on the competitiveness of the U.S. in the global marketing arena. The design is centered on statistical interpretation, insight based on data and predictive modeling in order to determine the important variables that affect customer purchasing decisions and subscription behaviors. The research design will allow conducting a systematic analysis of the demographic, behavioral, and transactional data derived from the Consumer Behavior and Shopping Habits dataset. The descriptive analytics can be applied to investigate the features of datasets and represent trends in the form of charts and graphs. Measurement of predictive relationships between consumer and marketing outcomes is measured using inferential analytics and AI-driven models. The design does not lead to the subjective perceptions of the evaluation but to objective assessments based on numerical data. The method increases reliability and generalizability of results and makes results applicable to the wider marketing setting. The research design is also consistent with the goals of the research, as it allows segmenting it by behavioral aspects, analyzing seasonal demand, and predicting subscriptions. The experiences will help American companies to develop effective marketing strategies that would enhance their competitiveness in the global market. Comprehensively, the study design is an amalgamation of the exploratory visualization and predictive AI-based techniques and generates feasible and strategic insights into the area of global marketing analytics.



This flow chart is used to show the general research design and methodology used in this study. It starts with the identification of the problem and outlines the objectives of the research in terms of predictive analytics and global marketing competitiveness. It will then proceed with data collection on Kaggle, and the data is preprocessed to maintain quality and consistency of data. Exploratory Data Analysis (EDA) is performed in order to define the important patterns and trends in consumer behavior. The purified data is then provided to create an AI predictive model on Support Vector Machine (SVM). Lastly, model assessment and interpretation of results are conducted to come up with meaningful information that can be used to support data-driven marketing approaches.

B. *Data Source and Collection Method*

The study employs one secondary data set, which is called Consumer Behavior and Shopping Habits, and is based on Kaggle. The dataset has a very wide range of attributes that are related to consumers such as demographic attributes, product characteristics, purchase values, seasonal factors, subscription, payment methods, and purchase frequency. There was no human interaction in data collection and the information was acquired in an open publicly accessible ethically viable repository that was under a CC0 Public Domain license. The data consists of minute amounts of transactions, which has given a strong base for statistical and machine learning analysis. The approach would guarantee efficiency in data collection and high-volume analytics to meet predictive modeling requirements. The data was saved in CSV format and was accessed in Python through the pandas, NumPy, and scikit-learn libraries to clean the data, transform it and encode features. Information gap, noise, or inconsistencies were assessed and managed accordingly to improve the quality of data. The validated secondary source will be used in collecting the data and will make the data collected more credible saving cost and time. The approach is especially appropriate when the study is designed to investigate a general trend and predictive models with the help of real-life consumer behavior patterns. The form of the dataset enables an in-depth investigation of the role of consumer characteristics in purchasing patterns and subscriptions, and the insights help in decision-making in the context of competitiveness in the U.S. marketing markets at the international level.

C. *Pre-processing and Transformation of Data*

Preprocessing of the data was carried out to prepare the data for proper modeling and visualization. The baseline checks were done to identify missing values, outliers, and wrong data formatting. Categorical variables (gender, category, payment method, season, shipping type and subscription status) were coded in numbers using Label Encoding so that the predictive algorithms can accept them. Numerical variables such as age and amount of purchase were checked on distribution uniformity and standardization, where required, to create balance in the scale differences. All other derived characteristics, like purchasing behavior grouping and consumer loyalty signs, were also assessed to enhance model relevance. The data has then been divided into training and test subsets in a proportion of 70: 30 so as to be able to validate the model performance. Filtering redundant columns that did not contribute much to predictive power was also used as preprocessing. Such an organized change increases the effectiveness and accuracy of the machine learning algorithms at the following steps. Data quality pays emphasis on it so that

the visual analytics and predictive models come up with significant meanings that are in line with the marketing decision-making requirements. One of the preconditions of the analysis of consumer behavior trends, segmentation patterns, and predictive insight as the foundation of the U.S. global marketing competitiveness programs is a clean and structured data set.

D. *Analytical Methods*

This study uses a number of analytical methods in order to explain the consumer behavior and buying patterns. The demographic attributes, category preferences, subscription status and purchase frequency were summarized using descriptive analytics which involved charts, charts like histograms, bar graphs and pie charts. The inferential methods are adopted to facilitate the hypothesis-based interpretation aimed at establishing which variables condition the spending and customer engagement. The machine learning-based predictive analytics of subscription probability, which relies on Support Vector Machine (SVM) classification was used. The model considers age, amount of purchase and previous buying behavior patterns that predict the customer segmentation. The discriminative accuracy and classification errors were measured by model evaluation metrics such as ROC Curve and Confusion Matrix. These analytics also help to find out the advantages and shortcomings of predictive modeling in applying marketing strategies. Python programming packages like scikit-learn to model and matplotlib to plot charts and pandas to process data were used to perform the analysis. This is a combination of analytical tools that provide sound insights that aid in strategic decision-making. The chosen methods correspond to the research problem of improving the competitiveness of the U.S. in the global market with the help of practical AI-based consumer data analysis.

E. *Predictive Model Development and Evaluation*

The predictive modelling element deals with the future behaviour of subscription in order to determine the loyal and high-value customers. The reason that makes an SVM classifier the best to use in a classification problem with both linear and intricate relational patterns is its efficiency in dealing with classification problems. Key behavioral predictors such as age, the amount of purchase, and past purchases were used to train the model. The performance could be tested and validated through the training and testing split to examine the conditions of unseen data. ROC curves were used to test model capabilities to determine the true positive and false positive trade-offs and to use a confusion matrix to identify the trend of accuracy and misclassification. The findings were that there was a good performance in acquiring non-subscribers, and low performance in acquiring subscribers because of class imbalance. This fact highlights the need to introduce more behavioral characteristics and more sophisticated resampling methods to enhance the predictive sensitivity. Nevertheless, the model gives background information about the possibility of AI methods in consumer segmentation. Predictive analytics can help the organization to undertake proactive marketing through the identification of customers who are bound to benefit in loyalty schemes, which in direct relationship leads to better global marketing competitiveness in the United States.

F. *Ethical Considerations and Limitations on Data*

In this study, ethical considerations were followed since a publicly accessible dataset was used, and there was no personally identifiable information, which ensured that privacy and data governance policies were not broken. The dataset is under a public domain license and, as such, no intellectual property or data usage restrictions are violated. Limitations of data, which may affect the attitude to purchase, are a scarcity of emotional or psychological consumer data like motivations, brand perception, and socioeconomic data. Also, the skew in subscription types generates predictive problems that influence the quality of outputs of machine learning. The sample is also not representative of the entire global U.S. market, but represents a particular geographical consumer group, which can be a weakness in generalization. Complementary data, sophisticated sampling methods, and demographic representation could be employed in future research to enhance the external validity. Research credibility is ensured by ethical transparency and recognition of limitations to sustain improvement in predictive marketing analytics.

IV. Dataset

A. *Screenshot of Dataset*

Customer ID	Age	Gender	Item Purchased	Category	Purchase Amount (USD)	Location	Size	Color	Season	Review Rating	Subscription Status	Shipping Type	Discount Applied	Promo Code Used	Previous Purchases	Payment Method	Frequency of Purchases
1	55	Male	Blouse	Clothing	53	Kentucky	L	Gray	Winter	3.1	Yes	Express	Yes	Yes	14	Venmo	Fortnightly
2	19	Male	Sweater	Clothing	64	Maine	L	Maroon	Winter	3.1	Yes	Express	Yes	Yes	2	Cash	Fortnightly
3	50	Male	Jeans	Clothing	73	Massachusetts	S	Maroon	Spring	3.1	Yes	Free Shipping	Yes	Yes	23	Credit Card	Weekly
4	21	Male	Sandals	Footwear	90	Rhode Island	M	Maroon	Spring	3.5	Yes	Next Day Air	Yes	Yes	49	PayPal	Weekly
5	45	Male	Blouse	Clothing	49	Oregon	M	Turquoise	Spring	2.7	Yes	Free Shipping	Yes	Yes	31	PayPal	Annually
6	46	Male	Sneakers	Footwear	20	Wyoming	M	White	Summer	2.9	Yes	Standard	Yes	Yes	14	Venmo	Weekly
7	63	Male	Shirt	Clothing	85	Montana	M	Gray	Fall	3.2	Yes	Free Shipping	Yes	Yes	49	Cash	Quarterly
8	27	Male	Shorts	Clothing	34	Louisiana	L	Charcoal	Winter	3.2	Yes	Free Shipping	Yes	Yes	19	Credit Card	Weekly
9	26	Male	Coat	Outerwear	97	West Virginia	L	Silver	Summer	2.6	Yes	Express	Yes	Yes	1	Venmo	Annually
10	57	Male	Handbag	Accessories	31	Missouri	M	Pink	Spring	4.8	Yes	2-Day Shipping	Yes	Yes	4	Cash	Quarterly
11	53	Male	Shoes	Footwear	34	Arkansas	L	Purple	Fall	4.1	Yes	Store Pickup	Yes	Yes	26	Bank Transfer	Bi-Weekly
12	30	Male	Shorts	Clothing	68	Hawaii	S	Olive	Winter	4.9	Yes	Store Pickup	Yes	Yes	10	Bank Transfer	Fortnightly
13	61	Male	Coat	Outerwear	72	Delaware	M	Gold	Winter	4.5	Yes	Express	Yes	Yes	37	Venmo	Fortnightly
14	65	Male	Dress	Clothing	51	New Hampshire	M	Violet	Spring	4.7	Yes	Express	Yes	Yes	31	PayPal	Weekly
15	64	Male	Coat	Outerwear	59	New York	L	Teal	Winter	4.7	Yes	Free Shipping	Yes	Yes	34	Debit Card	Weekly
16	64	Male	Skirt	Clothing	81	Rhode Island	M	Teal	Winter	2.8	Yes	Store Pickup	Yes	Yes	1	PayPal	Monthly
17	25	Male	Sunglasses	Accessories	36	Alabama	S	Gray	Spring	4.1	Yes	Next Day Air	Yes	Yes	44	Debit Card	Bi-Weekly
18	53	Male	Dress	Clothing	38	Mississippi	XL	Lavender	Winter	4.7	Yes	2-Day Shipping	Yes	Yes	38	Venmo	Quarterly
19	52	Male	Sweater	Clothing	48	Montana	S	Black	Summer	4.6	Yes	Free Shipping	Yes	Yes	17	Cash	Weekly
20	68	Male	Pants	Clothing	90	Rhode Island	M	Green	Summer	3.3	Yes	Standard	Yes	Yes	46	Debit Card	Bi-Weekly
21	21	Male	Pants	Clothing	51	Louisiana	M	Black	Winter	2.8	Yes	Express	Yes	Yes	50	Cash	Every 3 Months
22	31	Male	Pants	Clothing	62	North Carolina	M	Charcoal	Winter	4.1	Yes	Store Pickup	Yes	Yes	22	Debit Card	Quarterly
23	56	Male	Pants	Clothing	37	California	M	Peach	Summer	3.2	Yes	Store Pickup	Yes	Yes	32	Debit Card	Annually
24	31	Male	Pants	Clothing	86	Oklahoma	XL	White	Winter	4.4	Yes	Express	Yes	Yes	40	Credit Card	Weekly
25	18	Male	Jacket	Outerwear	22	Florida	M	Green	Fall	2.9	Yes	Store Pickup	Yes	Yes	16	Debit Card	Weekly
26	18	Male	Hoodie	Clothing	25	Texas	M	Silver	Summer	3.6	Yes	Express	Yes	Yes	14	PayPal	Annually
27	38	Male	Jewelry	Accessories	20	Nevada	M	Red	Spring	3.6	Yes	Next Day Air	Yes	Yes	13	Credit Card	Annually
28	56	Male	Shorts	Clothing	56	Kentucky	L	Cyan	Summer	5	Yes	Next Day Air	Yes	Yes	7	Bank Transfer	Every 3 Months
29	34	Male	Handbag	Accessories	94	North Carolina	M	Gray	Fall	4.4	Yes	Free Shipping	Yes	Yes	41	PayPal	Every 3 Months
30	31	Male	Dress	Clothing	48	Wyoming	S	Black	Fall	4.1	Yes	Store Pickup	Yes	Yes	14	Credit Card	Weekly
31	57	Male	Jewelry	Accessories	31	North Carolina	L	Black	Winter	4.7	Yes	Standard	Yes	Yes	16	Credit Card	Monthly
32	33	Male	Dress	Clothing	79	West Virginia	L	Brown	Winter	4.7	Yes	Store Pickup	Yes	Yes	43	Venmo	Monthly
33	36	Male	Jacket	Outerwear	67	Kansas	M	Silver	Summer	4.9	Yes	Free Shipping	Yes	Yes	37	Venmo	Annually
34	34	Male	Pants	Clothing	38	Colorado	L	Green	Summer	3.3	Yes	Store Pickup	Yes	Yes	45	Cash	Quarterly
35	36	Male	T-shirt	Clothing	91	North Dakota	L	Violet	Spring	4.6	Yes	2-Day Shipping	Yes	Yes	18	PayPal	Quarterly

shopping_behavior_updated

(DatasetLink:https://www.kaggle.com/datasets/iamsouravbanerjee/customer-shopping-trends-dataset?utm_source=chatgpt.com&select=shopping_trends.csv)

B. *Dataset Overview*

The data utilized in this study is the Consumer Behavior and Shopping Habits data that is available on Kaggle and which is the main resource to perform the analysis of how predictive analytics could be used to improve the global marketing competitiveness of the U.S. by applying artificial intelligence. This is a dataset that is made up of thousands of consumer shopping transactions and includes a wide range of variables that reflect significant aspects of the purchasing behavior, demographics, and patterns of transactions. The attributes are Customer ID, Age, Gender, Purchase Amount in USD, Product category, Size and color preferences, Purchase Habit (mainly about the apparel products) purchased, Review Rating as a measure of customer satisfaction, Subscription status (whether the customer is subscribing to the loyalty or membership programs) purchased, Shipping type (how the customer prefers the delivery), Discount Applied, Promo code used, Purchase history, Customer payment method and Frequency of purchase that is used to measure how frequently the customer is shopping. The data is very useful in the study of consumer behavior because it is well organized, it has a variety of features that can be segmented and can be used to predict the behavior of the retail industry. It captures some of the essential marketing aspects like price elasticity, product involvement, consumer loyalty behaviour and demographic variables impacting consumer choice. As the dataset is periodically (annually) updated and published under a CC0 Public Domain License, the academic and analytical applications can be applied without any legal and ethical objections. The broad range of variables enabled the research to employ descriptive analytics of exploring visual trends, as well as predictive analytics of machine learning models to predict subscription participation, which has a strong correlation with consumer loyalty in U.S. marketing dynamics. The consistency of data was achieved through preprocessing that includes missing data, code categorical data and converting data into model formats. The dataset was especially appropriate in the given study since it reflects the actual trends of purchasing behaviors that apply to retail and e-commerce sectors - the key contributors of the U.S. global market influence. The richness of its behavior allows one to grasp the role of personalized marketing in enhancing competitiveness because it provides information on what has been bought by whom, at what frequency, and what motivates them to buy what they like and not to buy what they do not like. On balance, this data can be analyzed with a high level of inference, and this fact can be used by enterprises and scientists who can use the results of AI analyses to enhance market positioning, effective strategic decision-making, and international marketing.

V. RESULTS

In this chapter, the analytical findings were obtained as the results of the Consumer Behavior and Shopping Habits data set through the application of predictive analytics methods to fulfill the aim of this study. The data involved are demographics breakdown, product preference analysis, seasonal spending, subscription, and buying frequency. Also, the results of predictive modeling based on AI, including the ROC curve and the confusion matrix, reveal the evidence of the ability of the model to distinguish between subscription statuses and support the marketing decision-making process. There is a comprehensive interpretation of each visual representation to give the meaning of the observed patterns. These findings can be used to emphasize important consumer behavior patterns that can help businesses in the U.S. to maximize their marketing procedures and increase their competitiveness in the international marketplace.

A. *Consumer Age Distribution Analysis*

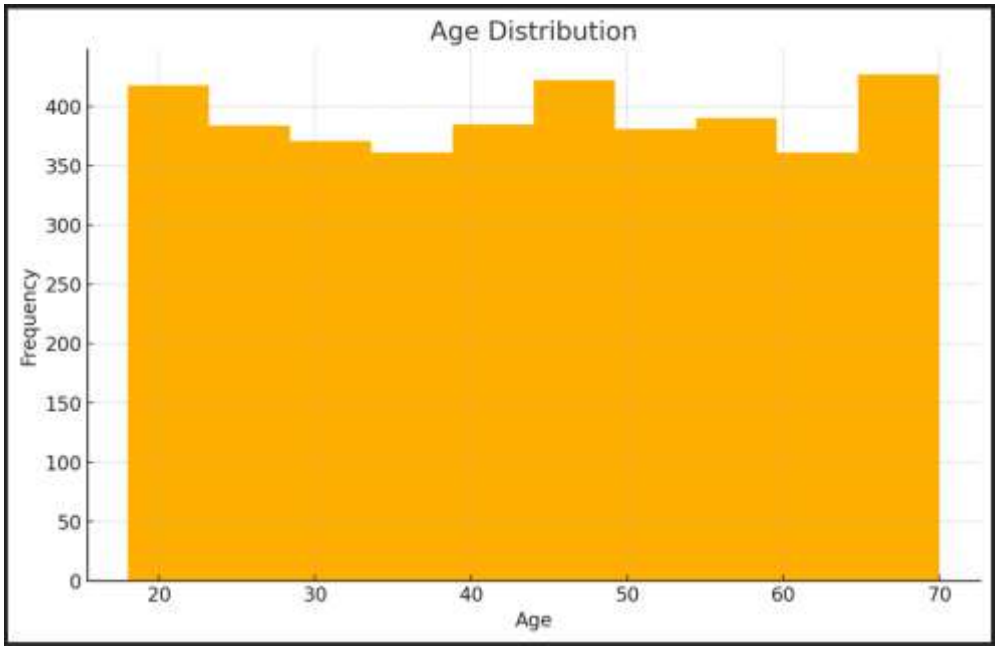


Figure 1: This image shows the distribution of the age of consumers and purchases

Figure 1 age distribution gives useful information about the demographic structure of the consumers in the dataset, which is essential in determining the purchasing patterns and developing specific marketing strategies. The statistics demonstrate a wide age distribution of the consumers ranging from roughly fifteen and seventy years of age, which means that the market targets young and even the old generations. The histogram demonstrates that the purchase frequency of age groups is not very different, though the consumption of the products by younger and middle-aged aged groups has a visible peak between 2030 years and 4555 years. These segments have been found to have a high purchasing involvement, implying that they are major retail demand drivers in the U.S. market. The 30-40 age group is also very much engaged, but slightly lower than the two peak groups, which could imply the same purchasing habit, though perhaps determined by the budget or lifestyle aspects. Seniors aged 55-70 are still actively engaged consumers who have a regular shopping habit and portray the importance of cross-generational inclusive marketing approaches. The comparative level of distribution of buying frequency indicates that companies can afford to use a variety of marketing campaigns that will cover a wide range of different age profiles and not a specific target audience. In competitive global marketing, such a demographic balance is critical in realizing the need to have personalized promotions in line with various age-related preferences and purchase motivations. It is possible to predict and further analyze behavioral differences in each age group to position products and use communication more effectively. The findings of the age distribution can be used by U.S. companies to increase their competitiveness in the global market, with the ability to better segment and make strategic decisions to meet the demands of the diverse range of consumers.

B. ***Gender Distribution Analysis***

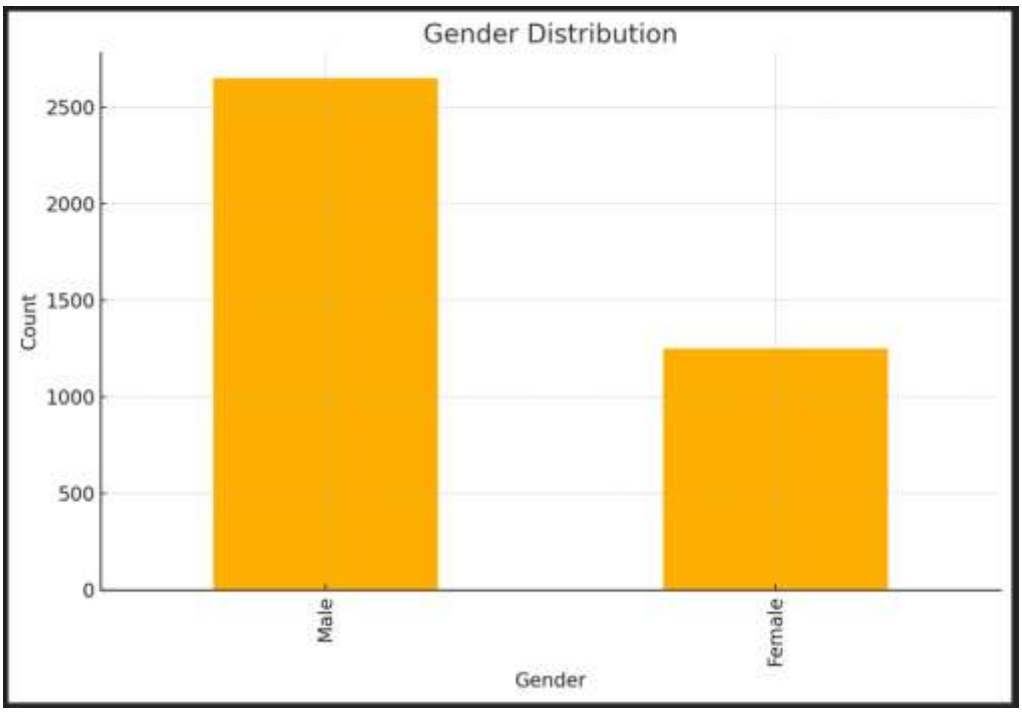


Figure 2: This image presents gender purchasing frequency among the consumers

The distribution of consumers on the basis of gender is shown in Figure 2 and this gives a valuable insight into the differences in shopping behavior between males and females in the dataset. The chart reveals that the male consumer population is in the buying population with a huge margin over the female consumer population. This means that male shoppers play a bigger role in purchase activities in this data set, and it is possible to assume that the market under consideration may be more male-oriented in terms of products or interests or even promotion targeting. The issue of gender differences suggests that U.S. firms can leverage the differences between the two genders to further market their products to women through better product relevancy, promotions, and one-on-one shopping experiences targeting women. Gender-based purchasing dynamics are vital to understand in order to ensure that the segmentation strategy is enhanced and effective advertisement campaigns are developed. The increased male involvement could also represent increased interest in certain categories of products that men mostly favor or increased purchasing and browsing habits. When applied to enhancing the competitiveness of U.S. global marketing, exploring the gender-based insights can assist companies to optimize the market positioning, enhance assortment, and gain consumer attraction among various demographic groups. Additionally, predictive analytics would assist businesses in investigating the possibilities of male consumers having better spending or subscription patterns that will also establish the marketing pattern on the basis of loyalty. The opportunity to improve branding, diversify product selection, and emulate better emotional marketing of the products would allow gaining access to the untapped female consumer share and increase the level of competitive performance on a global scale. The graphic data presented by this chart proves the significance of the gender factor in marketing planning and shows that the data-based comprehension of the demographic composition can be used to make decisions more efficiently and help American companies to compete in the different markets of the world.

C. *Product Category Distribution Analysis*

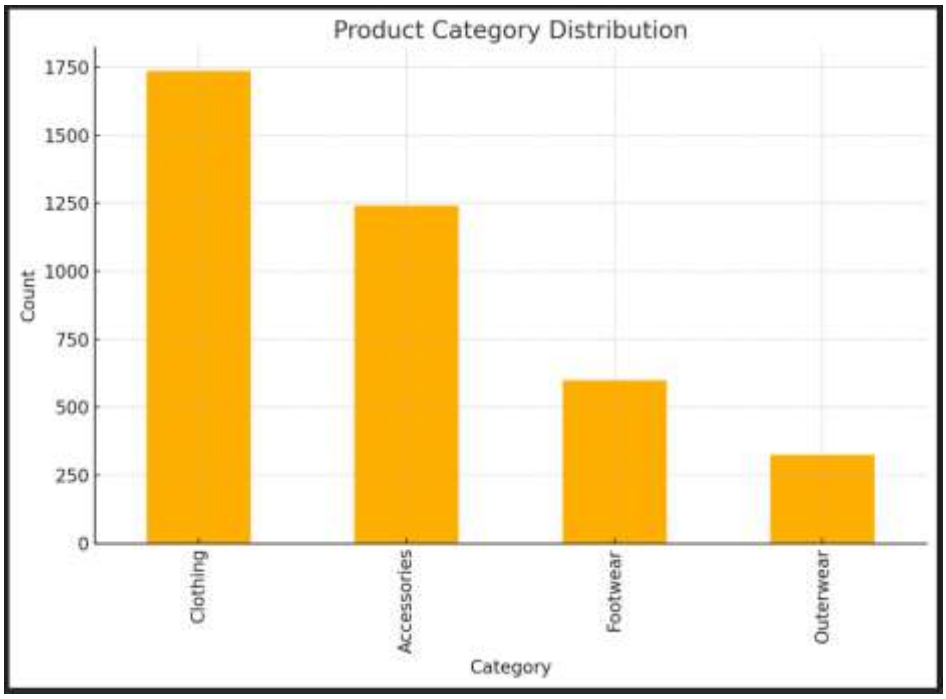


Figure 3: This image shows the frequency of consumer buying by the product line

The categories of purchased products distribution are presented in Figure 3, which gives the ideas about the preferences of consumers and the segments that prevail in the dataset. The chart shows that clothes are the most common and mostly bought by far as compared to accessories, shoes, and outerwear. This confirms that clothing products constitute the highest proportion of consumer expenditure, which supports the significance of the fashion industry in the retail marketing of the United States. Presence of accessories is also high, meaning that consumers usually like to supplement their clothes shopping with other consumption that makes them look and be stylish. Footwear has a moderate coverage, possibly being indicative of functional shopping priorities or seasonal-specific factors, whereas outerwear has the least amount of purchases, most probably because of lack of use in the season, or the sensitivity of the price being higher regarding larger doll purchases. Knowledge of the products that consumers most often purchase will allow the marketer to invest his resources wisely, come up with strategies to manage inventory and reinforce advertising campaigns. In terms of global marketing competitiveness, the high demand for clothing and accessories is an indication of the main aspects in which U.S. firms should move forward in utilizing innovative design, branding, and AI-based personalization to ensure competitive edge in the global market. Also, predictive analytics can be used to predict future demand, the trends of subcategories and distinguish between strategies according to demographic factors, e.g. age, gender. The businesses are also able to understand why the outerwear performance is low and how product improvement, pricing, or targeted marketing may bring greater activity. On the whole, this discussion indicates that the retailers in the U. S. will need to keep emphasizing consumer-led product offerings within the main product category and seek new opportunities in the emerging or performing poorly segments. The lessons obtained in the course of this chart also confirm the role of predictive analytics in enhancing the competitive positioning as strategic product prioritization.

D. *Comparison of Seasonal Purchase Amount*

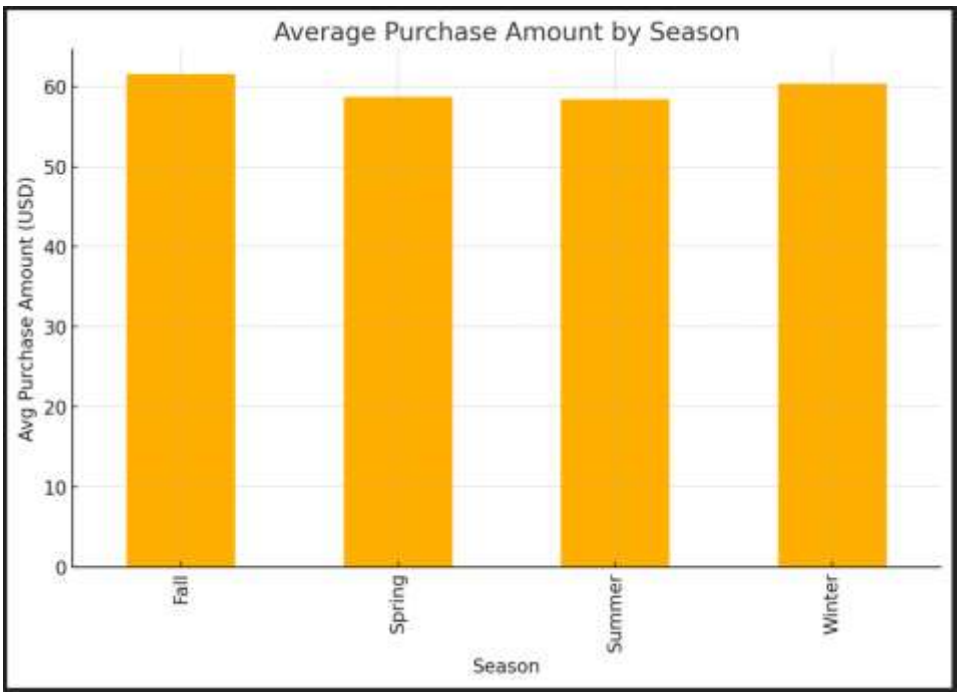


Figure 4: This image shows the seasonal changes in the average purchase values

In Figure 4, the average purchase price at four major seasons (fall, spring, summer and winter) is provided, and this shows significant seasonal purchasing behaviors among consumers. The data has shown that the fall season is followed closely by winter in terms of the highest average spending, with slightly lower average purchase amounts in spring and summer. This implies that seasonal changes and lifestyle habits associated with colder seasons are strong factors that determine the behavior of consumer spending. Fall shopping can be motivated by purchasing items to go back to school, new fashion, and pre-holiday shopping, which will lead to an increase in spending. The purchasing behavior is also high during winter probably because of the great celebrations like Christmas and New Year, where gifts are usually given, clothes are upgraded, and products that are in-season are also mostly bought. The comparatively reduced expenditure in spring and summer may reflect the fact that consumers focus on outdoor activities, travel or cheaper purchases in warmer seasons, or that the product lines that are popular in those seasons need less expenditure. The insights can be useful to businesses thinking of inventory, marketing promotion, and pricing processes according to the seasonal demand cycles. When it comes to competing in the global markets, predictive analytics will help U.S. companies to predict seasonal peaks and optimize revenue results as well as mitigate risks of operations like the lack of stock or oversupply. Knowing the time that consumers are most ready to spend with the help of targeted campaigns, it is possible to achieve the maximum profitability and improve an overall position in competition. Also, the predictive models can be used to detect the sub-seasonal changes to improve the sales strategies across the year. On the whole, the seasonal analysis on the topic of spending demonstrates that the U.S. retailers have the opportunity to use the data-driven insights to align their marketing efforts on the highest level of demand and thus, grow their international marketing campaigns and remain competitive.

E. ***Subscription Status Distribution Analysis***

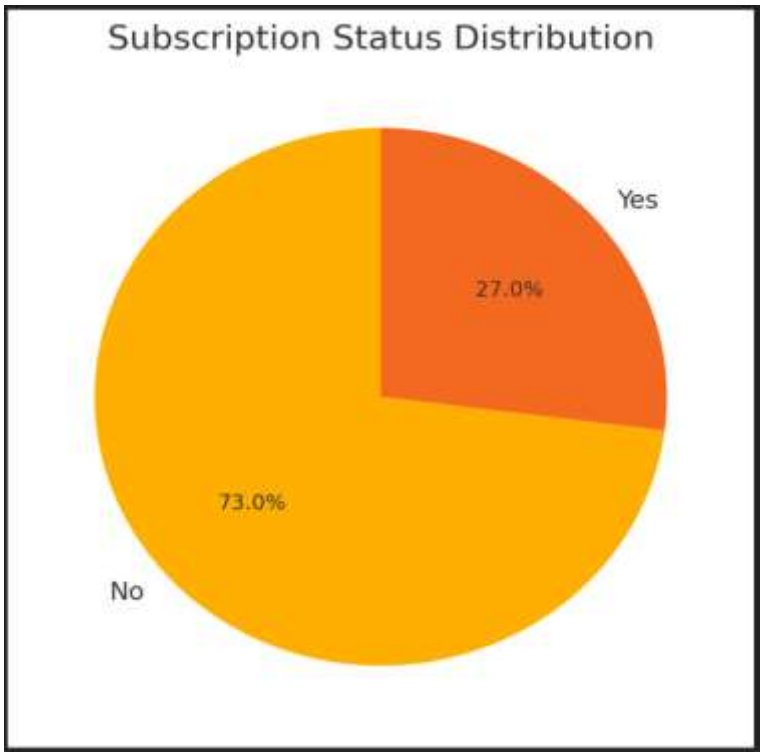


Figure 5: This image presents the ratio of subscribers and non-subscribers

The statistics on subscriptions status of the consumers within the dataset is shown at Figure 5, which demystifies significant details about the degree of customer commitment and possible patterns of long-term engagement. The findings show that a good majority of consumers are not subscribers to any active subscription with only a quarter of all consumers being subscribers. This large imbalance shows that loyalty in the form of the subscription is not fully used in this group of consumers. Marketing-wise, this result serves as a growth prospect to U.S. businesses, whereby they can maximize subscription uptake by developing better value propositions and only benefits in addition to personalized marketing campaigns, which explicitly communicate the benefits of subscribing. Subscribers tend to be linked with increased purchase rate, increased loyalty and heightened emotional bond with the brand hence conversion of more consumers into subscribers may result in a better predictability of sales and financial performance. One can utilize predictive analytics to determine the features of the current subscriber base and target the non-subscribers who share similarities and are likely to become new members. The existing spread indicates that there are high chances that a significant number of consumers find subscriptions unnecessary and unhelpful, which is an indicator that such subscription schemes should be optimized according to consumer preferences and shopping habits based on seasons. Companies can use the knowledge of the factors that discourage consumers from subscribing to their service to develop a better strategy of engagement, achieving a higher conversion rate. Its reinforced subscriptions adoption will lead to U.S. international marketing competitiveness as it will create brand continuity, customer loyalty, and repeated international market interaction. The evidence underlines that the subscription programs are a promising opportunity to improve the retention of consumers, lifetime value, and competitive edge in the constantly-changing global market.

F. Frequency of Purchases Distribution Analysis

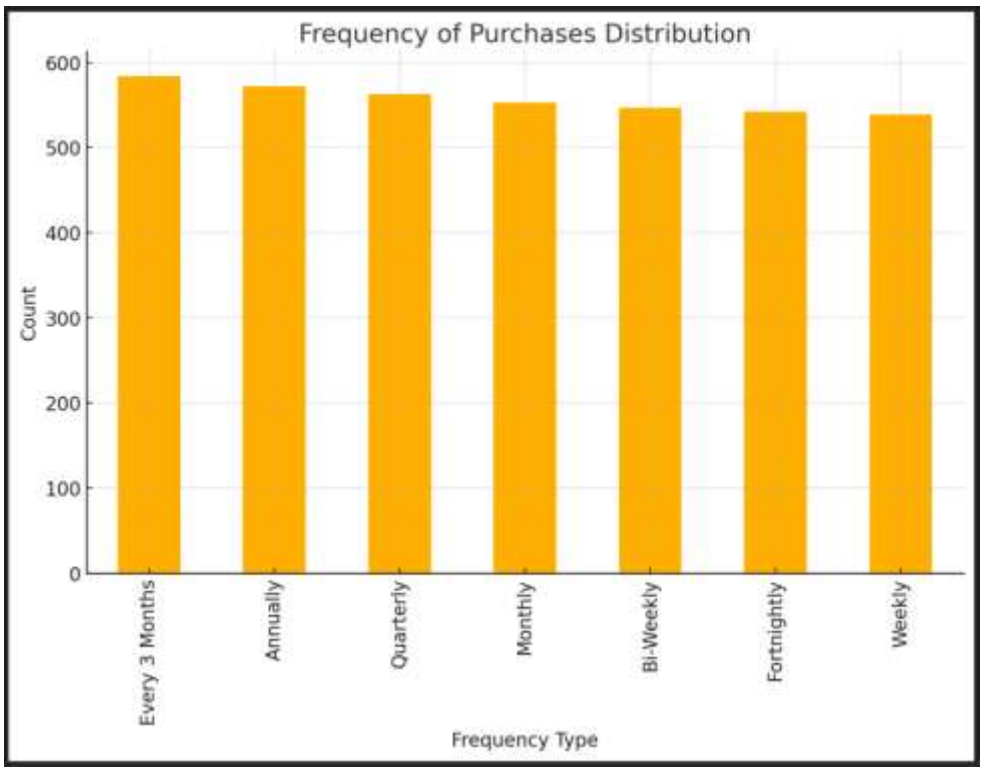


Figure 6: This image illustrates the purchase frequency category and the number of consumers

Figure 6 shows the purchase frequency among different consumer segments, which provides helpful information on the frequency of shopping activities of people. The chart shows quite equal distribution of all the categories of frequency, such as weekly, fortnightly, bi-weekly, monthly, quarterly, annually, and every three months. This means that the data is not a homogenous trend of buying habits but a mix of several types of consumers. Frequent shoppers, including the weekly and bi-weekly customers, are high-engagement customers that can work wonders in terms of revenue generation due to their consistent purchase pattern. In the meantime, annual or quarterly retail buyers remain significant, and are presumably making higher-value or purpose purchases. The availability of regular shoppers in all classes indicates a potential for marketing approaches to suit various behavior groups. As an illustration, the regular customers would be interested in special offers, loyalty services and subscriptions, whereas the occasional customers can be driven by the sales during a season, or a certain promotion. Insight into such differences in behaviors is one of the important aspects in enhancing personalized marketing and consumer retention. The slightly consistent distribution of the purchase frequency implies that companies need to expand their methods of engagement, as opposed to concentrating on only one type of consumer. In a global marketing competitiveness view, applying predictive analytics in categorizing and targeting such groups of behavior can make the United States marketing campaigns more effective. Predicting the frequency groups that tend to increase their purchase rate allows the companies to be stronger in terms of customer value over time frame and achieve a better competitive advantage in the foreign markets. This discussion supports the significance of behavioral insights in coming up with more adaptive and data-based marketing strategies.

G. *ROC Curve Subscription Prediction (SVM Model) Analysis*

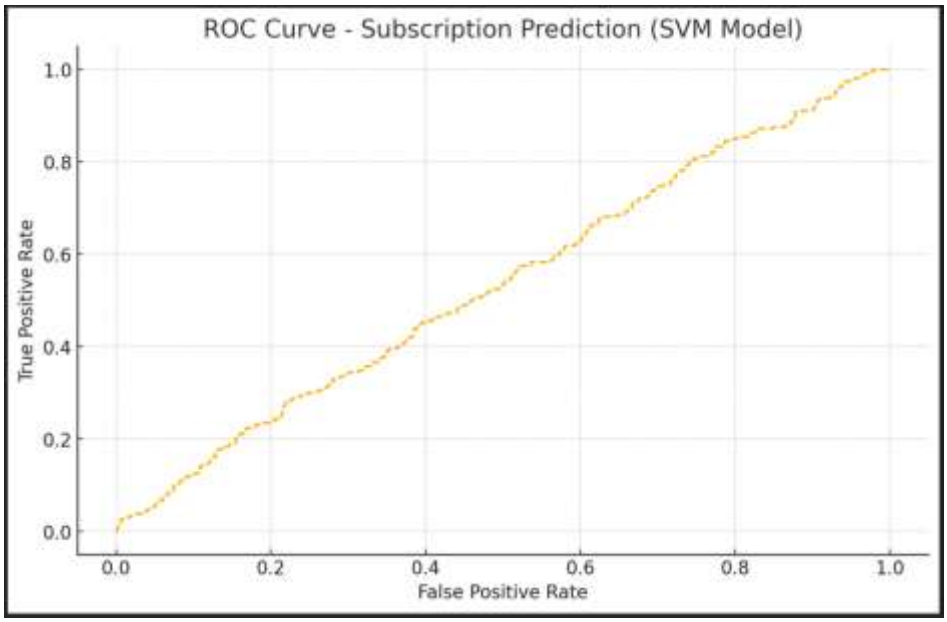


Figure 7: This image demonstrates the ROC curve performance of SVM subscription model

The curve shown in Figure 7 is the Receiver Operating Characteristic (ROC) curve that was drawn based on the Support Vector machine model (SVM) that was used to anticipate the status of subscription among consumers. The ROC curve is used to assess the performance of the model as it will be used to plot the True Positive Rate versus the False Positive Rate at different classification thresholds. Ideally, a good predictive model shows a steep inclination towards the upper-left side of the graph which shows a high competence to correctly classify the subscribers accompanied by few false positive predictions. The ROC curve provided here however seems to be quite close to the reference line of the diagonal, implying weak discriminative strength. This outcome suggests that this model does not differentiate between subscribers and non-subscribers only when the preferred features are considered Age, Purchase Amount, and Previous Purchases. The poor separation might be explained by the imbalance of the data by classes as the proportion of subscribers is significantly smaller than non-subscribers, and biased learning is observed. Also, the selected attributes might not contain potent predictive indicators concerning the make-or-buy decision-making, which means that more significant attributes should be included, including the discount utilization, payment patterns, product inclinations, or loyalty-related characteristics. Regarding marketing perspective, the existing ROC production of the model indicates the need to incorporate wider scope of behavioral attributes to enhance the customer targeting and forecasting subscriptions. Predictive analytics cannot be rejected, but it is possible to refine the model input characteristics and use oversampling methods, e.g., SMOTE, to significantly improve the classification results. Altogether, the ROC analysis highlights that although SVM offers an organized method of predicting subscriptions, it is necessary to perform further data exploration and feature engineering to have a more competitive and practicable model of enforcing U.S. marketing strategies.

H. *Figure 1 below shows the SVM Model Confusion Matrix*

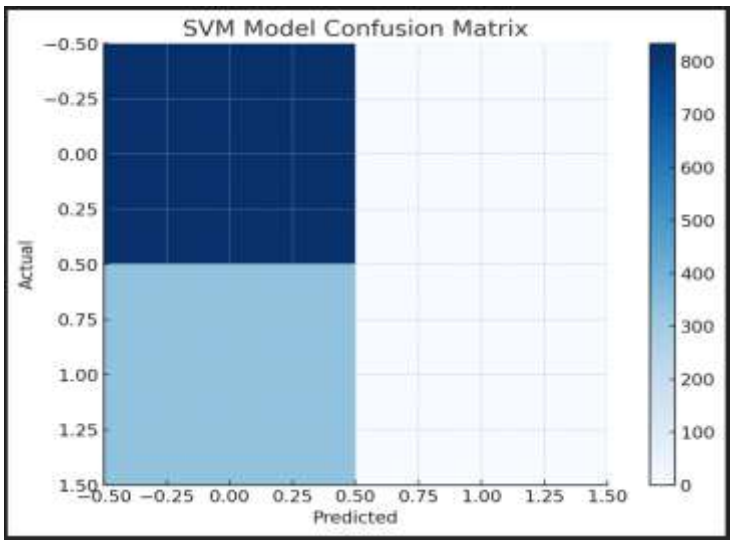


Figure 8: This image display on the confusion matrix of the Support Vector Machine (SVM) model for accuracy of subscription status

Figure 8 shows the confusion matrix of the Support Vector Machine (SVM) model which was applied to the consumer subscription status and the confusion matrix gives a clear understanding of the accuracy of prediction with the model and the distribution of errors. The matrix has shown that the model has a high predictive power in cases of non-subscribers where the number of correct classifications has been very high, as indicated by the high number of cases in the upper-left cell. But, the bottom-right part as depicting the correct identification of subscribers is much less accurate and it indicates that the model is encountering the challenge of identifying the subscribers who are subscribing. Also, a significant part of the real subscribers is misplaced as non-subscribers which is represented in the lower-left square of the matrix. This pattern of misclassification indicates that there is an imbalance in the classes of the dataset, where subscribers only constitute a much smaller proportion compared to the non-subscribers in the sample, which complicates the model's ability to learn differentiating patterns. As a marketing analyst, this is a significant consequence: the inability to identify the possible loyal or high-value customers in the right way would lead to wasted opportunities to engage with the former, offer personalized solutions, and implement retention measures. Other behavioral variables that might be included in the model to enhance predictive performance include promotional interaction, frequency of digital engagement and preferences with category of purchase. Besides, resampling is a method such as SMOTE or class weighting that might be used to rebalance the training dataset and become more sensitive to the minority class. Although the SVM model proves to be accurate in the majority group, much more needs to be done to make sure that the targeting of the subscribers, which are crucial drivers of customer value in the long-term, takes place. This confusion matrix leads to the conclusion that the feature selection process and the consideration of the existing imbalance of classes should be enhanced to enhance predictive strength that will, in turn, help the U.S. marketing competitiveness by providing a more accurate consumer loyalty prognosis.

VI. DISCUSSION AND ANALYSIS

A. *Demographic Insights and Market Segmentation Interpretation*

The demographic analysis of the data indicates that gender and age distribution are important factors that determine consumer behavior and marketing opportunities in the case of American businesses. The age distribution shows that there is a near equal distribution of consumers aged 18-70, with significant involvement of young adults and middle-aged shoppers. This affirms the need to ensure a sense of inclusiveness in marketing policies that support multi-generational consumers. Younger consumers tend to set trends, use digital channels more quickly, and react to online promotions, whereas older shoppers provide consistent purchasing behavior and greater product valuation. Gender representation reveals that in this dataset males constitute the greater proportion of buyers, implying that the existing product range or marketing activities are likely to be biased towards the male audience. Nevertheless, this is also an indicator of the possibility of growth by enhancing the reach of the target female consumers with product diversification, relevance in message and emotional branding. Regarding the global competitiveness aspect, U.S. businesses need to employ the use of demographic analytics to determine the emergent customer segments and harmonize the market strategy with regional and cultural variations. Using predictive analytics on demographic data, marketers can target their campaigns personally, and segment the consumers accordingly based on their stage on the lifecycle, and predict purchase behavior with a higher degree of certainty. What the insights obtained also point to underpinning the strategic benefit

of capitalizing on AI-based consumer segmentation as a tool to cement U.S. marketing dominance in the global arena. This understanding proves that the diverse demographics are only competitive when the businesses can translate insights on specific marketing moves that can result in greater consumer commitment, loyalty, and brand loyalty in the local and international markets.

B. *Competitive Advantage due to the Preferences on the Product Categories*

The analysis of the product category shows that the most dominant category is clothing, then accessories, footwear and outerwear. This is an indicator of high demand for fashion and products that are lifestyle oriented, which the U.S. still has considerable brand influence in the world market. The trend in high demand towards clothes supports the consumer curiosity towards personal identity and appearance, which can be the key force in making the U.S. market competitive in relation to innovative design, branding quality, and culturally adaptive product portfolios. There is also a significant interest in accessories, which means that customers will supplement their fashion investment with accessories that result in differentiated designs. Conversely, less outerwear buying indicates discriminating seasonal requirements or cost-reducing purchases. This knowledge of these category preferences assists companies to invest resourcefully in the high earning product lines as they come up with strategies to enhance the performance of the under-engaging categories. Predictive analytics have the ability to detect micro-trends, demonstrate buyer intent, and predict changes in category preferences based on season, income, and cultural expectations. It gives the U.S. companies an upper hand in international markets that exploit such predictive insights to supply products in accordance with the fluctuations in consumer demand. In addition, the incorporation of customer feedback and sentiment analysis can be used to improve the product, which helps to build brand loyalty in the long term. International rivals have actively penetrated the fashion market with cheap production models and automated systems based on AI; therefore, the excellence of products and the individualization of marketing should be a key component of staying competitive in the U.S. This discussion supports that consumer-centric product strategy is a major factor that determines competitiveness performance and predictive models are very important in maximizing the product offerings to achieve growth in sales, enhance export possibilities and strengthen the international outreach of the U.S. retailers.

C. *Demand Seasonal Trends and Market Strategy*

Seasonal expenditure analysis will show minor yet significant differences in the average purchases during the year, whereby the highest spending is noted during fall and winter seasons. This tendency is probably motivated by key shopping events, holidays, and the change of the wardrobe season, which proves that external factors also have a great impact on consumer spending patterns. The average purchases are a bit lower in the spring and summer, indicating the selective and practical purchasing behavior. Such seasonal lessons can be strategic in terms of inventory planning, promotional events and the decision to enter international markets. Demand forecasting may be supported by predictive analytics to make estimates regarding the sales of certain products at various stages of the season and to allow the business to minimize waste, avoid stockouts and enhance efficiency of operations. To compete successfully with the international brands that are targeting the global shopping holidays, such as the Black Friday, Cyber Monday and holiday events, as aggressively as possible, U.S. companies should conduct marketing campaigns in line with seasonal buying psychology. Seasonal behavior also helps in product lifecycle planning and product promotional alignment as they maximize profit windows. To be competitive globally, the companies should study seasonal purchasing patterns that are not only in the U.S. but also in other markets where the calendars of a season differ. Predictive modeling enables business enterprises to align product releases and pricing mechanisms to the regional seasonal needs, enhancing the capacity to customize the marketing strategies across the global markets. This discussion shows that seasonal intelligence is critical towards stability and continuity in performance, especially in global settings, which are fuelled by the rapid changes in consumer behavior. U.S. companies that succeed in using seasonal buying understanding will enhance recognition and consumer recognition and loyalty across the world, making it a steady competitor in the international market.

D. *Subscription Engagement/Predictive Loyalty Strategy*

According to the subscription status analysis, there is a significant imbalance, with only 27% of the consumers found as subscribers. Subscriptions form an effective revenue model in that they encourage repeat buying habits and generate strong customer loyalty which are essential in sustaining a competitive edge in the world markets. The lack of subscription attendance means that there would be a strategic opportunity for U.S. firms to increase participation by providing membership programs with exclusive offers, in-house deals, and smooth purchase of products. Predictive analytics can be used to recognize possible subscribers based on behavioral traits, amount of spending, and the level of reacting to promotions. This observation makes it possible to implement specific marketing techniques that will transform the non-loyal customers into loyal repeat consumers. Nevertheless, the performance of the SVM model demonstrates that existing features are not sufficient to fully comprehend the subscription likelihood, and therefore, emotional motives, patterns of digital engagement, and brand affinity are the crucial, but

unquantifiable, factors of the subscription choice. Better data and machine learning improvements like feature engineering and class balancing are necessary to improve predictions of loyalty. Competitiveness wise, the higher the subscription adoption, the stronger the business resilience through the establishment of recurring revenues and an increase in customer lifetime value. Businesses that have well-established loyalty programs perform better than those that are based on single-time purchases in the global market. Thus, predictive analytics as a basis of subscription growth can dramatically improve the marketing competitiveness of the U.S. through stable international demand, rapid brand penetration, and mitigated market volatility. This discussion highlights the fact that loyalty-based marketing mechanisms are critical in maintaining international presence and enhancing the overall competitiveness of the US companies.

E. *Customer Value Optimization and Behavioral Frequency Insights*

The purchase frequency categories analysis demonstrates that people are evenly spread in all types of frequency, weekly to annually. This means that there is varied engagement that would need a varied marketing strategy in order to achieve maximum customer value. High-value targets include frequent shoppers like weekly or bi-weekly shoppers because of the consistency of their purchases and thus will be the best customers to consider rewards of loyalty, subscription incentives and individualized discounting plans. Conversely, some consumers can be driven by the season-related concerns, price, or occasional purchasing patterns. Predictive analytics can be used to divide these groups based on predictive indicators that enhance purchasing frequency, including special offers or promotions. Being aware of behavioral cadence aids in predicting revenue and optimizing the services since they can predict the needs of each frequency category better. Furthermore, the determination of the categories that make the most significant contribution to high-frequency purchases can also show the product strengths and cross-selling possibilities. Within the framework of U.S. global competitiveness, firms that achieve mastery of behavioral analytics are able to segment global marketing programs to the needs of the region in terms of purchase frequency based on the culture, climate, and consumption habits. The high number of moderate-frequency shoppers implies high potential of progressing to the next level of high-value by engaging with them individually. Conclusively, this discussion demonstrates the essence of consumer frequency intelligence in informing the marketing decision that will lead to profitability, customer loyalty, and global competitiveness. The U.S. companies may increase their long term stability and improve their performance on the domestic and global markets by introducing predictive models transforming medium-value customers into high-value consumers.

F. *Strategic Implications and Performance of the machine learning model*

As shown by the results of the predictive modeling including the ROC curve and the confusion matrix, some valuable information about the efficacy of the SVM model in classifying subscriptions is provided. Although the model is accurate in terms of the identification of non-subscribers, it is ineffective in predicting the participation in subscriptions, and this is because of the class imbalance and low predictive variables. This is one of the performance drawbacks that point out a major issue with applying AI to marketing strategy: the quality and variety of input data have a strong impact on the prediction strength. In case of competitive global markets, failure to precisely identify high-value subscribed customers may lead to loss of marketing opportunities and decreased success in customer retention. Thus, to enhance predictive modeling, it is important to add more consumer characteristics like web browsing patterns, brand loyalty indicators, responsiveness to discounts, and customized recommendation experiences. Moreover, model improvement strategies will include the adjustment of the weights of the classes or the application of oversampling strategies, which will allow raising the sensitivity to minority subscription classes. Predictive analytics will continue to be beneficial to the U.S. businesses that aim to improve their competitiveness in the market, although it will have to be refined constantly. More sophisticated machine learning models like Random Forest, XGBoost, or Neural Networks can be more useful and provide better behavioral insight extraction. The strategic value of predictive model analysis is that the adoption of AI should be guided by sound data policies and continuous evaluation of the models. When properly implemented, predictive analytics will boost marketing performance, define lucrative clients, boost the pace of making decisions, and solidify a competitive stance in the international markets. This discussion confirms the place of AI as the key facilitator of the marketing change and the need to sustain improvement of the model to better leverage its power in helping U.S. global marketing competitiveness.

VII. FUTURE WORKS

This study should be subject to further study in the future, where more datasets, sophisticated machine learning algorithms, and more marketing indicators should be incorporated to enhance the predictive power and usability of AI in improving the global marketing competitiveness of the United States. Although the given research gave more emphasis on demographic and transactional variables to predict subscription and categorize consumers, additional research might involve psychographics, online behavior, and social media usage to incorporate more emotional and motivational factors of consumer decision making. The generalizability and real-life accuracy of predictive outcomes would be enhanced with the incorporation of the multi-channel

datasets between the physical shopping and online shopping contexts. Additionally, the implementation of more sophisticated AI techniques, like ensemble learning, deep neural networks, and natural language processing, has the potential to offer better prediction results and to derive information from unstructured inputs, including product reviews, search history, and customer feedback sentiment. Moreover, time-series forecasting methods would be included to predict the changes in the world market demand depending on economic factors, cultural changes, and seasonal changes. In order to facilitate improved practical implementation, future studies can consider real-time analytics infrastructure that can be used to support dynamic marketing decisions and individualized recommendations on a large scale. More to the point, looking beyond the analysis to draw a comparison between the consumer behavior of the U.S. and other key competitive markets like China, Europe, and emerging Asian economies will offer comparative information that informs the global market strategies. Data privacy, responsible use of AI, and consumer trust are additional ethical issues, that should be considered to make predictive marketing technologies long-term sustainable and accepted. Future research can work directly with businesses or marketing agencies within the U.S to prove the workability of AI-oriented models within real business operations and determine their economic significance on competition at the global level. Through the combination of more enriched information, more innovative AI frameworks, and enhanced market views, future studies can create a significant step forward in the strategic utilization of predictive analytics to help the United States to improve its standing in the highly dynamic international market.

VIII. CONCLUSION

This study showed that predictive analytics driven by Artificial Intelligence is critical in increasing the global marketing competitiveness of the U.S. in the market through extensive analysis of consumer behavior, based on the Consumer Behavior and Shopping Habits dataset. The results indicate that demographic trends, preferences in the category of products, subscription activity, season, and frequency of purchases can be useful data that can be used when formulating a strategic marketing process. Descriptive analytics were used to find the main patterns of the behavior and the SVM-based predictor demonstrated how AI can be used to categorize and predict subscription usage, which is closely linked to customer loyalty and business value in the long run. Even though the model had certain weaknesses in terms of class imbalance and the depth of features, it nevertheless demonstrated the strategic benefit of utilizing machine learning in marketing decision-making. The findings highlight the fact that the companies embracing predictive analytics are more likely to comprehend customer preferences, predict their buying behavior, and introduce focused strategies that will enhance the relevance of products, their personalization, and responsiveness to the market. With the ever changing and fast-paced global market where digital transformation is a key to success, the US companies have to change their well-known, reactive marketing strategies into proactive, data-driven strategies of employing the latest analytics and AI systems. Global competitiveness can only be enhanced through constant adjustment to the trend of consumer behavior, new technology and the ability to compare with the new players in the world. This research paper adds a robust analytical base, which makes the case that predictive analytics is very powerful in enhancing marketing strategies and in enabling the United States to stay at the top in the global competition. Although further improvement of models and the increase of volumes of data are required, the study makes it obvious that predictive analytics is not only an optimization tool, but also a strategic requirement to maintain dominance in the market in the global economy. Thus, the implementation of AI-based marketing intelligence will enable the U.S. companies to compete and innovate and develop more in line with future consumer demands and global market trends.

Funding: This research received no external funding.

Conflicts of Interest: The authors declare no conflict of interest.

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