Social Mood Insights

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Abstract— This study aims to identify and predict mental health trends by analyzing content from social media platforms such as Instagram, YouTube, TikTok, LinkedIn, and Facebook. It examines how mental health issues influence consumer behavior during periods of societal stress, academic or workplace pressures, relationship challenges, and loneliness. The insights gained will help businesses understand the impact of mental health on customer well-being and shopping habits, enabling them to adjust their products and marketing strategies accordingly. Additionally, the research will explore how factors such as age, gender, location, and the type of content shared on social media shape these trends. The study will also analyze the spending patterns by taking into consideration which age groups and genders and other factors have been most affected and how they are coping with mental health challenges, and also check if these issues are more evident during holidays or specific seasons. By observing all these factors and people's spending habits, companies can develop more specific and supportive approaches to meet the emotional and financial needs of their customers. This research provides a framework for a deeper understanding of the relationship between mental health and consumer behavior, encouraging more empathetic and effective business practices.

Index Terms—Mental health, social media analysis, consumer behavior, societal stress, academic pressures, workplace challenges, relationship challenges, loneliness, marketing strategies, emotional well-being, location-based analysis

I. INTRODUCTION

In recent years, the growing discourse around mental health has gained prominence on social media platforms such as Instagram, YouTube, TikTok, LinkedIn, and Facebook. These platforms have become spaces where individuals openly share their experiences with mental health challenges, creating an invaluable repository of emotional and behavioral data. This research analyzes this content to identify and predict mental health trends while exploring their impact on consumer behavior. By integrating sentiment analysis with business intelligence (BI) tools like Power BI and Tableau, the study provides businesses with actionable insights to foster empathy-driven strategies and better meet the needs of their customers. Mental health challenges, including conditions such as anxiety, depression, and emotional distress, are influenced by various factors like societal stress, academic pressures, workplace challenges, and personal struggles. Social media platforms reflect and amplify these experiences, offering a real-time lens into the public's emotional well-being. However, there is limited research that combines sentiment analysis of these discussions with demographic insights and actionable business applications. This study addresses this gap by exploring how factors such as age, gender, location, and content type shape mental health trends and how businesses can respond effectively.



Fig. 1. Factors Influencing Mental Health Trends

Demographic factors play a significant role in shaping mental health discussions online. "The growth of digital technology has affected numerous areas of adolescent lives. Nowadays, teenagers' use of social media is one of their most apparent characteristics."[1]. Conversely, older demographics may exhibit more reserved or solution-oriented discussions, often on professional networks like LinkedIn. Gender differences further highlight unique coping mechanisms and language choices in mental health discourse. Women are often found to discuss topics like anxiety and self-care more openly, while men may focus on workplace stress or financial challenges. "According to the Aflac WorkForces Report, 76% of employees said mental health coverage is just as important, if not more important, than physical health coverage." [2]. These demographic insights provide businesses with opportunities to customize their engagement strategies, ensuring they resonate with the emotional needs of their target audiences.

Another critical dimension explored in this research is the correlation between mental health trends and consumer spending patterns. Sentiment analysis of social media content reveals how stressors like holidays, exam periods, or economic downturns influence shopping habits and financial decisions. For example, during the holiday season, heightened discussions around loneliness or financial stress may lead to increased demand for products that offer comfort or affordability. Businesses can leverage these insights to design empathetic marketing campaigns, offering solutions that align with the emotional and financial needs of their customers.

The integration of BI tools such as Power BI and Tableau enhances the analysis of large-scale sentiment data. These tools enable real-time visualization of emotional trends, making it easier for organizations to identify shifts in sentiment and respond proactively. For instance, a spike in negative sentiment related to academic stress during exam periods could prompt educational institutions to promote mental health resources or businesses to market products that alleviate stress. This approach combines the analytical rigor of sentiment clustering with the actionable potential of BI, creating a robust framework for understanding and addressing mental health challenges in real-time.

Despite its promising applications, the study also acknowledges challenges in sentiment analysis, such as data accessibility, privacy concerns, and the evolving nature of language on social media. These barriers are addressed through the use of advanced clustering techniques and ethical data collection practices, ensuring that the analysis remains accurate and respectful of user privacy. By synthesizing sentiment analysis with demographic insights and BI tools, this research offers a multidimensional approach that bridges academic theory and practical application.

Ultimately, this study contributes to a deeper understanding of the relationship between mental health trends and consumer behavior. It emphasizes the importance of decision-making in business strategies, empathetic encouraging organizations to move beyond profit-driven models to incorporate emotional intelligence and social impact. By analyzing how demographic factors and sentiment trends influence consumer behavior, the research provides a roadmap for businesses to engage meaningfully with their audiences and address mental health challenges effectively. "For marketers to succeed in this data-driven landscape, they must gradually embrace data-driven decision-making. Multiple sources of data, including customer demographics, website traffic, purchase history, and social media interactions, can be harnessed to provide insights for informed decision-making" [3].

This research not only fills critical gaps in the literature but also lays the groundwork for future studies. Potential areas of exploration include refining sentiment analysis models to detect subtle emotional shifts, expanding demographic analyses to include cultural and socioeconomic factors, and exploring the long-term impact of empathy-driven business strategies on customer loyalty. By integrating mental health insights with business intelligence, this study advocates for a more compassionate approach to understanding and addressing the complexities of consumer behavior.

II. LITERATURE REVIEW

"Mental health conditions include mental disorders and psychosocial disabilities as well as other mental states associated with significant distress, impairment in functioning or risk of self-harm." [4]. It's essential to gain a deeper understanding of mental health, as it has a significant impact on individuals worldwide. The consequences of mental health conditions are severe. These issues can create problems in various areas of life, including relationships with family, friends, and the community, and they can also contribute to difficulties in academic and work settings. Mental health issues can lead to a lot of people being less productive at work or school which results in financial losses for businesses and society. Furthermore, individuals with mental health disorders face a higher risk of suicide. They also often experience challenges in maintaining their daily responsibilities, which can further impact their overall quality of life.

A. The Significance of Social Media in Mental Health Insights

"In recent years, there has been a significant increase in media coverage of mental health, reflecting the growing public awareness of the importance of mental health and calling for an increase in awareness of the prevalence and impact of psychological problems." [5].

Social media platforms have become an integral part of people's lives, they are used as spaces where individuals express their thoughts, feelings, and experiences, including their personal struggles, including difficult times they are going through.

By reviewing the content shared on these platforms such as posts, comments, videos, and hashtags we can figure out how people are feeling and what they like to indulge in, like what kind of products are they looking to spend on in order to make themselves feel better. These platforms basically offer realtime interactions that allow individuals to connect with those facing similar issues, whether it's anxiety, depression, or financial stress.

B. Understanding the Role of Mental Health in Shaping Consumer Choices

"Psychological needs are emotional reasons for purchase, and they're almost always more important than physical needs. So how does someone pick where to make their purchase? Opinions, desires, and preferences shape most purchasing. That's why things like convenience, pricing, reliability, reputation, service, and values often lead a customer to choose one company over the competition." [6].

People often make purchases based on their emotional needs rather than just their physical needs. This means that when deciding what and where to buy something, their feelings, opinions, and personal preferences play a big role. Understanding that customers often base their purchases on emotional needs is crucial for businesses.

III. EXPLANATION OF RESEARCH

This research focuses on understanding the intersection between mental health and consumer behavior, precisely how mental health issues influenced by various societal factors impact purchasing decisions and engagement on social media platforms. By analyzing the content shared across platforms like Instagram, YouTube, TikTok, LinkedIn, and Facebook, the study aims to uncover patterns that reveal how mental health challenges affect individuals' behavior regarding emotional well-being, economic decisions, and consumption habits.



Fig. 2. Purchasing Patterns Based on Mental Health and Consumer Behaviour Changes

The research objectives begin with identifying mental health trends. The study will analyze social media content to identify trends related to mental health with platforms like Instagram and TikTok being significant due to their growing use for sharing personal stories, struggles, and support. The study will categorize types of mental health challenges, such as anxiety, depression, and loneliness, and correlate these discussions with periods of societal stress, including global crises, pandemics, and academic pressures (e.g., exam seasons and schoolwork stress), workplace stress (e.g., job insecurities and burnout), and relationship struggles.

The research will analyze how these mental health trends influence consumer behavior. For example, it will explore whether individuals facing mental health challenges are more likely to make impulsive purchases, seek comfort products or change their spending habits in response to their emotional states.[7] Furthermore, the study will examine how specific products or services—such as wellness products, entertainment, and self-care goods—gain popularity during periods of mental health distress. To gain further insight, the study will segment data demographically by age, gender, and geographic location to understand how different groups are affected. For instance, younger generations like Gen Alpha may engage more in online mental health communities, while older generations may exhibit different coping mechanisms or shopping patterns in response to stress.

The study will also investigate the role of seasonality and holidays in mental health and consumer spending patterns. [8] Certain times of the year, such as holidays or specific seasons (e.g., winter depression or back-to-school stress) may significantly impact mental health and shopping behavior. During these times individuals may experience heightened emotional states, leading to either increased spending as a form of coping or decreased spending due to financial constraints or emotional fatigue. Spending patterns and coping mechanisms will be a key focus, as the study explores whether mental health struggles prompt individuals to invest in self-care products, therapy, or comfort purchases, or lead to reduced spending caused by financial strain and shifting priorities.

The ultimate goal of this research is to provide businesses with actionable insights. By understanding how mental health trends affect consumer behavior, companies can adjust their marketing strategies and product offerings to be more empathetic and aligned with their customers' emotional and psychological needs. Businesses may tailor campaigns to emphasize self-care, mindfulness or stress relief during peak mental health challenges. Companies could also consider offering discounts, flexible payment options, or mental health related initiatives as part of their corporate social responsibility efforts. In conclusion this study bridges the gap between mental health awareness and consumer behavior and offering a comprehensive framework for businesses to adopt more empathetic, responsive and effective marketing strategies. This approach will help foster stronger brand loyalty, enhance trust, and create a supportive environment for customers while improving businesses' overall success.

IV. KEY TERMS IN MENTAL HEALTH

Our project's keywords focus on several aspects of mental health. In order to properly understand mental health behavior, key terms like awareness, sensitivity, trauma, pressure, self-esteem, abuse, and guilt are essential. Additionally, mental health conditions such as depression, anxiety, stress, PTSD, bipolar disorder, OCD, and burnout will be essential in exploring how these affect individuals and businesses.





Categorization of Key Terms in Mental Health: The keywords associated with mental health can be grouped into three primary sections to provide a structured understanding of the topic:

Mental Health Conditions: Depression, anxiety, stress, PTSD (Post-Traumatic Stress Disorder), Bipolar disorder, OCD (obsessive-compulsive disorder), Burnout.

Mental Health-Related Terms: Mental wellness, emotional health, self-care, well-being, therapy, counselling, coping mechanisms, mindfulness, mental health stigma.

Social and Behavioral Indicators: Isolation, loneliness, fatigue, panic attacks, sleep problems, low mood.

Depression: Depression (also known as major depression, major depressive disorder, or clinical depression) is a common but serious mood disorder that causes severe symptoms affecting how a person feels, thinks, and handles daily activities like sleeping, eating, or working.

Low self-esteem: While not a mental illness, poor self-esteem can still affect a person's thoughts, emotions, and patterns of behavior.

Loneliness: A sadness resulting from feeling alone or feeling empty, unwanted, unimportant. Loneliness is the state of distress or discomfort that results when one perceives a gap between one's desires for social connection and actual experiences of it.

PTSD: Post-traumatic stress disorder (PTSD) is a common mental health condition that can develop after a traumatic event, involving symptoms like flashbacks, anxiety, negative thoughts and beliefs, and hypervigilance. The main treatment for PTSD is psychotherapy.

Bipolar Disorder: Bipolar disorder (formerly called manicdepressive illness or manic depression) is a mental illness that causes unusual shifts in a person's mood, energy, activity levels, and concentration.

Anxiety: People with an anxiety disorder, the anxiety does not go away and can get worse over time. The symptoms can interfere with daily activities such as job performance, schoolwork, and relationships.

Panic attacks: A sudden episode of intense fear or anxiety that can cause physical symptoms like shortness of breath, dizziness, muscle tension, sweating, nausea, chest pain.

Stigma: Although stigma isn't a direct mental health keyword, but it plays a critical role in shaping how people experience and address their mental health challenges. "Stigma in mental illness happens when someone has an unfair attitude or belief about a person with mental health challenges."[9] Many people believe that persons who suffer from mental illness are somehow "weak." This harmful belief can lead to self-stigma, where those struggling with mental health issues can hold onto these negative thoughts. They could feel embarrassed or ashamed, which discourages them from getting the support they need. I feel it could be valuable in our analysis of how social media can be a tool for breaking down stigma.

"Seasonal Affective Disorder: This is a depression disorder in which your mood drops during certain times of the year. Most commonly, your mood will drop during winter. That said, shorter days and less sunlight are common culprits. There's also the fact that winter weather inhibits outdoor activity. Because of this, you might not be able to lead your life to the fullest, resulting in feelings of depression." [10]

V. PROJECT REQUIREMENTS

The Social Mood Insights research project aims to analyze mental health trends on social media platforms and their correlation with consumer behavior. To achieve the project's objectives, specific resources, tools, and expertise are required.

A. Data Requirements

1. Social Media Platforms:

The project relies on data extracted from major platforms such as Instagram, Twitter, Facebook, and TikTok. These platforms were chosen for their widespread adoption and diverse user base, which provide a rich variety of emotional expressions in the form of posts, hashtags, and comments.

- 2. Dataset Features: The dataset includes:
 - a) Text-based content: Posts, comments, and hashtags.
 - b) Engagement metrics: Likes, shares, and comments.
 - c) Temporal data: Time and date stamps.
 - d) Geolocation data: Regional and geographical information.

These features are critical to identifying patterns of emotional states across demographics and geographic locations.





3. Diversity of Data:

Data collection was conducted with attention to demographic balance, ensuring representation of various age groups, genders, and geographic regions. This diversity minimizes bias and enhances the generalizability of the findings.

B. Tools and Technology

1. Sentiment Analysis:

The project used VADER, TextBlob, and BERT to analyze and classify emotional tones in textual data. These tools enabled categorization into positive, negative, and neutral sentiments, as well as specific emotional states like stress, anxiety, and excitement.

- 2. Data Preprocessing: Preprocessing was conducted using Pandas and NumPy, which handled tasks such as data cleaning, feature extraction, and removal of missing or irrelevant data.
- 3. Machine Learning Models:

Predictive analytics leveraged frameworks like Scikit- learn and TensorFlow to identify and model the relationship between social media trends and consumer behavior.

4. Data Visualization:

Visualization tasks were performed using Tableau to create dynamic dashboards for stakeholders, enabling easy interpretation of results.

C. Expertise

- Data Analysts: Responsible for data cleaning, feature extraction, and performing exploratory data analysis to identify key trends.
- 2. Machine Learning Specialists: Developed predictive models to connect social media sentiment trends with consumer behavior patterns.
- 3. Psychology Consultants: Validated the emotional classifications from the sentiment analysis tools to ensure their relevance to mental health indicators.
- Marketing Analysts: Translated the findings into actionable strategies for businesses, focusing on aligning marketing campaigns with emotional trends.

D. Infrastructure

- 1. High-Performance Computing: The project utilized AWS for data storage, real-time processing, and scalable computing power. AWS ensured that the project could handle the large volume of data generated from social media platforms.
- 2. Collaboration Tools: Jira facilitated Agile workflows, managed tasks, and maintained transparency across team members.

E. Stakeholder Involvement

1. Businesses:

Insights derived from the project were designed to help businesses refine their marketing strategies by aligning them with consumer emotional trends.

2. Policymakers:

Data-driven recommendations aimed to assist policymakers in implementing mental health interventions tailored to geographical and temporal trends.

VI. TECHNOLOGY SOLUTION AND METHODOLOGY

The Social Mood Insights project adopted an advanced technological framework and employed the Agile methodology to ensure iterative progress, stakeholder collaboration, and timely delivery of results.

- A. Technology Solution
- 1. Sentiment Analysis Framework:
- a) Sentiment analysis formed the foundation of the project's technology stack. Tools like VADER, TextBlob, and BERT were implemented to detect and classify emotional expressions in text-based social media data.
- b) Emotional tones such as stress, anxiety, happiness, and excitement were categorized into three main sentiment categories: positive, negative, and neutral.
- c) Specific hashtags and keywords (e.g., #selfcare, #anxiety) were analyzed to understand emotional trends and their link to consumer behavior.
- 2. Predictive Modeling:
- a) Machine learning models developed using Scikitlearn and TensorFlow analyzed and predicted correlations between emotional expressions and purchasing trends.
- b) Temporal and geographical sentiment variations were modeled to uncover region-specific patterns of mental health and consumer behavior.
- 3. Data Visualization:
- a) Tableau was used to create interactive dashboards that presented real-time findings to stakeholders.
- b) Dashboards allowed businesses to visualize sentiment trends, geographical differences, and temporal variations dynamically.
- 4. Cloud Computing:
- a) The use of AWS ensured scalable infrastructure for handling large-scale data.

- b) The platform facilitated real-time processing, which was essential for maintaining the project's efficiency and accuracy.
- B. Agile Methodology

The Agile methodology provided a structured yet flexible approach to project execution, fostering continuous improvement and close collaboration among team members. The key components of the Agile process were:



Fig. 5. Key Phases of Agile Development

- 1. Scrum Framework:
- a) The project was divided into four sprints, each lasting 2–4 weeks. Regular stand-up meetings ensured transparency and accountability within the team.
- b) Sprint retrospectives were conducted to review progress, address challenges, and incorporate feedback into subsequent iterations.
- 2. Phased Development:
- a) *Sprint 1:* Data collection and preprocessing: Tasks included gathering data from social media platforms and cleaning it using preprocessing libraries.
- b) *Sprint 2:* Sentiment analysis and emotional categorization: Sentiment analysis tools were applied to extract emotional trends from the cleaned data.
- c) *Sprint 3:* Predictive modeling and trend analysis: Machine learning models were developed and tested to identify patterns linking mental health expressions to consumer behavior.
- d) Sprint 4: Dashboard development and stakeholder presentation:

Final insights were presented through interactive dashboards designed in Tableau.

- 3. Feedback Loops:
- a) Stakeholders were engaged at the end of each sprint to ensure alignment with project objectives.

- b) Feedback from businesses and policymakers informed subsequent phases of the project.
- 4. Deliverables:
- a) The project delivered preprocessed datasets, sentiment analysis results, predictive models, and dynamic dashboards to stakeholders.
- C. Project Timeline

The timeline for the project was structured to ensure the efficient execution of tasks and milestones. Figure 1 illustrates the Gantt chart, which details the key tasks and their respective timelines.

Research Project - Social Mood Insights



Fig. 6. Project Timeline

VII. PRACTICAL APPLICATIONS

A. Sentiment Clustering:

In this study, we applied sentiment clustering techniques to analyze and group similar emotional patterns from social media data.

The clustering of sentiments enables businesses to identify and understand the emotional patterns within their audience, helping them tailor content and communication strategies to resonate with specific emotional states.

By grouping similar sentiments, companies can target customer segments more effectively, addressing the unique emotional needs or concerns of each group to enhance brand loyalty and engagement.



Fig. 7. Sentiment Clustering

B. Business Implication

By analyzing sentiment clusters, businesses can design highly targeted marketing campaigns that appeal to specific emotional states, such as excitement, contentment, or nostalgia, which can lead to more personalized and effective customer engagement.

VIII. FINDINGS

The graph illustrates the distribution of various emotional mentions across popular social media platforms: Facebook, Instagram, and Twitter.



Fig. 8. Distribution of Emotional Mentions on Social Media Platforms

From the data, we observe that excitement is the most frequently mentioned emotion across all platforms, as depicted by the predominant blue bars. This suggests that users across these platforms express a high level of enthusiasm or positive energy in their posts or comments. Instagram stands out as the most popular platform in terms of emotional mentions, with a higher count of mentions compared to both Facebook and Twitter. The graph shows that Instagram users often express emotions like excitement, followed by contentment (red) and admiration (green), which collectively dominate the emotional landscape on the platform. Facebook also shows a high number of emotional mentions, though slightly fewer than Instagram, with similar emotional patterns. Twitter, on the other hand, appears to have a more balanced distribution of emotions but with fewer overall mentions, particularly for emotions like thrill (orange) and surprise (purple), which appear less frequently than other emotions.

The emotional mentions of depression, sadness, and loneliness are also represented in the data but at significantly lower levels compared to emotions like excitement or contentment. These emotions, though less frequent, suggest that social media users may still express their mental health challenges, though the broader trends indicate a more positive emotional engagement across these platforms.

In conclusion, the graph highlights the widespread presence of positive emotions such as excitement, contentment, and admiration in social media discussions, particularly on Instagram, while also showing that less frequently mentioned emotions such as thrill and surprise are still part of the social media discourse. This data offers valuable insights for businesses aiming to tailor their marketing and communication strategies to the emotional states of their audiences, enabling more targeted and effective engagement.

IX. FUTURE WORK

As we continue to develop this project, there are several areas we plan to improve and expand. One key focus will be enhancing the accuracy of our data analysis by incorporating more sophisticated algorithms and machine learning models to better identify patterns in social media content. We also aim to include additional social media platforms and data sources to capture a broader and more diverse perspective on mental health trends and their impact on consumer behavior.

Another improvement we want to make is refining how we classify and analyze spending patterns, taking a more granular approach to understanding the role of age, gender, location, and other demographics. By doing this, we hope to provide businesses with even more targeted insights to adapt their products and marketing strategies. We also plan to explore how seasonal and event-based mental health challenges, such as those seen during holidays or crises, affect consumer behavior.

To make this project even more impactful, we are considering creating interactive dashboards and tools that allow businesses to monitor trends in real time. Additionally, we want to collaborate with mental health professionals and policymakers to ensure the insights we generate can be used not just for marketing purposes but also to improve public health initiatives and consumer well-being. These future developments aim to build on the foundation we've established, ensuring our project remains relevant, impactful, and capable of driving meaningful change for businesses and society.

X. REFERENCES

- A.M. Khalaf, A.A. Alubied, A.M. Khalaf, and A.A. Rifaey. "The Impact of Social Media on the Mental Health of Adolescents and Young Adults: A Systematic Review". National Institutes of Health (NIH). Section: Introduction and_background.(2023). <u>https://pmc.ncbi.nlm.nih.gov/articles/PMC10476631/</u>
- [2] K. Mayer. "Women Are Experiencing a Mental Health Crisis. What That Means for Employers". Society for Human Resource Management (SHRM). Section: "What Employers_Can_Do".(2024). <u>https://www.shrm.org/topics-tools/news/benefitscompensation/women-are-experiencing-a-mental-healthcrisis--what-that-means-f</u>
- [3] A.T. Rosário, and J.C. Dias. "How has data-driven marketing evolved: Challenges and opportunities with emerging technologies". Internation Journal of Information Management Data Insights. Science Direct. Section: "Defining data-driven marketing". (2023). <u>https://www.sciencedirect.com/science/article/pii/S26670</u> <u>96823000496</u>
- [4] World Health Organization -<u>https://www.who.int/health-topics/mental-health#tab=tab_2</u>
- [5] H.Zhang & A.Firdaus. (2024). MDPI. What Does Media Say about Mental Health: A Literature Review of Media Coverage on Mental Health, Introduction, page 1. <u>https://www.mdpi.com/26735172/5/3/61#:~:text=Positive</u> <u>%20media%20reports%20can%20help,hinder%20people</u> <u>%20from%20seeking%20help</u>
- [6] KadenceInternational-<u>https://kadence.com/en-</u> us/understanding-customer-needs-in-a-rapidly-changingworld-a-best-practice-guide/
- [7] Karim, F., Oyewande, A., Abdalla, L. F., Ehsanullah, R. C., & Khan, S. (2020). Social media Use and its Connection to Mental Health: A Systematic review. *Cureus*. <u>https://doi.org/10.7759/cureus.8627</u>
- [8] Study: Social media use linked to decline in mental health |MIT Sloan. (2022, September 14). MIT Sloan. <u>https://mitsloan.mit.edu/ideas-made-to-matter/study-social-media-use-linked-to-decline-mental-health</u>
- [9] Mental_Illness_Stigma.<u>healthdirect</u> <u>https://www.healthdirect.gov.au/mental-illness-stigma</u>
- [10] 100+ Words Related to Mental Health https://capitalizemytitle.com/100-words-related-tomental-health/