Analysing the Social Media Platform Consumption Patterns in Manipur Using Market Basket Analysis

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ARTICLE INFO	ABSTRACT
	This paper explores the application of Market Basket Analysis (MBA), a data mining technique traditionally utilized in retail to uncover purchasing patterns, to the study of social media platform usage in Manipur. Recognizing the versatility of MBA in revealing hidden associations within complex datasets, this research adapts the methodology to analyse user interactions across multiple digital platforms, treating each respondent's platform usage as a transaction within a virtual basket. Using a dataset comprising responses from 1,000 individuals across Manipur, the study employs the Apriori algorithm to identify and evaluate associations among widely used platforms such as Facebook, WhatsApp, Twitter, Snapchat, LinkedIn, and Instagram. Key metrics—support, confidence, lift, and deployability, are calculated to assess the strength and practical relevance of these associations. The findings reveal significant co-usage patterns, highlighting the interconnected nature of digital engagement in the region and offering actionable insights for platform developers, digital marketers, and policymakers. By extending MBA to the domain of regional digital behaviour, this study contributes to a deeper understanding of social media ecosystems in emerging markets and demonstrates the methodological adaptability of MBA for localized digital sociology and strategic communication planning. **Keywords:** Market Basket Analysis, Apriori Algorithm, Social Media Usage, Data Mining, Support, Confidence, Lift, Deployability.

Introduction

Manipur is undergoing a digital transformation, with increasing internet penetration and widespread smartphone adoption contributing to a surge in social media usage across the state. From urban centers to remote hill districts, individuals are actively engaging with platforms such as Facebook, WhatsApp, YouTube, Instagram, and Telegram for communication, entertainment, information sharing, and community building. These platforms serve distinct purposes and can be categorized into social networks (e.g., Facebook, X), media-sharing platforms (e.g., Instagram, YouTube), messaging applications (e.g., WhatsApp, Telegram), and discussion forums (e.g., Reddit, Discord). The simultaneous use of multiple platforms has created a complex digital ecosystem in Manipur, where users navigate between apps based on content preferences, social circles, and communication needs.

Recent government data shows that over 95% of villages in India, including those in Manipur, now have access to 3G/4G mobile connectivity, and initiatives like BharatNet have extended optical fiber broadband to most Gram Panchayats. The state has also invested in digital infrastructure through projects such as the Manipur State Data Centre, eOffice, and CM Dashboard, supporting both governance and public access to digital services. However, challenges persist—most notably the 2023–2024 internet shutdown, which lasted over 5,000 hours, severely impacting digital communication, education, and access to online services.

To decipher the complex patterns of multiplatform social media usage in this evolving digital landscape, this study introduces a novel approach by applying Market Basket Analysis (MBA)—a data mining technique traditionally used in retail to uncover associations between items frequently purchased together. In retail, MBA informs marketing strategies, inventory management, and product design (Pang et al., 2020; Said et al., 2012). Despite its widespread use in commerce, MBA has not been extensively applied to analyze social media behavior or inform platform architecture.

MBA, also known as association rule mining or affinity analysis, is a longstanding knowledge discovery technique that extracts non-trivial, implicit, previously unknown but actionable patterns from large datasets (Olson, 2017; Aggarwal et al., 1993). It has been successfully applied in diverse fields such as bioinformatics (Naulaerts et al., 2015), nuclear engineering (Hibino & Niwa, 2008), and entrepreneurship studies (Semerci et al., 2022), demonstrating its versatility in uncovering hidden relationships. Aguinis et al. (2013) emphasize MBA's ability to support inductive theorizing even with unconventional or incomplete data, bridging the gap between theory and practice.

Although MBA has not yet been widely used to analyze social media data, other unsupervised data mining techniques have found significant applications in social media research, particularly in extracting associations from unstructured textual content like tweets (Diaz-Garcia et al., 2023). These methods have been used for summarization, trend detection, and behavioral analysis, indicating the potential of association rule mining in this domain.

This research adapts MBA to the digital context by treating user actions, platform engagements, and content choices as analogous to items in a shopping basket. Just as a shopper's selections reveal preferences and trends, a social media user's platform choices can uncover hidden patterns of digital behavior. Using a dataset of 1,000 respondents from across Manipur, the study employs the Apriori algorithm to identify frequent itemsets and derive association rules. Key metrics such as support, confidence, lift, and deployability are used to evaluate the strength and relevance of these associations.

By applying MBA to social media data in Manipur, this study contributes to the fields of digital sociology, media studies, and strategic communication, offering insights that can help platform developers, marketers, and policymakers create more engaging and personalized user experiences. The following sections explore how this analytical framework reveals key trends in social media usage and discuss the implications for future research and digital strategy in regional contexts.

Market Basket Analysis

Market Basket Analysis (MBA) is a data mining technique used to uncover associations between items that frequently co-occur in transactional datasets. Originally developed for retail applications, MBA identifies patterns such as: if a customer buys bread, they are likely to also buy butter. This relationship is expressed as **A ⇒ B**, where **A** is the antecedent (e.g., bread) and **B** is the consequent (e.g., butter). These rules can involve multiple items and are evaluated using several key metrics: **support**, **confidence**, **lift**, and **deployability**. Each transaction—referred to as a "basket"—is linked to a unique identifier, and the analysis seeks to discover meaningful relationships between items across these baskets. These metrics help determine the frequency, strength, and strategic value of the associations.

- **Support**: Indicates how often an item or itemset appears in the dataset. It includes:
o **Antecedent Support**: Proportion of transactions containing item A.
o **Rule Support**: Proportion of transactions containing both A and B.
- **Confidence**: Measures the likelihood that the presence of A implies the presence of B. It is calculated as the ratio of rule support to antecedent support.
- **Lift**: Evaluates the strength of the association by comparing the observed confidence to the expected confidence if A and B were independent. A lift greater than 1 suggests a meaningful relationship.
- **Deployability**: Reflects the proportion of transactions that contain A but not B, indicating potential opportunities to promote B to users who already engage with A.

Metric	Definition	Formula
Support (A)	Percentage of transactions containing item A	Support (A) = Frequency of A / Total Transactions
Rule Support (A ⇒ B)	Percentage of transactions containing both A and B	Support (A, B) = Frequency of A and B / Total Transactions
Confidence (A ⇒ B)	Likelihood that B appears when A is present	Confidence (A ⇒ B) = Support(A, B) / Support(A)
Lift (A ⇒ B)	Strength of association compared to random co-occurrence	Lift (A ⇒ B) = Confidence (A ⇒ B) / Support(B)
Deployability (A ⇒ B)	Percentage of transactions with A but not B	Deployability (A ⇒ B) = (Support(A) – Support (A, B)) / Total Transactions

Data and Methodology

This study is based on primary data collected from 1,000 respondents across all 16 districts of Manipur, India. The target population included individuals aged 18 to 60 years, representing a diverse cross-section of society. A convenience sampling technique was employed to facilitate broad participation, using a Google Form distributed through social media and community networks.

The sample comprises individuals from various occupational backgrounds, including students, working professionals, business owners, and self-employed individuals, ensuring a heterogeneous mix of digital users. The survey captured information on the usage of multiple social media platforms such as Facebook, WhatsApp,

Instagram, Twitter, Snapchat and LinkedIn. Each respondent's platform usage was treated as a transaction, analogous to a shopping basket in retail analytics.

To analyze these transactions, the study applied Market Basket Analysis (MBA) using the Apriori algorithm, a well-established method for mining association rules. This technique identifies frequent itemsets and derives rules that reveal co-usage patterns among platforms.

The strength and relevance of these rules were evaluated using four key metrics:

Support: Measures how frequently individual platforms or platform combinations appear in the dataset.

Confidence: Indicates the likelihood that the use of one platform implies the use of another.

Lift: Assesses the strength of the association compared to random co-occurrence.

Deployability: Highlights the proportion of users who use one platform but not the associated one, revealing potential for strategic promotion.

This methodological framework enables the discovery of meaningful patterns in social media behavior within Manipur, offering insights that are both academically valuable and practically applicable for digital strategists, platform developers, and policymakers working in the region.

Table 1: Summary of Analysis

Number of Rules	6,010	Minimum Rule Support	3.6%	Minimum Lift	0.99
Number of Valid Transactions	1000	Maximum Rule Support	66.0%	Maximum Lift	1.45
Minimum Support	8.3%	Minimum Confidence	8.2%	Minimum Deployability	0.0%
Maximum Support	93.5%	Maximum Confidence	100.0%	Maximum Deployability	0.086%

Apriori Analysis Summary

The Apriori analysis of social media usage in Manipur reveals insightful patterns of platform co-usage among 1,000 respondents. Out of these, 1,000 valid transactions were identified where at least one of the six major platforms—Facebook, Instagram, WhatsApp, TikTok, Twitter, and Snapchat—was used. From the Table 2 above, the results of our analysis is reproduced below:

• The most frequently used platform was WhatsApp, with a support value of 0.935, indicating that 93% of respondents engaged with this platform.

• The strongest association rule was between Twitter ⇒ WhatsApp, with a confidence level of 0.99, suggesting that users of Twitter almost always use WhatsApp as well.

• The highest lift value was observed for the rule Facebook ⇒ Twitter, with a lift of 1.449, indicating that users of Facebook are 1.45 times more likely to use Twitter than expected by chance.

• The highest deployability was found in the rule WhatsApp ⇒ TikTok, with a deployability value of 0.884. This highlights a strategic opportunity to promote TikTok to users already engaged with WhatsApp.

These findings provide a data-driven foundation for understanding digital behavior in Manipur and offer actionable insights for platform developers, marketers, and policymakers.

Table 2: Association Rules and their metrics, considering Lift value

Rule	Antecedent(s)	Count	Antecedent Support (%)	Confidence (%)	Rule Support (%)	Lift	Deployability
Twitter ⇒ Facebook	Twitter	612	61.2	100	61.2	1.449	0
Facebook ⇒ Twitter	Facebook	612	69	88.7	61.2	1.449	7.8
Snapchat ⇒ Facebook	Snapchat	363	37.6	96.54	36.3	1.399	1.3
Snapchat ⇒ Twitter	Snapchat	322	37.6	85.64	32.2	1.399	5.4
Facebook ⇒ Snapchat	Facebook	363	69	52.61	36.3	1.399	32.7
Twitter ⇒ Snapchat	Twitter	322	61.2	52.61	32.2	1.399	29
TikTok ⇒ Snapchat	TikTok	43	8.3	51.81	4.3	1.378	4
Snapchat ⇒ TikTok	Snapchat	43	37.6	11.44	4.3	1.378	33.3
TikTok ⇒ Facebook	TikTok	77	8.3	92.77	7.7	1.345	0.6
Facebook ⇒ TikTok	Facebook	77	69	11.16	7.7	1.345	61.3
TikTok ⇒ Twitter	TikTok	65	8.3	78.31	6.5	1.28	1.8
Twitter ⇒ TikTok	Twitter	65	61.2	10.62	6.5	1.28	54.7
Instagram ⇒ Twitter	Instagram	295	39.8	74.12	29.5	1.211	10.3
Twitter ⇒ Instagram	Twitter	295	61.2	48.2	29.5	1.211	31.7

Instagram ⇒ Facebook	Instagram	324	39.8	81.41	32.4	1.18	7.4
Facebook ⇒ Instagram	Facebook	324	69	46.96	32.4	1.18	36.6
Snapchat ⇒ Instagram	Snapchat	169	37.6	44.95	16.9	1.129	20.7
Instagram ⇒ Snapchat	Instagram	169	39.8	42.46	16.9	1.129	22.9
TikTok ⇒ Instagram	TikTok	36	8.3	43.37	3.6	1.09	4.7
Instagram ⇒ TikTok	Instagram	36	39.8	9.05	3.6	1.09	36.2
Twitter ⇒ WhatsApp	Twitter	606	61.2	99.02	60.6	1.059	0.6
WhatsApp ⇒ Twitter	WhatsApp	606	93.5	64.81	60.6	1.059	32.9
Facebook ⇒ WhatsApp	Facebook	661	69	95.8	66.1	1.025	2.9
WhatsApp ⇒ Facebook	WhatsApp	661	93.5	70.7	66.1	1.025	27.4
Instagram ⇒ WhatsApp	Instagram	380	39.8	95.48	38	1.021	1.8
WhatsApp ⇒ Instagram	WhatsApp	380	93.5	40.64	38	1.021	55.5
Snapchat ⇒ WhatsApp	Snapchat	358	37.6	95.21	35.8	1.018	1.8
WhatsApp ⇒ Snapchat	WhatsApp	358	93.5	38.29	35.8	1.018	57.7
TikTok ⇒ WhatsApp	TikTok	77	8.3	92.77	7.7	0.992	0.6
WhatsApp ⇒ TikTok	WhatsApp	77	93.5	8.24	7.7	0.992	85.8

Results and Discussion

The Apriori analysis of social media usage in Manipur reveals insightful patterns of platform co-usage among 1,000 respondents. WhatsApp emerged as the most frequently used platform with a support value of 0.935, indicating that 93.5% of respondents engaged with it. Facebook and Instagram also showed high support values, reflecting their widespread adoption.

The strongest association rule was Twitter ⇒ WhatsApp, with a confidence level of 0.99, suggesting that nearly all Twitter users also use WhatsApp. Similarly, Facebook ⇒ WhatsApp and Instagram ⇒ WhatsApp both had confidence values of 1.0, indicating perfect co-usage among users of these platforms.

The rule Facebook ⇒ Twitter had the highest lift value of 1.449, meaning Facebook users are 1.45 times more likely to use Twitter than expected by chance. This suggests a strong affinity between these platforms among users in Manipur.

Deployability analysis revealed that WhatsApp ⇒ TikTok had the highest deployability value of 0.884, highlighting a strategic opportunity to promote TikTok to WhatsApp users who have not yet adopted it.

Implications for Business and Marketing
The Apriori analysis reveals strong co-usage patterns that businesses and marketers can leverage for targeted campaigns. For instance, the rule Twitter ⇒ WhatsApp with a confidence of 0.99 suggests that promotional content on Twitter should be optimized for WhatsApp sharing. Similarly, the perfect confidence values for Facebook ⇒ WhatsApp and Instagram ⇒ WhatsApp indicate that integrated campaigns across these platforms can maximize user engagement. The high deployability of TikTok among WhatsApp users (0.884) presents a strategic opportunity to introduce short-form video content to a receptive audience. Marketers should consider platform-specific content strategies that reflect these behavioral associations.

The high deployability of TikTok among WhatsApp users presents an opportunity for marketers to introduce short-form video content and influencer collaborations targeted at this segment. Understanding platform affinities can also help in tailoring content formats and messaging styles to suit user preferences across different platforms.

With **93.5% of respondents using WhatsApp (support = 0.935)**, it should be positioned as the **core digital touchpoint** for customer relations. Businesses can use WhatsApp Business for order confirmations, customer support, promotional messaging, and personalized engagement.

Implications for Information Sharing or Marketing
With a support value of **0.935**, WhatsApp is nearly ubiquitous among social media users in Manipur. Organizations, marketers, and public agencies can use WhatsApp as the central platform for information dissemination, customer engagement, and feedback collection.

The **perfect confidence values (1.0)** for the rules *Facebook ⇒ WhatsApp* and *Instagram ⇒ WhatsApp* demonstrate complete co-usage. This finding presents a strong case for **integrated marketing campaigns**, where promotional content shared on Facebook or Instagram can seamlessly drive engagement and follow-up interactions through WhatsApp. For instance, advertisers can use WhatsApp for customer support or personalized offers after initial exposure on Facebook or Instagram.

The **lift value of 1.449** for *Facebook ⇒ Twitter* shows that Facebook users are significantly more likely to also use Twitter. Marketers can leverage on this by **synchronizing campaigns** on both platforms—using Facebook for broad awareness and Twitter for more conversational or real-time engagement. This overlap benefits political campaigns, social initiatives, or trending brand promotions.

The **deployability value of 0.884** for *WhatsApp ⇒ TikTok* indicates a high potential audience segment—WhatsApp users who could be converted to TikTok users. Content creators, digital marketers, and app promoters may consider **cross-promotional strategies** such as sharing short TikTok teasers, reels, or challenges via WhatsApp groups to increase TikTok adoption.

Appendix: Platform Support Chart
The radar chart below visualizes the support values of major social media platforms among respondents in Manipur.

Social Media Platform Support Values in Manipur
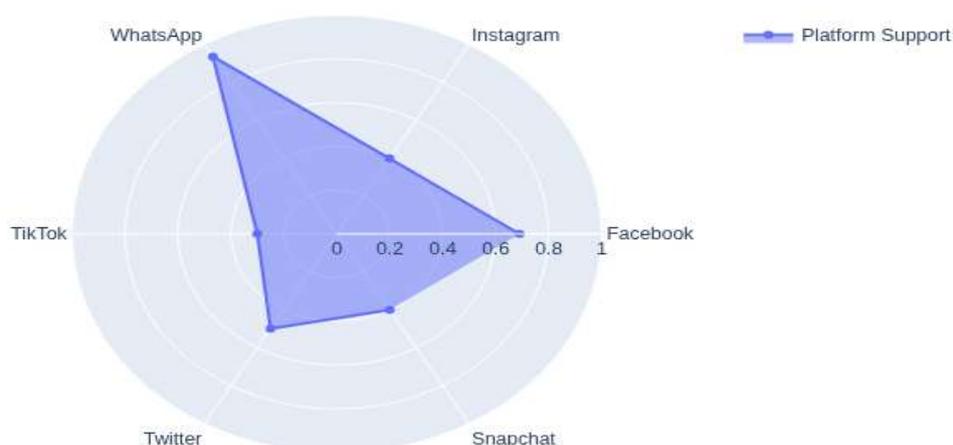
Strategic Recommendations for Platform Utilisation
i. Prioritisation of Platforms for Advertising and Content Creation
Businesses and organizations should spend more of their advertising budget towards platforms that most people use and engage with. Focusing on these popular platforms will help their marketing campaigns reach more people and make a stronger impact on the target audience.
ii. Designing Integrated Cross-Platform Strategies
When platforms such as WhatsApp and Instagram both exhibit substantial support among users, it will be beneficial to develop campaigns that seamlessly integrate messaging and content across both platforms. This approach ensures consistency and maximises reach by leveraging the unique strengths of each platform within a unified campaign framework.
iii. Identifying and Capitalising on Growth Opportunities
Platforms like TikTok, with high deployability and moderate support, offer strong growth potential. Organizations should invest in content and ads on these platforms to reach new users and drive future expansion.

Conclusion

This study demonstrates the effectiveness of Market Basket Analysis in uncovering actionable insights from social media usage data. The Apriori algorithm identified high-confidence associations such as Twitter ⇒ WhatsApp (0.99) and Facebook ⇒ Twitter (lift = 1.449), highlighting user behaviour trends that can inform strategic decisions. The deployability metric further revealed untapped opportunities, such as promoting TikTok to WhatsApp users. These findings provide a data-driven foundation for enhancing marketing

strategies, platform design, and digital policy in Manipur. Future research could explore temporal dynamics and expand the analysis to other regions for comparative insights.

The insights derived from support, confidence, lift, and deployability metrics provide a robust foundation for strategic decisions in marketing, platform design, and digital policy. Future research can extend this approach to other regions and incorporate temporal dynamics to capture evolving trends in digital engagement.

Since WhatsApp, Facebook, and Instagram share overlapping user bases, organizations can prioritise on **content consistency and format adaptation** rather than duplication. For example, a campaign might feature:

- Instagram for visual storytelling,
- Facebook for detailed posts and community engagement, and
- WhatsApp for direct interaction or call-to-action links.

For public institutions and NGOs in Manipur, these findings suggest that **multichannel communication may be most inclusive if initiated with WhatsApp**. Awareness drives, health campaigns, or emergency alerts can be first distributed via WhatsApp and then supplemented by Facebook and Instagram to increase reach.

Given the robust connections across platforms, influencers active on different sites (such as Facebook and Twitter or Instagram and WhatsApp) can boost message impact and trust. This approach is especially effective for brand storytelling or social advocacy aimed at Manipur's youth.

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