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Assignment 1 - Literature Review

The Role of Social Media in Shaping Big Data: Tools, Trends, and Business Implications

Student Name: Muhammad Yousouf Ali Budullah
TP Number: TP086704
Intake Code: APDMF2501DSBA(BI)(PR)
Programme: MSc Data Science & Business Analytics
Module Lecturer: Assoc. Prof. Dr. Raja Rajeswari

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1 Abstract and Keywords

Social media platforms act as major creators of big data through their rich and diverse user-generated content, which helps businesses innovate and strategize better. Businesses have begun using sophisticated techniques like precision marketing, user profiling, marketing optimization, and real-time customer engagement based on social media data. However, these opportunities also introduce several ethical challenges, such as concerns regarding privacy, data security, algorithmic bias, and the lack of robust ethical safeguards across diverse global contexts. Despite various theories offering conceptual solutions, there is still little practical and actionable guidance on how to integrate ethics into daily analytics workflows. In addition, new content such as videos, live streams, and multimedia content require further exploration to mitigate risks and maximize value. It is concluded that future research must work toward developing adaptable, scalable ethical frameworks and practical tools to ensure the sustainable and responsible use of social media big data by businesses worldwide.

Keywords: Social media analytics, big data, marketing strategies, precision marketing, consumer behavior, privacy risks, ethical challenges, digital governance

2 Methods

This systematic literature review ensured it featured the latest developments in the field by selecting academic papers published in the last five years. A narrow-to-broad search strategy was used, starting with specific keywords relevant to each theme (data generation and collection via social media, applications in business and marketing, social and ethics), before expanding to capture broader relevant studies.

The Sources for the project were found using various research databases and tools including; SciSpace, Elicit, Google Scholar and Asia Pacific University E-Library. Following a detailed review, fifteen of the most recent articles were selected based on the previously mentioned themes. Further studies aimed at the development of highly technical algorithms as well as those that examined domains outside of business and social media data analytics were excluded from the review. Developing an overarching theme allowed the review to maintain some semblance of focus while incorporating multiple academic literature.

3 Introduction

The rise of social media has changed how big data is being utilised. It provides various organizations access to a plethora of real-time data. Social media platforms like Facebook, Twitter, Instagram, and TikTok have developed into more than just communication platforms, but rather data-rich environments, where billions of interactions (posts, likes, shares, comments, multimedia uploads, etc.) take place every day. The digital footprints users leave behind create a large variety of data that is continuously generated. This overwhelming amount of data is being used by businesses, researchers, and policymakers to understand user's behavior, market trends, and dynamics in society.

Big data collected through social media can be beneficial for businesses as it assists in precision marketing, strengthens customer relationship management, improves brand engagement strategies and contributes in analysing competition. Businesses can take more informed decisions faster by gaining insights from millions of user interactions, which creates a more proactive response. Contrastingly, the increasing dependence on social media analytics gives rise to significant challenges and concerns around privacy of data, ethics, misinformation, as well as bias in algorithms. These challenges and concerns require careful consideration and responsible data management practices.

The present literature review examines the effect of social media on big data. More specifically, this literature review will discuss (1) Data Creation and Collection via Social Media, (2) Business and Marketing Applications and (3) Social Big Data and Social Big Data with Ethics. Through these themes, we assess a range of academic contributions to determine how

social media data is collected, how it is implemented for business to extract value, and what risks and responsibilities arise from it. The review intentionally limits its scope and focuses on the practical, strategic and ethical implications of social media and big data. Therefore, database structures, storage architectures, and algorithmic models are not part of the analysis. The review explores how businesses can obtain value from social media data, and how evolving ethics must be taken into consideration to ensure the sustainable and trustworthy use of big data technologies. Consequently, the focus of the review resides in understanding the opportunities and challenges of social media and big data.

4 Key Themes and Discussions

4.1 Theme 1: Data Generation and Collection via Social Media

Social media applications are platforms for communication and simultaneously dynamic networks that continuously generate a large variety of real-time user-driven data. This Big Data is generating valuable information that enables the creation of business strategies, improves marketing accuracy and achieves a competitive advantage in one's industry.

Rahman and Reza (2022) in a systematic review pointed out that social media data (SMD) are vast and mainly unstructured data that grow continuously through various user activities such as posting images, videos, and personal messaging. The Sunflower Model concept is put forth to effectively process and define social media big data, concentrating on their key attributes; Volume, Velocity, Variety, Veracity and 10 further expanded 'Bigs' . According to this model, big data must be dynamic and flexible to keep pace with technological developments.

Rahman and Reza (2022) highlights crucial aspects of using big data analytics in social media, especially text-based means. However, it underrepresents the growing importance of multimedia such as videos, podcasts, and live streams. Although the Sunflower Model offers a broader picture of bigger data characteristics, it is largely conceptual with not enough emphasis on real-world limitations such as latency for processing streaming data influence practical implementation. This presents a gap between the theoretical and practical feasibility, especially for industries which require instant decision-making capabilities.

Sauid et al. (2024) go beyond big data frameworks and employ the Social Network Theory and Diffusion of Innovations Theory to understand the dynamic functionality of social media data in user networks. Social media platforms do not just act like passive storehouses of information, but also the functions of these platforms play a greater role in the diffusion of innovations and influencing social behaviors. This theory shifts the focus from soley data collection to the interactional and transformative potential of these social media networks.

The reviewed studies together strengthen the relevance of Social Network Theory and Diffusion

of Innovations Theory, in the understanding of social media data generation and collection. The dynamic interactions across many social media platform networks at real-time demonstrate how social media networks change and help in spreading information and behaviour quickly. According to Salian (2024), the growing user engagement significantly increases the size and complexity of the data, making social media environments dynamic. In the same vein, Rahman and Reza (2022) highlight that social media data is evolving, which is an observation consistent with the network-driven perspective or approach of Social Network Theory, notwithstanding the practical limitations of their Sunflower Model.

Gomathy et al. (2022) state that user interactions, such as likes and shares, form patterns that businesses can harness to gain insights. Businesses can plan strategies to execute their plans based on these insights. Similarly, Sauid et al. (2024) relate these patterns to the wider diffusion of innovations of digital networks. In addition, Osaulenko and Horobets (2021) emphasize how artificial intelligence and databases are necessary to cope with the amount and speed of social media content, to run real-time analyses of influence and innovation diffusion.

Despite the wide range of literature written on social media data, there remains more that needs to be discussed. First and foremost, fusing text analytics from various sources with the emerging multimedia types, like video, voice, and live, is an area that still needs investigation especially since they increasingly dominate user activity. Furthermore, the ethics of user privacy, particularly in relation to real-time video analysis have been largely sidelined. Subsequent studies should therefore not only develop ways to incorporate multimedia data in the analysis system but also develop ethical models that would safeguard users' data and not compromise on their analysis. Filling in these gaps would provide more insights and a better understanding of social media data as a strategic asset.

4.2 Theme 2: Applications Business and Marketing

Social media analytics (SMA) can be a powerful tool for businesses as it provides actionable insights from big data produced through social media activities. Through advanced tools like sentiment analysis, trend identification, and user behavior, modeling organizations can improve marketing strategies, personalize consumer engagement, and gain competitive advantages. The usage of SMA has become imperative for companies to achieve relevance, agility and sustainable growth as we are experiencing a rapid data-driven era.

According to Zhang et al. (2022), Big Data-assisted Social Media Analytics (BD-SMAB) is the first framework developed to enhance big data analytics usage through social media analytics to help businesses make better decisions. Firms are leveraging large amounts of data from social media like Facebook, Twitter, Instagram to predict users' preference, adjust marketing strategies and react to competitors. Their findings show that insights, which are based on real-time data, enhance strategic agility and market performance. They also demonstrate the

model's usage in other industries like real estate and beauty trade fairs, which exemplifies how the model may help in other industries.

Zhang et al. (2022) framework provides useful strategies and insight into the big data driven SMA, but it does not paint an accurate picture of business operations. The analysis assumes that organizations are technically capable with existing infrastructure, which may not be true of Small Medium Enterprises (SME) or businesses in resource-poor environments. As highlighted in their discussion, the management of the real-time social media data's complexity, volume and velocity remains a key challenge. In addition, Zhang et al. (2022) mainly focuses on benefits by applying big data, while giving less equal attention to risks such as data biases, technological limitation, ethical issues and more.

Mao and Dong (2024) propose the Precision Marketing which advocates for highly personalized marketing approaches based on complete user behavior analysis. According to their theory, businesses can increase their marketing accuracy, improve their customer loyalty, and enhance their market prediction by understanding the individual user's preferences and behaviours drawn from the social media big data.

Recent research has validated Precision Marketing by demonstrating that social media big data enables very personalized marketing to individuals. Precision Marketing being a marketing approach that leverages data application and technology to reach consumers. As indicated by Qin (2023), the construction of detailed user portraits through behavior, interest and consumption analysis can enable better audience targeting and optimization of marketing strategies. Similarly Ashraf (2024) states that by studying engagement rates, return on investment (ROI) and conversions in real time, companies can improve their strategies. The ability to dynamically adjust means that marketing remains closely aligned to consumer behaviour, thus operationalizing the theory. According to Dinç (2023), irresponsible data governance will breach ethical issues on the risk of personalization on the level of Facebook–Cambridge Analytica. As a result, even though social media analytics enhances the precision of marketing efforts, businesses must integrate ethical safeguards. This is necessary to maintain consumer trust and ensure sustainable success.

Current research gives valuable insights, but a gap remains on embedding ethics in live social media analytics systems. Dinç (2023) and other established studies caution about the jeopardies of data misuse and breaches. Nevertheless, the practical guidance on how businesses can operationalise ethics into their analytics pipelines is rare. Existing models focus mostly on technical performance and strategic outcome, but not enough consumer privacy and data transparency. As SMA technologies become more advanced and intrusive, this failure poses considerable reputational and legal risks. Bridging this gap will allow marketers to build trusted marketing practices that can survive in a growing world governed market.

4.3 Theme 3: Ethical Concerns Surrounding Social Media Big Data

The growth of SMA poses transformative capabilities yet it also invites multiple ethical concerns. At the core of these problems are privacy, informed consent, data security, and the irresponsible use of user-generated content. As big data technologies grow in scale and sophistication, likewise the social fears that methods of extracting and analyzing personal information are being misused.In view of this ethical governance is now being regarded as a mandatory requirement and foundation for legitimate and sustainable social media analytics in the academic and commercial spheres.

The intricacies surrounding the utilisation of social media analytics in migration research are profuse. According to Mahoney et al. (2022), it raises serious ethical issues like profiling of individuals, sharing of data and gathering consent from vulnerable groups. Mahoney et al. (2022) highlight that while data from social media is a valuable opportunity to conduct research and formulate policies, it can put at risk those that are marginalised, such as migrants when not done ethically. Mahoney et al. (2022) in particular comment on the EU-funded PERCEPTIONS project and state that even large research projects have difficulties trying to align practical data ambitions with ethical requirements imposed by institutions and governments. Their findings suggest that ethical issues are not peripheral but rather they are central to design, conduct and outcomes that may be performed with SMA.

The contribution of Mahoney et al. (2022) lays out important ethical considerations but it has limited application as it only focuses on migration contexts and EU funded projects. The findings of the migration sector which certainly highlighted ethical risks, may not easily extend to other SMA applications like commercial marketing, political campaigning or health informatics. In addition to the identification of ethical tensions with mitigation strategies, the study provides limited guidance to practitioners aside from structured frameworks of formalised academic research. Consequently there is still a significant disconnect between flagging ethical risks and offering flexible, scalable methodologies that organizations and analysts can use in everyday analytics settings across sectors and globally.

Building on these insights, Fadda et al. (2022) offered the notion of Ethical Digital Epidemiology, where they emphasised ethical issues like privacy, informed consent, data security as well as geo-temporal sensitivity in social media related research. Notable the use of geo-referenced data from social media platforms, which is commonly analyzed without the full knowledge of users, presents significant risks of privacy violations, stigma, and harm. This mandates much deeper and thoughtful ethical frameworks than those usually prevalent in existing data governance models.

Various studies accentuate the need for increased ethical awareness in social media data analytics in particular Chew and Gunasekeran (2021) show that social media platforms allow for data mining in times of extremity to help public health emergency responses. Nevertheless it

could also act as a source for misinformation and that could pose serious ethical concerns such as accuracy, information reliability, and engendering public distrust. Omoyiola (2022) further argues the systemic risks brought about by big data technologies, such as invasions of privacy, biased automated decision-making, and the widening of digital divides. In conjunction with these concerns, Mahgoub (2020) investigates how social networks utilizing algorithms that leverage artificial intelligence enable manipulation at the psychological and behavioral levels with serious consequences on user autonomy, mental health, and informed consent. Together these findings provide a crucial consensus that while social media analytics is highly transformative, it requires the building of robust ethical frameworks. Specifically ones that can help with the protection of individual rights, trust building, and societal harms due to excessive data exploitation.

Although there has been much discussion on the ethical implications of social media analytics there remains a critical gap around embodying ethics into practice systematically. Most existing frameworks do a decent job of capturing potential risks. However they remain largely an abstract exercise, they do not lend themselves to actionable and concrete protocols that can be easily adopted by businesses, marketers, NGOs, and researchers outside of large institutional projects. Therefore it is essential to develop standardized and empirical ethical guidelines that can be adapted to different organizations, sizes and countries therefore the gap between theory and practice can be closed. These frameworks should not only provide a retrospective ethical audit but embed ethics dynamically within the analytics lifecycle for data collection and storage to analysis, dissemination, and algorithmic decision-making.

5 Conclusion

5.1 Summary of key findings

This literature review examined the role of social media in big data that help businesses in improving strategies, marketing efficiency and ever-growing ethical issues. The review was focused on data generation and collection through social media, business and marketing applications, and ethical implications of social big data. The synthesis of recent contributions, illustrated both opportunities and challenges present in social media and big data analytics.

Social media platforms are now one of the major contributors to big data, generating large amounts of data in real-time through users. Research suggests that social media data is dynamic in nature such as volume, velocity, variety and veracity. It offers businesses opportunities to strategise, innovate and improve customer engagements through various frameworks such as the Sunflower Model (Rahman and Reza, 2022) and how the integration of theories such as Social Network Theory and Diffusion of Innovations Theory (Sauid et al, 2024) aid in understanding how users' interactions can boost information's spread and behaviour change.

SMA refers to the comprehension and application of users' social media information, especially through the data available on social media platforms in various business and marketing applications. SMA plays an important role in precision marketing, user profiling and real time customer engagement. Models such as the BD-SMAB framework (Zhang et al. 2022) show how firms can efficiently use social media data to boost decision-making in different industries. Allowing them to obtain a competitive advantage hence organizations now have to adapt to best practices such as precision marketing, detailed user portraits as well as campaign optimization techniques (Qin, 2024). Nevertheless, despite the benefits, research warns that there are certain barriers such as limitation of infrastructure for the SMEs, complication in real-time analysis and bias in data itself.

The reviewed literature highlighted that ethical issues were a constant theme. According to Mahoney et al. (2022) and Fadda et al. (2022), issues related to informed consent, data privacy, user profiling, and the risks of algorithms are the main concern. Dinç (2023) has given the case of Facebook-Cambridge Analytica demonstrating that personal data could be used for a different purpose rather than its intended use. It's clear that the current regulations are not enough to prevent misuse of data and protect users' privacy. There have been numerous ethical frameworks and policy recommendations put forth however there are limited practical implementations mentioned for commercial fields and a lack of ethical safeguards in the analytics pipeline. The findings show that while social media big data has the potential for business value creation, it also poses risks and ethical challenges requiring urgent, systematic consideration. Businesses need to not just invest in technology to handle big data generated by social media but also develop good governance mechanisms focused on transparency, data protection and user rights.

5.2 Future Research Directions

Future research should work towards covering the gaps identified by the reviewed literature. Even though there is a large discussion on ethical issues of social media big data, most of the work remains conceptual. Moreover, they don't offer much in terms of applying ethics for real-time analytics. Future work is needed in these areas to develop frameworks and tools that make ethics an actionable part of the analytics lifecycle. These tools can ensure privacy, transparency, and fairness are maintained as data is collected and analysed. The main challenge will be to maximise user trust and social responsibility through the development of adaptable and scalable ethical models for business, marketing and policy-driven analytics systems.

Integration of new types of data represents another significant opportunity for future exploration. Most research has focused on posts, comments, and messages. The analysis of more complex formats, such as video, live stream, and audio, is still lacking. As users use richer and more complex platforms and their behaviors change, advanced analytic techniques are es-

sential for processing, interpreting, and ethically managing social media data. A key area of future research should be the examination of how companies and businesses can utilize these new formats ethically.

In addition, there should be much more attention to cross-cultural social media analytics. The existing models are developed within Western frameworks. Privacy expectations, legal requirements, user behaviour and platform norms vary greatly across countries and cultural contexts. Future research should be directed on cross-national comparative studies and context-specific adaptations of proposed analytic models, ethical frameworks and marketing strategies to make them globally inclusive, equitable and sustainable.

Lastly, as social media data is continuously generated, it becomes more difficult to balance speed, analytical accuracy and ethical responsibilities necessitating an improvement in real-time analytics capabilities. Future work should be aimed at developing hybrid systems that integrate artificial intelligence, edge computing, and dynamic ethical oversight mechanisms, allowing firms and organizations to respond in real time and ethically to social media trends. It will be important to address these areas of research to create a future of social media big data analytics that is sustainable, dependable and innovative.

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Appendix: Literature Review Matrix

Author(s), Year, Title	Research Question(s) / Hypotheses	Methodology	Analysis and Results	Conclusions	Implications for Future Research/Practice
Gomathy et al. (2022), Applications of Big Data in Social Media, IJSREM	How big data can enhance analysis of social media participation and business decision-making.	Conceptual literature review of applications in banking, healthcare, and entertainment sectors.	Found big data enables real-time social media trend prediction, sentiment tracking, and better engagement.	Emphasized the critical role of big data in optimizing customer understanding and marketing strategies.	Suggested need for deeper exploration of ethical management and fast-response analytics tools.
Salian (2024), Big Data in Social Media: Introduction, Methodology, Applications, IJARSCT	How big data shapes user behavior, privacy, and data management on social media platforms.	Analytical discussion and case examples focusing on personal data sharing and data storage issues.	Identified misuse of personal data, lack of user awareness, and opportunities for business revenue generation.	Highlighted the dual role of big data: business growth enabler and a major privacy threat.	Recommends designing ethical frameworks around user consent and transparent big data practices.
Osaulenko et al. (2021), Social Media Data in the Big Data Environment, NASOA Bulletin	How social media data (SMD) differs from traditional data and methods needed for analysis.	Review of Internet statistics and big data methodologies applied to SMD analysis.	Two perspectives identified: SMD as Internet statistics and SMD as big data analyzed via AI and machine learning.	Urged for development of specialized infrastructures for SMD handling and more interdisciplinary collaboration.	Future work should integrate statistical methods with AI-driven analysis to maximize SMD potential.
Rahman et al. (2022), A Systematic Review Towards Big Data Analytics in Social Media, Big Data Mining and Analytics	What are the most common big data analytics methods applied to social media, and how effective are they?	Systematic mapping study categorizing analytics based on data types and purposes.	Created the ”Sunflower Model” combining 5Vs and 10 Bigs; highlighted text analytics as dominant.	Defined a taxonomy of social media analytics, helping researchers select techniques for different needs.	Calls for broader use of image, audio, and video analytics to complement text-based approaches.

Mahoney et al. (2022), Ethical Considerations in Social Media Analytics in the Context of Migration:lessons learned from a Horizon 2020 project, Research Ethics	What are the ethical risks of using social media analytics in migration studies?	Case study reflection from the EU-funded PERCEPTIONS project.	Identified ethical tensions in profiling, consent, bias, and data sharing when analyzing migrant social media data.	Argued that consent, data minimization, and context sensitivity are crucial for ethical analytics.	Future studies must incorporate proactive ethical auditing and cross-country policy harmonization.
Chew et al. (2021), Social Media Big Data: The Good, The Bad, and the Ugly (Un)truths, Frontiers in Big Data	How does social media big data impact public health, especially during COVID-19?	Opinion article synthesizing public health research and WHO advisories.	Highlighted risks of ”infodemics” and potential of infodemiology to track misinformation patterns.	Social media big data can both disrupt and strengthen public health responses depending on usage.	Recommend stronger collaboration between governments, social media companies, and researchers for monitoring misinformation.
Mahgoub (2020), The Dilemma of Social Media, Arab Journal for Media and Communication Research	What are the ethical and psychological consequences of AI-driven data mining in social media?	Conceptual analysis with references to ”The Social Dilemma” documentary.	AI-driven social media platforms amplify privacy violations and contribute to mental health risks like anxiety and depression.	Warns that business models relying on user data manipulation are unsustainable ethically and socially.	Advocates for stronger AI governance policies and improved public digital literacy education.
Omoyiola (2022), The Social Implications, Risks, Challenges and Opportunities of Big Data, Emerald Open Research	What societal impacts does big data create, and what risks accompany its expansion?	Broad literature review of big data applications across sectors.	Big data enhances efficiency and decision-making but raises concerns like privacy invasion and digital divides.	Strong emphasis on balancing innovation with regulation to avoid exacerbating social inequalities.	Suggests building transparent regulatory frameworks and enhancing cybersecurity resilience.

Fadda et al. (2022), Ethical Issues of Collecting, Storing, and Analyzing Geo-referenced Tweets for Mental Health Research, Digital Health	How can ethical standards be improved for spatial social media research in mental health?	Review of ethical recommendations and critique of current guidelines.	Geo-referenced data raises higher risks of de-anonymization and potential harm to vulnerable users.	Stresses the importance of consent validation, data minimization, and public registries for social media research.	Calls for continuous updates to ethical standards reflecting evolving big data and AI capabilities.
Qin (2024), Analysis and Application of Big Data in Social Media Marketing, IJGEM	How can big data analytics improve social media marketing strategies?	Analytical review of current marketing practices integrating big data.	Big data helps create precise user portraits, predict behavior, and optimize marketing performance.	Demonstrates that businesses using big data outperform competitors in targeting and engagement.	Future studies should focus on real-time marketing automation and AI-driven personalization models.
Mao et al. (2024), Research on Marketing Strategy based on Social Media Big Data, Science and Technology and Social Development Proceedings	How can social media big data enhance precision marketing and crisis management?	Analytical discussion on data types, volume, structure, and user behavior trends.	Emphasized the role of big data in precision marketing, early crisis detection, and competitive strategy adjustment.	Big data is transformative for proactive decision-making but requires tackling data quality and privacy issues.	Recommended further research into harmonizing real-time big data analytics with privacy protection laws.
Ashraf (2024), Social Media Analytics and Business Performance, IJSREM	What role does social media analytics play in enhancing business KPIs?	Empirical analysis supported by case studies.	Found social media analytics drives customer insight generation, campaign optimization, and revenue growth.	Proved that data-driven social strategies outperform traditional intuition-based ones.	Encourages companies to develop robust analytics infrastructure and integrate insights into all business functions.

Dinç (2023), Big Data from Social Media Perspective: A Case Study with Facebook, Fenerbahçe University Journal of Social Sciences	How do social media platforms exploit big data, and what ethical risks arise?	Case study on Facebook and Cambridge Analytica scandal.	Highlighted manipulation of user data for profiling and political influence; serious privacy breaches exposed.	Big data on social media holds both immense power and deep ethical hazards when misused.	Stronger international data protection laws and corporate transparency standards are urgently needed.
Zhang et al. (2022), Big Data-Assisted Social Media Analytics for Business Decision-Making, Information Processing and Management	How can big data-driven social media analytics enhance business decision-making systems?	Proposal of the BD-SMAB model with case study validations.	Big data analytics enables real-time competitor analysis, smarter pricing, and enhanced customer engagement.	Demonstrated that businesses leveraging social media big data improve decision quality and responsiveness.	Future work should integrate AI-enhanced sentiment analysis into decision support systems.
Sauid et al. (2024) Integration of Big Data Analytics with Social Media: Theoretical Foundations, Applications and Implications Information Management and Business Review	How does the integration of big data analytics with social media enhance business intelligence, decision-making, and innovation?	Conceptual paper with theoretical discussion and framework analysis.	Identified that real-time social media data, when combined with big data analytics, significantly strengthens insights into human behavior, market trends, and social dynamics. Discussed key applications, ethical challenges, and technological barriers.	Concluded that synergy between big data and social media transforms how businesses and governments make data-driven decisions, but emphasized careful navigation of ethical risks and infrastructure demands.	Recommended more empirical studies to validate the proposed conceptual framework, deeper exploration into privacy-preserving technologies, and investigation of cross-platform integration for business advantage.