



Metaverse Technology Research in Tourism and Hospitality Marketing in Indonesian Context: A Systematic Review

Indonesian Journal of Tourism and Leisure, 2024
Vol. 05 (1), 1-26

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DOI: 10.36256/ijtl.v5i1.312

<https://journal.lasigo.org/index.php/IJTL>

Lasigo Journal

Article History

Received : February 14th, 2023

Revised : April 23th, 2024

Accepted : April 27th, 2024

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ABSTRACT

This article urgently examines the pressing need for research on metaverse technology (MT) within the tourism and hospitality marketing (THMK) context in Indonesia. Despite its potential, the current state-of-art-of MT research in THMK remains underexplored and limited particularly within tourism and hospitality marketing landscape. Through a systematic literature review (SLR) using the PRISMA Protocol and focusing on ProQuest database articles from 2012-2022, this study vigorously assessed 313 articles narrowing down to 34 relevant ones. These articles were meticulously analyzed to unveil the current state of MT within THMK context for the past decade. The study findings revealed that the current state of art of MT Research in THMK is substantially increasing although there were relatively limited studies in hospitality setting with very narrow and limited range of theoretical and methodical perspectives. Six dimensions of MT in THMK were identified, namely big data analytics, 3-D virtual representation, and augmented reality (AR), virtual reality (VR), smart, Internet of Things and blockchain technology. Using SLR provides an empirical foundation for understanding the current landscape of MT research in THMK within Indonesia, highlighting the need for further exploration and development. By addressing this urgent research gap, scholars and practitioners can unlock the full potential of MT in transforming THMK practices in Indonesia.

Keywords: Metaverse Tourism; Metaverse Hospitality; Virtual Reality; Augmented Reality

1. Introduction

Metaverse technology (MT) is an emerging area of research attracting more attention of the researchers across the global. The acknowledgment that the understanding and practical application of MT remain at a critical juncture, as highlighted by Gursoy et al. (2022), further emphasizes the urgency of conducting research in this area. While MT has garnered significant attention in other fields, its exploration within THMK remains limited (Buhalis et al. 2022; Gursoy et al. 2022; Koo et al. 2022; Sharif et al. 2019). Moreover, while the global market for MT in the Asian Pacific Region may be fragmented, its growth potential is significant driven by

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factors such as high number of new companies interested in metaverse investment, cryptocurrency, online purchases, users of internets and increasing number of smartphone users (Asia, 2022; Maida, 2022; Spherical insights.2022). Indonesian being a leading mobile technology ranked 4th country with greatest number of smartphone users in the world, the country stands to benefit greatly from the growing metaverse market.

Recognizing its strategic position, the Indonesian government has committed to investing approximately US\$ 6 billion in IT infrastructure by 2024 with specific focus on the tourism sector to drive digital economy growth through MT (Kainde et al.2022a; Asia, 2022; Nuraryani, 2022). This strategic vision of transforming “*Wonderful Indonesia*” into “*Wondeverse Indonesian*” through MT necessitates strong investment in MT research nationwide to equip academia and industrial practitioners with the requisite knowledge and technical expertise for effective MT application in the tourism sector (Asia, 2022; Nuraryani, 2022). This is because the successful realization of Indonesian’s commitment and understanding of its readiness to adopt and utilize MT hinges upon the extent to which MT Research and Innovations within THMK are effectively harnessed and integrated to facilitate the seamless diffusion of this immersive technology without later and hindrance. Therefore, this study aims to assess Indonesia's preparedness in harnessing MT effectively and evaluate the progress of MT research within the THMK context. A systematic literature review (SLR) is deemed essential to scrutinize the current landscape of MT research within the THMK context in Indonesia, offering insights into the country's readiness and research trajectory toward achieving strategic objectives in the digital economy and tourism realms.

2. Literature Review

2.1. Existing Body of Knowledge

The Notwithstanding of numerous writings in literature about metaverse technology around the world, there is no specific or universal meaning about metaverse (Christensen et al. 2022). What is known to users of metaverse is different from what is known by academia and industrial practitioners and its application in THMK is even more limited. Some scholars have tried to define what metaverse really mean by explaining the concept as a next level internet generation appears to dominate the world social interactions and business communication (Marr, 2022b; Aiello, 2022). This paper defines metaverse as a promising *digital platform* which requires collective support of *electronic devices* extremely *smart* to support *internet connection*, secure, interpret and transact the collected raw data and helps the user of the platform to interact and virtualize the raw data in *three-dimensional virtualization* that will create a *real-time immersive experience* and persistent interaction of the users and objects in virtual and real-world environment irrespective of setting. This definition highlights three key characteristics of metaverse including but not limited to *real-time three-dimension immersive user experience*, a persistence network access, and interoperability feature. Zhu, (2022) explained that real time immersive user experience means the use of the metaverse will experience an enhanced interaction in form of three-dimension world where users will be present within the internet not just looking at it.

Persistent network access of the metaverse means this platform is expected to offer unlimited user interaction remain active even when there are no users’ interactions. This will require strong and high-ranking speed of web access to support user devices convenient for metaverse accessibility. It is expected to be an interoperability platform with the ability to offer the real time immersive three-dimension experience and persistent network access across an interconnected virtual space (Zhu, 2022) Around the worldwide the metaverse market is fragmented into five major areas including Northern America, Europe, Latin America, Middle East & North Africa, and Asia-Pacific. The Northern America market is expected to accrue largest share of the metaverse market in the forecasted period due to availability of many customers users of MT using virtual reality (VR), Mixed Reality (MR), augmented reality (AR) and other associate

technologies linked to the metaverse (Emergen research, 2022; Maida, 2022; Precedence research, 2022). In Europe, the metaverse market is also expected to grow bigger due to the ability and experience of its users to use more sophisticated technologies associated with metaverse. In Latin America, metaverse is not expected to expand quickly due to lack of some key infrastructure that can enable the region to transform the large digital content into real time.

In the Middle East and North Africa region, metaverse is expected to unlock economic potentials and create more job opportunities for both entrepreneurs, communities, and businesses across industries. Lastly, in Asia Pacific region, metaverse is anticipated to take its place due to high numbers of new companies interested in metaverse investment, users of smartphones, use of cryptocurrency, top purchaser of digital assets and software developer, mixing reality and mixing reality at rise. Most of the key metaverse business player in APAC region include *WIR Group and Telkom University* (Indonesia), *Sandbox* (Hong Kong), *NextMeet* (India), *Axie Infinity* (Singapore), *GuildFi* (Thailand), *Shenzhen Zhongqingbaowang Interaction Network Co., Ltd. (ZQGame Global)*, and *miHoYo Co., Ltd.* in China (Asia, 2022; Maida, 2022; Spherical Insights.2022).

Despite the global fragmentation of metaverse market, there is a promising hope that metaverse market will grow and eventually knock US\$ 1.3 trillion at a rate of 44.5% by 2030 (Precedence research, 2022; Suanpang et al., 2022) due to an increasing trend of consumer users of MT including AR, VR, MR and XR (*Extended Reality*) (Maida, 2022). Indonesia records a high number of youth population next to China and India as stand to gain more from the metaverse market. It is positions herself as 75th country in the world on a global innovation index trailing behind other Asian countries in overall IT spending expected to reach US\$ 6 billion by 2024 (Asia, 2022). Despite of being a leading mobile technology, Indonesia is ranked 4th country with greatest number of smartphone users in the world. Most of the smartphone users in Indonesia use internet which accounts for 202.6 million people corresponding to 73.7% of the 267 million total population (BPS, 2020). Among them 138.1 million people aged from 18-64years use internet for e-commerce business while 74.4% use internet to make online purchases mostly food and beverages through online food delivery application (Mahmudiono et al., 2021a). This information plays a very great role for Indonesia to excel in digital economy estimated to get around US\$146 billion by 2025 (Asia, 2022; Nuraryani, 2022).

Notwithstanding the fact that tourism performance in Indonesia declined by 88.95% in September 2020 as compared to September 2019 yet the tourism sector has been chosen by the Indonesian government to enable the growth of digital economy using metaverse technology (Kainde et al., 2022a). There is still an impressive attempt of the Indonesian government to stage themselves as a world tourism destination despite the competitiveness of this sector and most dynamic nature of business environment. The Indonesian government plan to use metaverse technology in transforming the performance of tourism sector from Wonderful Indonesia to Wondeverse Indonesia as a metaverse world where people can real experience the wonderful Indonesia (Nuraryani, 2022). It is the plan of the government of Indonesia to use metaverse technology as a vehicle to improve the performance of micro, small and medium enterprises (MSMEs) in the country which currently employ 97% of Indonesia's workforce and contribute over 60% of the national GDP. It is the work of PT Telkom Indonesia to ensure the MSMEs are powered with best supportive infrastructure for the metaverse to help these intersperses to compete with large business companies (Asia, 2022). Recently the Indonesia government has made explicitly commitment to invest in technological acceptance as a strategy to boost the industrial performance which projected to reach US\$146 billion by 2025 (Asia, 2022; Nuraryani, 2022).

2.2. Limitation to existing knowledge

Even though metaverse was coined back in early 1960s as virtual reality and 1990s as a metaverse by Neal Stephenson in his novel *Snow Crash*, the efforts to understand metaverse concept in both academia and industrial practitioners are at a crossroad (Gursoy et al. 2022). In the Indonesian

context, there has been a convincing trend of evidence portraying the publications related to metaverse technology and its use in varied setting such as in the health sector, tourism and travel (Wardijono et al.2018a), tourism and geosites (Putra et al.2022), the communication sector (Satriawan et al.2022), management (Rahardja et al.2021), finance (Setyowati et al. 2020), the transport sector (Sukron et al.n.d.), urban management (Anggadwita et al.2021a), the education sector (Fendriani et al.2022), electrical engineering and informatics (Satriawan et al. 2022). Though metaverse is expected to alter the traditional way of how respective sectors has been performing its affairs the limitations of VR in Indonesia need to be overcome to maximize the VR benefits (Utami et al. 2022). However, due to *multi-inter-trans-and-cross disciplinary nature* of the tourism and hospitality industry, investigating other sectors performance and integrating their research findings innovations published outside the THMK is of imperative as tourism is not individual, standalone academic entity. However, the success of the government of Indonesia in keeping its commitment to metaverse technology adaptation will thoroughly depend on how much MT research innovations are taped and integrated to support the diffusion of such immersive technology without later and hindrance.

3. Method

3.1. Bibliographic Search strategy

The researchers adopt Systematic Literature review (SLR) methodology to conduct this review as it offers some logical structure with systematic steps toward the process (Cajal et al. (2020); Massaro et al. 2016). This methodology uses the *Preferred Reporting Items for Systematic reviews and Meta-Analyses* (PRISMA) Protocol, 2020 as one of the advanced research methods to identify, select, appraise, and synthesize all included studies of this review (Haddaway et al. 2022). The researchers use SLR methodology and PRISMA Protocol method rather than the traditional unstructured review because this methodology offers possibility for the same study to be replicated, provides transparent process which reduce the researchers prejudice and blunders, and gives a clear framework of existing body of knowledge and its limitations under the specific topic of study (Dal Mas et al. 2019; Massaro et al. 2016; Danese et al. 2018).

Additionally, this approach can also be used to help the emerging researchers to perform the analysis of large volume of studies, design necessary research questions and propose the research agenda that will provide foundation for future investigation (Dal Mas et al. 2019; Massaro et al. 2016). More interestingly, this method helps the emerging scholars to provide critical research insight by standing “*on the shoulders of giants*” that help to produce impactful research outcome different from traditional authorship to literature review (Massaro et al. 2016). This approach has successfully been used to study multi-inter-trans-and-cross-disciplinary field of tourism assessing the epistemological progress of the field (Lodhi et al. 2021; Sharif et al. 2019, 2020), methodological perspectives (Sharif et al. 2020), netnography in tourism (Tavakoli et al. 2019), tourism knowledge and neo-colonialism (Wijesinghe et al. 2019), critical theories in tourism (Mura et al. 2021), cultural heritage tourism and rural tourism (Nowacki, 2021; Rosalina et al. 2021), sustainable tourism (Carter et al. 2015), ecotourism and geotourism (Duarte et al. 2020; Ismail et al. n.d.; Ismail et al. 2021).

However, due to time limit and accessibility of other databases, the authors used *ProQuest Database* to perform the bibliographic search as it is recommended as a good database for SLR (Coombs, n.d.). Since the quality of results and successful SLR depends much on appropriateness of the keywords used and how bibliographic search strategy and techniques were applied, the authors combined various search techniques including *Boolean operators (OR)*, *invented quotation marker (“”)*, and *parenthesis ()* in extended fashion to monitor the relevance publications’ results (Cajal et al. 2020; Perez, 2013). Using bibliographic searching techniques, the author uses five (5) keywords related to metaverse technology interchangeably in ProQuest database. Interestingly, there were 123,631 publications both full text and peer reviewed publications found across the

global. The same search string was used by Goyal et al. (2021) to search bibliographic database literature for their systematic literature review.

Table 1: Database and Search String for Data Retrieval

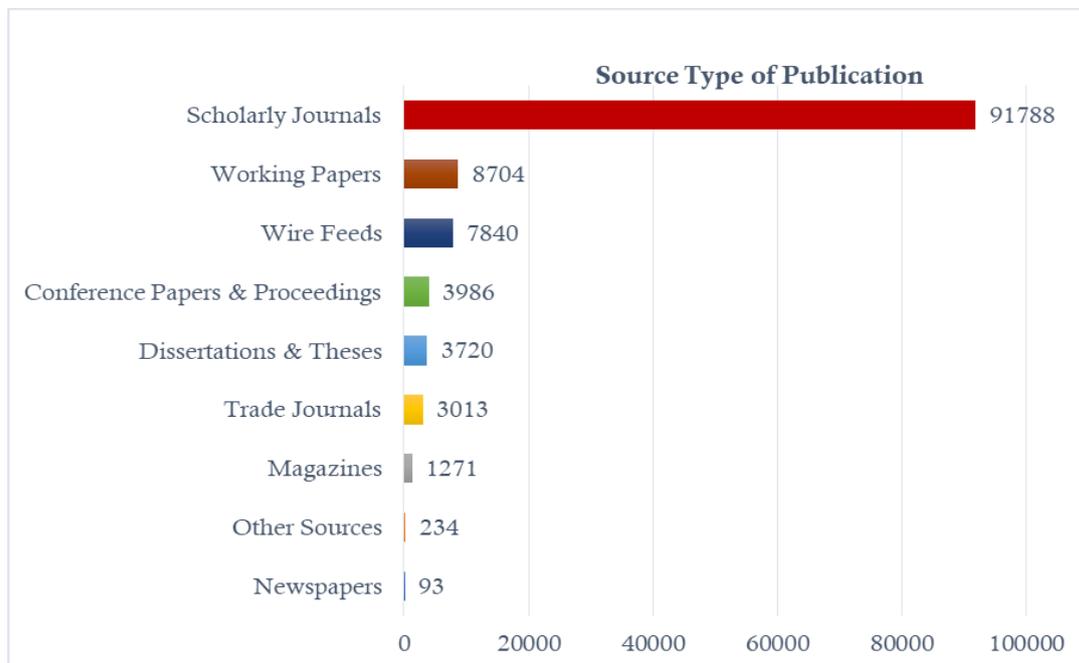
S/NO	Database	Searching String
	ProQuest database	("metaverse" OR "metaverse marketing" OR "metaverse tourism" OR "metaverse hospitality" OR "virtual reality" OR "virtual reality marketing" OR "virtual reality tourism" OR "virtual reality hospitality" OR "augmented reality" OR "augmented reality marketing" OR "augmented reality tourism" OR "augmented reality hospitality" OR "mixed reality" OR "mixed reality marketing" OR "mixed reality tourism" OR "mixed reality hospitality" OR "smart tourism marketing" OR "smart hospitality marketing" OR "internet of things" OR "internet of things marketing" OR "internet of things tourism" OR "internet of things hospitality" OR "blockchain technology" OR "blockchain marketing" OR "blockchain tourism" OR "blockchain hospitality")

Source: Researcher (2023)

3.2. Selection Criteria

This SLR established selection criterion based on the conceptual boundaries of the study and the obtained studies (N=123,631) when screened by applying limitation to include only *full text publication* and as the result (N=120,766) *full text publications* were included while (N=2,865) publications were screened out as they were *peer reviewed publications*. Given the authors were interested to review only articles found on scholarly journal; the full text publications (N=120,766) were narrowed to (N=91,823) publications included while (N=28,943) publications were screened out of this study.

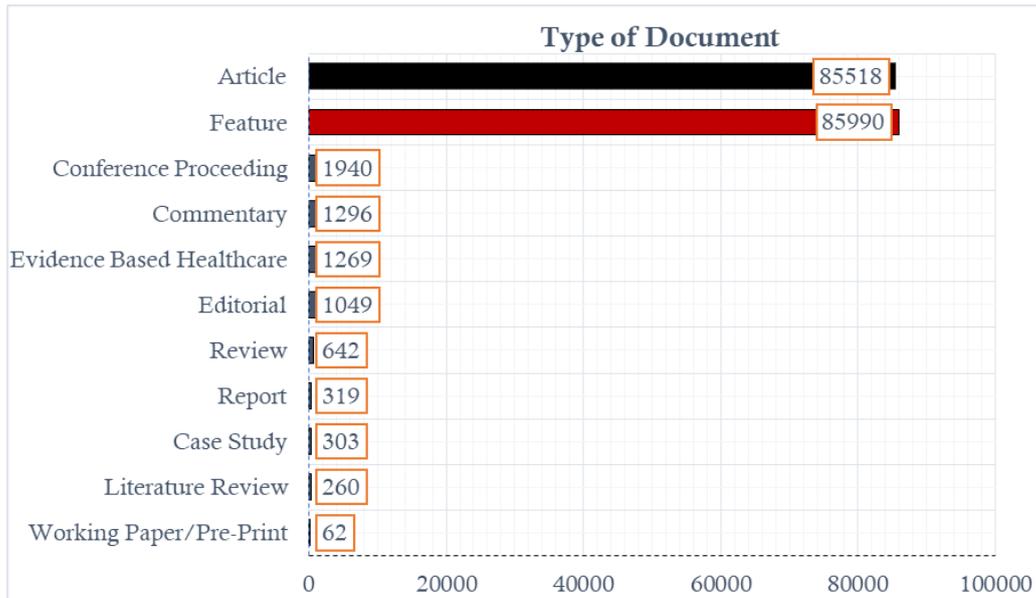
Figure 1. Source Type of Publications



Source: Researcher (2023)

All publications found at scholarly journal were comprised of many types of documents including reports, conference papers, working papers, books chapter, literature review and other of the types as depicted at Figure 2. To ensure the quality of this review, the authors limited the publication (N=91,823) to original articles. 85,555 original articles were found, screening out 6,268 articles which belong to other categories as depicted on Figure 2.

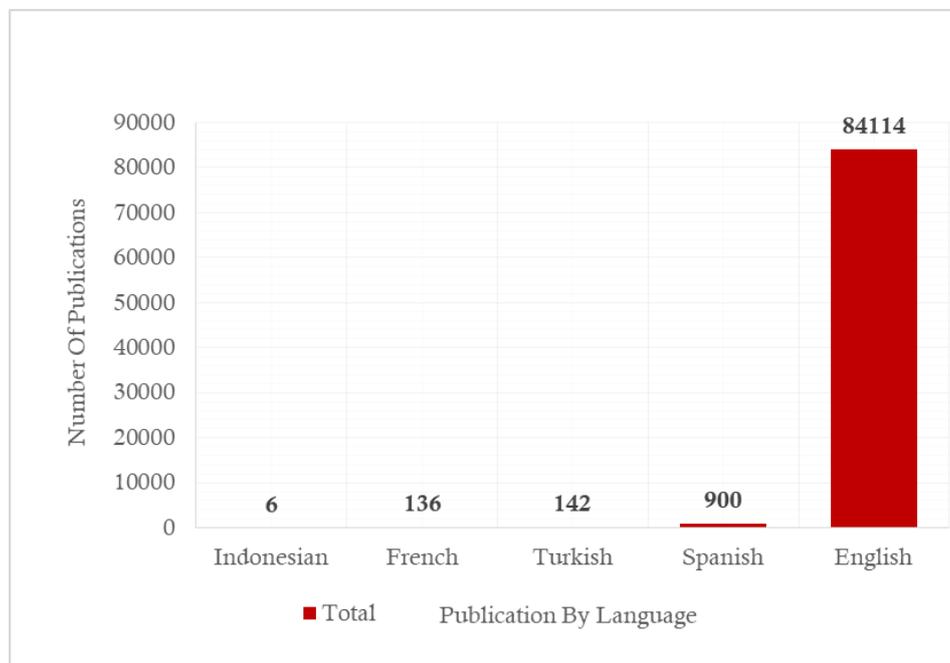
Figure 2. Document Type of Publications



Source: Researcher (2023)

Mastering the content of the study for proper understanding what is going on in literature, the articles (N=85,555) were *limited to English language*. 84,114 English articles were found while 1,441 articles were screened out of the process. Five non-English languages dominating the available literature were *Spanish, Portuguese, Russian, Turkish and French*. In this regard only six articles written in *Bahasa Indonesia* were available.

Figure 3. Publication by Language

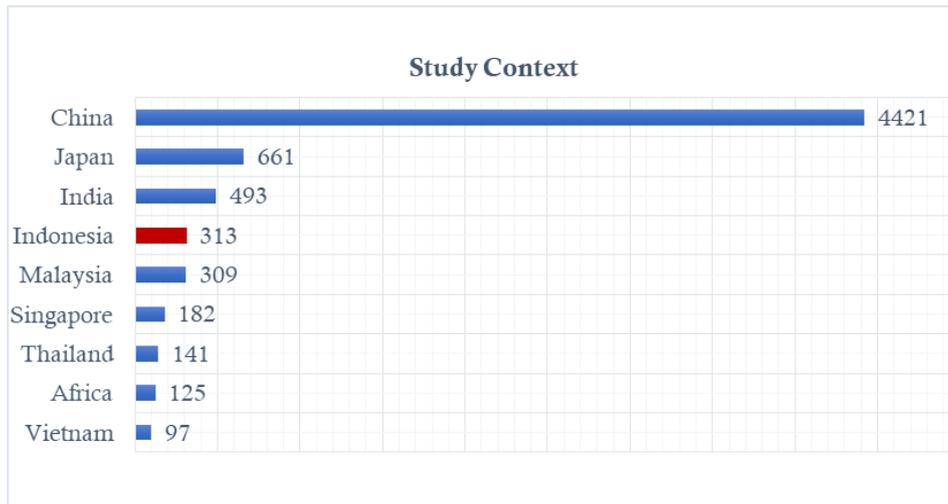


Source: Researcher (2023)

At this point, the authors narrowed the studies (N=84,114) to Indonesia context and limited the same to publication articles written in *English language*. As a result, the only six (6) publication articles written in Bahasa Indonesia were screened out to maintain the consistency of this piece of the study in English. The same exclusion criteria of limiting studies using language were used by Akhtar et al. (2022) and Mustapha et al. (2021) in their systematic literature review to

maintain the quality of their studies. Therefore, only 313 publications articles written in English language for the past 10 years were extracted from the ProQuest database for further analysis.

Figure 4. Publications limited Indonesian context.



Source: Researcher (2023)

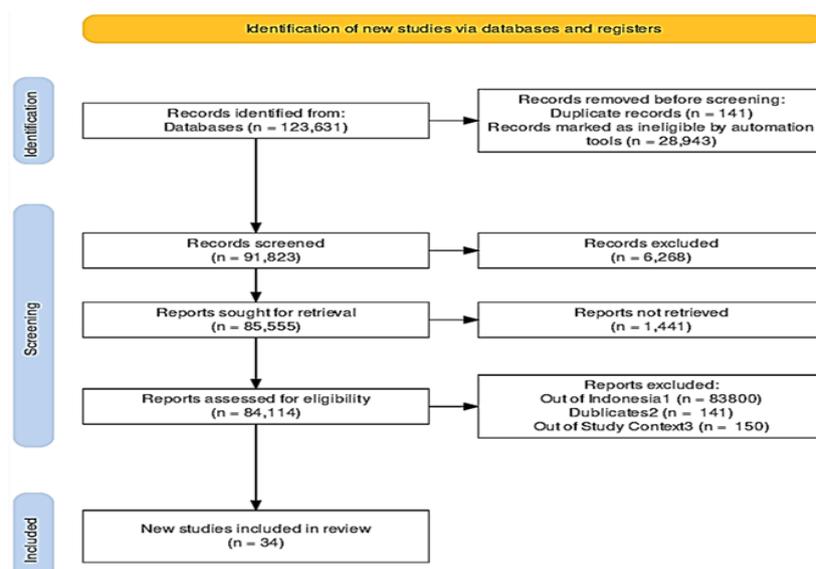
3.3. Quality Assessment Criteria

To improve the quality of the results of this SLR, the reviewed paper must be written in English language, sourced from scholarly journal and being an original article. It was assured that only articles in Indonesia context were included for this study producing only 313 articles for data clearance using an excel sheet.

3.4. Data Extraction and Clearance

The 313 publication articles were extracted from this database using the Microsoft excel sheet for purification. To maintain quality of the study, the abstracts of all extracted articles were thoroughly examined for its relevance, excluding out of scope and duplicates articles. Only 34 articles were included as a relevance article for systematic literature review, while 150 articles were duplicate and 141 articles were out of scope, which both were excluded from this review as depicted from figure 6 of this article.

Figure 5. PRISMA Framework



Source: Researcher (2023)

3.5. Research Questions

Specific research questions (RQ) serve as the study's direction. They seek to provide light on the current state of MT research in Indonesia in relation to THMK, gauge the country's readiness to use MT productively from the perspective of MT research in the THMK context, and serve as a roadmap for further MT research in this field. In the framework of THMK, these research questions aim to address important MT research aspects and streamline the data analysis process. Several research questions serve as the study's compass, including:

1. *What is the current state of MT research within the THMK context in Indonesia?*
2. *What methodological perspectives characterize MT research within the THMK context?*
3. *What theoretical frameworks underpin MT research within the THMK context?*
4. *What content dimensions of MT have been investigated in THMK research over the past decade?*
5. *What are the implications of the research findings for future MT studies within the THMK context?*

These questions seek to clarify Indonesia's readiness to use MT efficiently by applying MT research inside the THMK framework. Recommendations for future researchers looking to fill in important gaps in the current landscape are provided at the study's conclusion.

4. Results And Data Analysis

4.1. Descriptive Analysis

4.1.1. The current landscape of MT research within THMK Context in Indonesia

In this section, we aim to provide a descriptive analysis of the current landscape of MT research within the context of THMK in Indonesia. This analysis is guided by **RQ1: "What is the current state of art of MT research studies within THMK context in Indonesia?"** To address this question, we examined the publications published in journals indexed in ProQuest Data from 2012 to 2022 the duration of ten years using criteria such as years, study areas and sector or settings. These metrics help us to understand the progress and distribution of MT research within THMK in Indonesia over the past decade.

4.1.2. Publication trend by Year

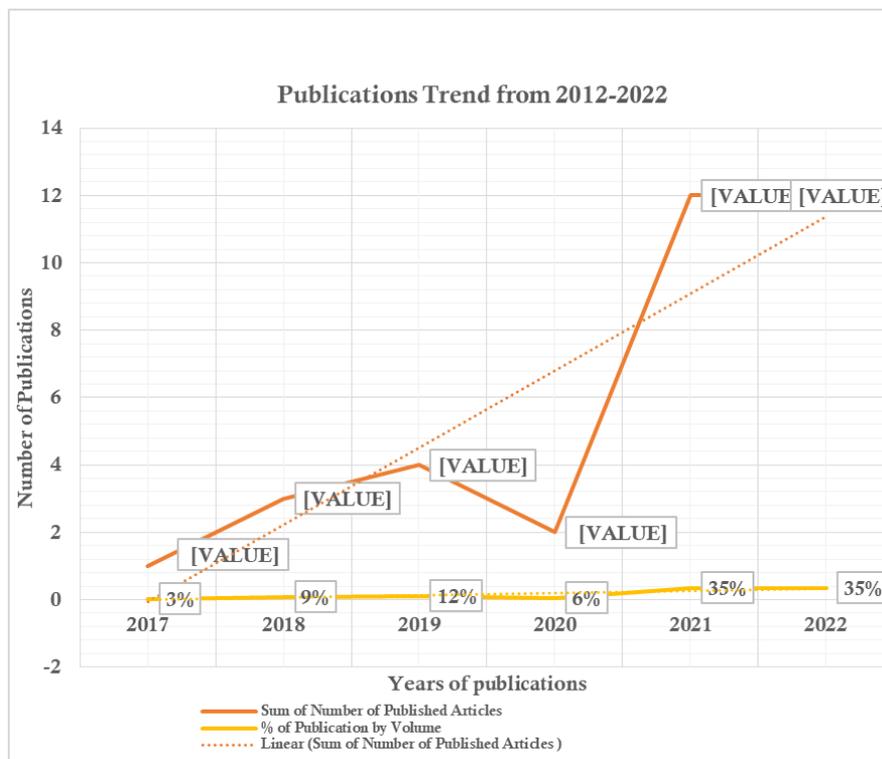
Over the past decade from 2012-2022 there were thirty-four ($N=34$; 100%) articles published in different journals related to MT research within THMK context in Indonesia. Initially there was minimal research activity or low number of publications related to MT research within THMK context recording only one publication ($N=1$; 3%) in 2017. This could be attributed to fact that MT might have been in its early stages of exploration within THMK context in Indonesia during that time and perhaps most of researchers and academics might have limited awareness or understanding of the concept and its relevance to the tourism and hospitality sector. It is also important to note that the scarcity of existing research on MT within the THMK context in Indonesia prior to 2017 may have also contributed to the low publication count as it is obvious without foundation of previous studies to build upon most of the researchers become less inclined to explore the new topic.

The number of publications has been observed to gradually increase from only one publication ($N=1$; 3%) in 2017 to three publications ($N=3$; 9%) in 2018 and four publications ($N=4$; 12%) in 2019. This gradual increase in the number of publications related to MT research within the THMK context in observed in the subsequent years could be attributed to the fact that MT has been receiving attention globally and most of the researchers and academia in Indonesia may have become increasingly aware of its potential applications in THMK context. As the field of MT within the THMK context get matured researchers may have gained a deeper understanding of the concepts, challenges and opportunities associated with this technology. Acknowledging other factors such as funding opportunity and collaborative efforts, availability of devices to support virtual reality (VR), augmented reality (AR) and other immersive technologies

may have made it easier for researchers to explore MT within THMK context. Therefore, this gradual increase in publications from 2018-2019 reflects a growing interest, improved technological capabilities, enhanced funding opportunities, collaborative efforts and the maturity of the MT research within THMK context in Indonesia.

Despite the noted gradual increase of publications recorded from the previous years, the trend was observed to suffer from slightly decrease of the publications from four publications (N=9;12%) in 2019 to only two publications (N=2;6%) in 2020. This slight decrease in publications related to MT research within THMK context in Indonesia could be attributed to the global impact of COVID-19 pandemic which emerged in early 2020 that may have limited research activities around MT within THMK context during this period. However, during this time, it is possible that most of the research priorities and resource allocation was shifted to issues related to public health including the effective measures to combat global impact of COVID-19 pandemic. Despite the fact that there was notable trend of advancement of technology including VR and AR devices to support methodological efforts to abide with social distancing and avoiding remote field work practices imposed by pandemic researcher may have encounter difficulties in collecting data and engaging participant in a VR or AR setting possibly leading to delays or modification in research activities.

Figure 6. Year Based Publications



Source: Researcher (2023)

The most significant increase in publications was observed to record twelve publications (N=12;35%) in 2021 and twelve publications (N=12;35%) in 2022 respectively. This significant increase in publications related to MT research within THMK context in 2021-2022 may have been attributed by growing interest and awareness, funding support, industry demand, collaborative efforts and technological advancements such as VR, AR and MR which may have contributed to the expansion of research on MT research within THMK context during this period. Therefore, for the past decade, the trend of publications indicates a gradual but substantial increase in research activities related to MT within THMK context in Indonesia, underscoring the growing significance and potential of MT in shaping the future THMK in the country.

4.1.3. Publications by Journals

For the past decade, the recorded publications were found to be published in a diverse range of journals accounting for twenty-three publications (N=23;100%) from diverse fields including ecology, education, health, tourism, psychology, and urban management as indexed in ProQuest database as indicated in *Table 8* of this analysis. This diversity reflects the multidisciplinary and Interdisciplinary nature of MT research and its application beyond tourism and hospitality domains. However, for the past decade, four journals emerged as top contributors of the MT research within THMK context. This includes the *Journal of Physics* that has emerged as a leading and most influential journal as recorded to provide significant avenue for publishing seven publications (N=7;21%) of MT research within THMK context. While this journal may not focus specifically on tourism and hospitality management but inclusion of TM research within the THMK context suggest a multidisciplinary and interdisciplinary nature of the MT research beyond the tourism and hospitality domains. Second contributor appears to be *Geo Journal of Tourism and Geosites* which provided avenue for publishing three publications (N=3;9%) of MT research within THMK context. This journal appears to specialize in tourism and geospatial research indicating a focus on topics relevant to MT within the THMK Context. Its thematic alignment suggests that it may attract researchers and readers interested in the intersection of geospatial technologies and tourism management.

Table 2. Publications Journals

No	List of Journals	Number of Publication	%
1	Journal of Physics	7	21%
2	Geo Journal of Tourism and Geosites	3	9%
3	Materials Science and Engineering	3	9%
4	MDPI, Sustainability	2	6%
5	International Journal of Ecology	1	3%
6	Earth and Environmental Science	1	3%
7	Education Research International	1	3%
8	European Journal of Investigation in Health, Psychology and Education	1	3%
9	Journal of Open Innovation	1	3%
10	MDPI, Applied Sciences	1	3%
11	MDPI, Big Data and Cognitive Computing	1	3%
12	MDPI, Designs	1	3%
13	MDPI, Economies	1	3%
14	MDPI, Education Science	1	3%
15	MDPI, Future Internet	1	3%
16	MDPI, Infrastructure	1	3%
17	MDPI, Nutrients	1	3%
18	MDPI, Computer	1	3%
19	On - Line Journal of Nursing Informatics	1	3%
20	The Asian Journal of Technology Management	1	3%
21	The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences,	1	3%
22	Theoretical and Empirical Researcher in Urban Management	1	3%
23	Tourism and Hospitality Management	1	3%
Total Reviewed Papers		34	100%

Source: Researcher (2023)

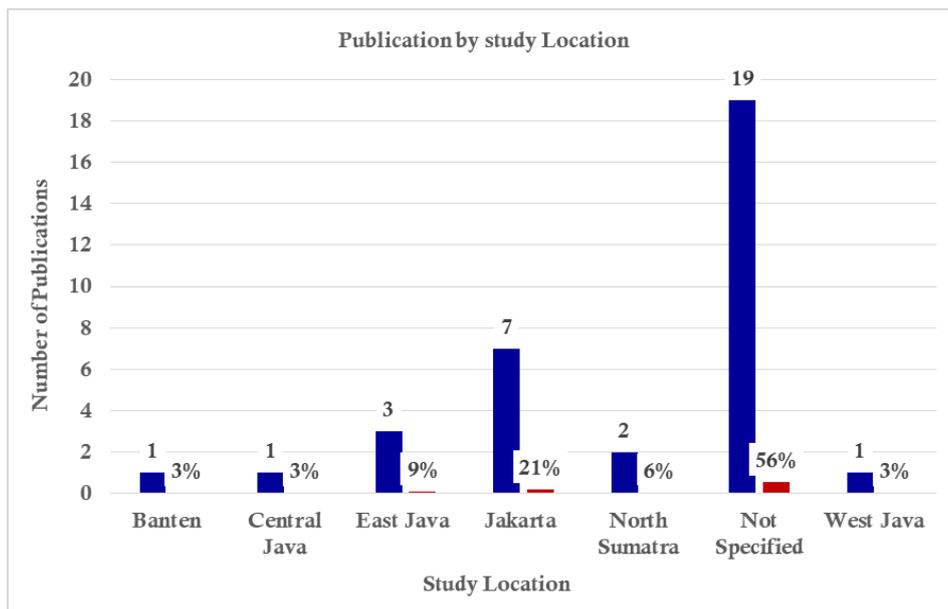
The third journal recorded to make substantial contributions to MT research within THMK context is *Materials Science and Engineering* with three publications (N=3;9%) recorded. Despite irrelevance of this journal to THMK context which may raises questions about the thematic relevance of MT research published some studies explore MT applications in materials science

and engineering contexts which highlights collaborations and novel application of MT beyond traditional field. The fourth journal to make substantial contribution emerged to be *MDPI, Sustainability* which record two publications (N=2;6%) of MT research within THMK context. While this Journal is not specific related to tourism and hospitality field but sustainability aligns with themes relevant to MT research within THMK context. Most importantly some journals with fewer publications (N=1;3%) such as *Tourism and Hospitality Management* underscore the recognition of MT research relevance within THMK context. This reflects a growing awareness among scholars and practitioners in tourism and hospitality field the need to understand and harness the opportunities presented by MT in THMK context.

4.1.4. Publications by Study Locations

The distribution of the publication by study locations provides valuable insights into the geographical focus of MT research within THMK context in Indonesian. The study revealed that with seven publications (N=7;21%) *Jakarta* emerges as a primary location for MT research within the THMK context. This concentration of research activities in the capital city may be attributed to presence of leading academic institutions, research centers and government agencies actively engaged in promoting digital innovation and technology adoption and scholars with significant interest in MT research in this region. The *East Java* emerges as notable location for MT research within THMK context with three publications (N=3;9%) indicating significant interest in MT research which might be influenced by presence of universities with strong research programs, government initiatives to foster innovations and growing prominence of digital technology hubs in East Java. With two publications (N=2;6%) *North Sumatra* appear as a notable location for MT research within THMK context with scholars’ interest in MT research influenced by tourism potential of North Sumatra and effort to leverage tourism potential of North Sumatra and efforts to leverage technology for sustainable development and economic growth. Othe Locations like *Banten*, *Central Java* and *West Jave* each contribute to one publication (N=1;3%) to the overall distribution which signifies a more dispersed pattern and broader geographical interest of MT research within THMK context across Indonesia. However, the largest proportion of the publications almost nineteen publications (N=19;56%) recoded under *Unspecified locations* suggests that a significant portion of MT research within THMK context does not explicitly mention the study locations.

Figure 7. Publications by Study Area



Source: Researcher (2023)

While this lack of specificity may limit insights into regional variations or localized application of MT research within THMK context it indicates a need for future researcher to exploring regional dynamics towards enhancing geographical context in MT research within THMK context in Indonesia to provide more detailed information about the geographical context of MT research studies. Therefore, the distribution of publication by study locations highlights the diverse geographical landscape on MT research within THMK context in Indonesia with concentration of activity in major cities like Jakarta and emerging interest in other regions like East Java and North Sumatra. Understanding this geographic pattern can inform future research agendas, policy interventions and industry initiatives aimed at harnessing MT research within THMK context in Indonesia.

4.1.5. Publication by sector/setting.

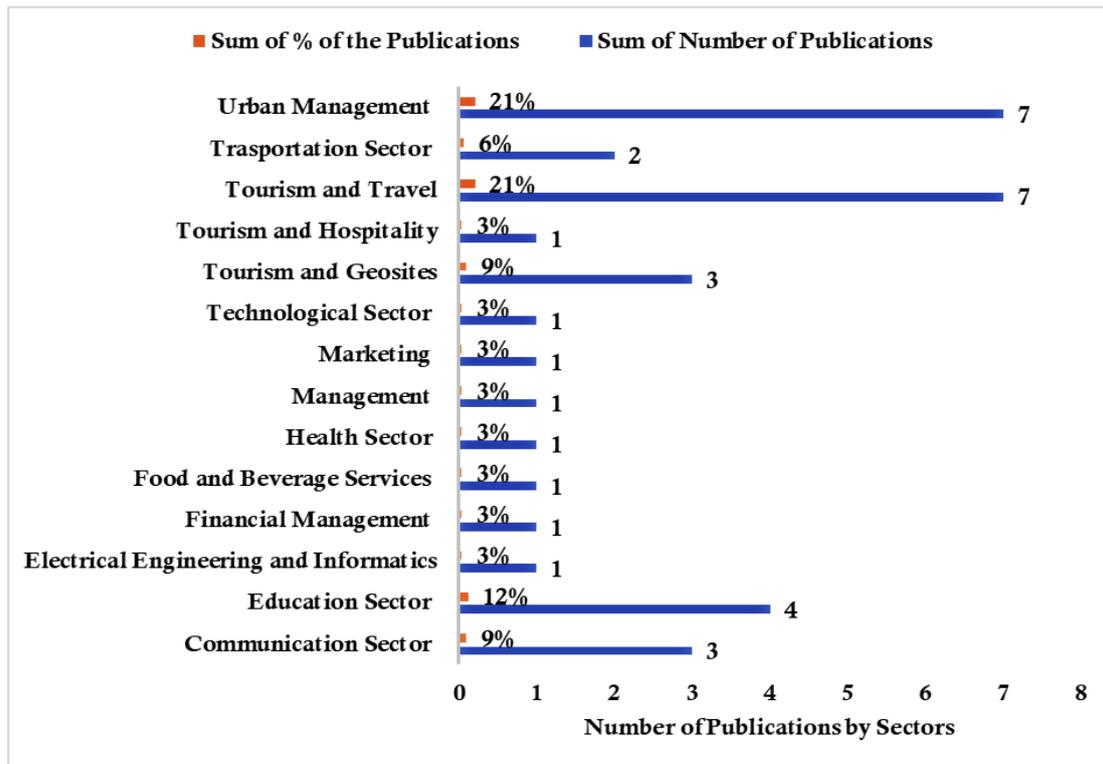
The publications by sectors/setting were made to provides insights into the distribution of MT research within various domains related to THMK in Indonesia. Given the multi-inter-trans-and-cross disciplinary nature of the tourism and hospitality industry it is imperative to recognize that advancements and innovations from other sectors can significantly impact and enhance the THMK landscape. This recognition underscores the necessity of investigating the performance of other sectors and integrating their findings into tourism and hospitality domain. Acknowledging that tourism and hospitality do not operate in isolation, tapping into innovations from other sectors is crucial for enriching the existing body of knowledge related to MT within THMK context. In this analysis as depicted in *Table 9* and *Figure 10* clearly revealed that *Urban Management, Tourism and Travel* settings stands out with the highest number of publications (N=7;21%) respectively. MT has been applied in this setting to explore how cities can be transformed into smart cities using smart technology and using smart cities as essential infrastructure to support smart tourism which in turn easier the application of metaverse technology within THMK context. This suggests a significant focus on exploring the application of MT in transforming tourism sector while promoting the government agenda to promote digital economy. The *education* setting recodes to have four publications (N=4;12%) indicates a growing interest in exploring the role of MT within educational context related to THMK in Indonesia. The presence of publications in this sector highlights the importance of understanding how MT can be integrated into educational setting to enhance learning experiences and prepare students for career in the THMK.

Communication, Tourism and Geosites setting recodes three publications (N=3;9%) respectively. While presence of publications in communication underscores the importance of understanding how MT can be leveraged to enhance communication effectiveness within THMK context, presence of the publication in tourism and geosites highlights the importance of leveraging MT to create immersive and interactive experience that showcase Indonesia's diverse cultural, natural, historical and heritage attractions to domestic and international tourists. Further research in this area should focus on Exploring the role of MT in enhancing destination marketing, visitor interpretation and heritage preservation within the tourism geosites in Indonesia and Exploring the role of MT in shaping communication dynamics and strategies within THMK context in Indonesia. *Transport setting* report low contribution of publications (N=2;6%) related to MT research within THMK context indicating a moderate level of interest and exploration on how MT can enhance tourism transportation system.

Though low publication may reflect the complexity and specificity of transportation related MT applications within THMK context. Presence of the publication from this sector highlights its significance as a critical component of urban infrastructure and underscores the need to explore innovative ways to integrate MT to address transportation challenges and enhance overall urban morbidity and connectivity across Indonesia. However, other study settings including *tourism and*

hospitality, food and beverage setting records one publication (N=1;3%) each suggests a relatively lower level of focus compared to other mentioned study settings.

Figure 8. Publication by Sectors/settings



Source: Researcher (2023)

The limited publication may be attributed to the complexity of applying MT in tourism and hospitality contexts to effectively implement MT solutions. This underscores the importance of future research in these areas to unlock the full potential of MT to reshape the future hospitality landscape and overall guest experience.

Table 3. Publications by Sector/Settings

S/N	Sector/setting	Author	Number
1	Communication Sector	Alfaldi et al.(2022)	1
		Ardian et al.(2018)	1
		Dirin et al. (n.d)	1
2	Education Sector	Castro et al.(2021)	1
		Rahmawati et al.(2021)	1
		Fendriani et al.(2022)	1
3	Electrical Engineering and Informatics	Sulisworo et al.(2021)	1
		Satriawan et al.(2022)	1
		Setyowati et al.(2020)	1
4	Financial Management	Setyowati et al.(2020)	1
5	Food and Beverage Services	Mahmudiono et al.(2022)	1
6	Health Sector	Lindayani, (2021)	1
7	Management	Maulana et al.(2012)	1
8	Marketing	Alamsyah et al.(2022)	1
9	Technological Sector	Safitri et al.(2022)	1
10	Tourism and Geosites	Idris et al.(2021)	1
		Kurnia et al.(2022)	1
		Wahyuningtyas et al.(2022)	1
11	Tourism and Hospitality	Kusumah et al.(2022)	1
12	Tourism and Travel	Arifitama et al.(2019)	1
		Cahyadi et al.(2021)	1

		Kawato et al.(n.d.)	1
		Ronyastra et al.(n.d.)	1
		Arifitama et al.(2019)	1
		Wardijono et al.(n.d.)	1
		Wardijono et al.(2018)	1
13	Transportation Sector	Sukron Mufaqih et al.(n.d.)	1
		Priadi, (n.d.)	1
14	Urban Management	Anggadwita et al.(2021)	1
		Kainde et al.(2022)	1
		Hasmawaty et al.(2022)	1
		Lim et al.(2021)	1
		Rachmawati et al.(2021)	1
		(Ortiz-Ramirez et al.(2021)	1
		(Rachmawati et al.(2021)	1
Grand Total			34

Source: Researcher (2023)

4.2. Literature Classification

The researcher employed a literature classification method to synthesize the findings of this SLR with the aim of addressing the remaining research questions each delved into different aspects of MT research within THMK contest in Indonesia. The analysis focused on exploring methodical perspectives, theoretical framework underpinning MT research studies within THMK context, understanding the content dimensions of MT investigated in the reviewed studies and finally outline the future research agenda and direction based on the identified gaps, limitation and opportunities released by the SLR findings.

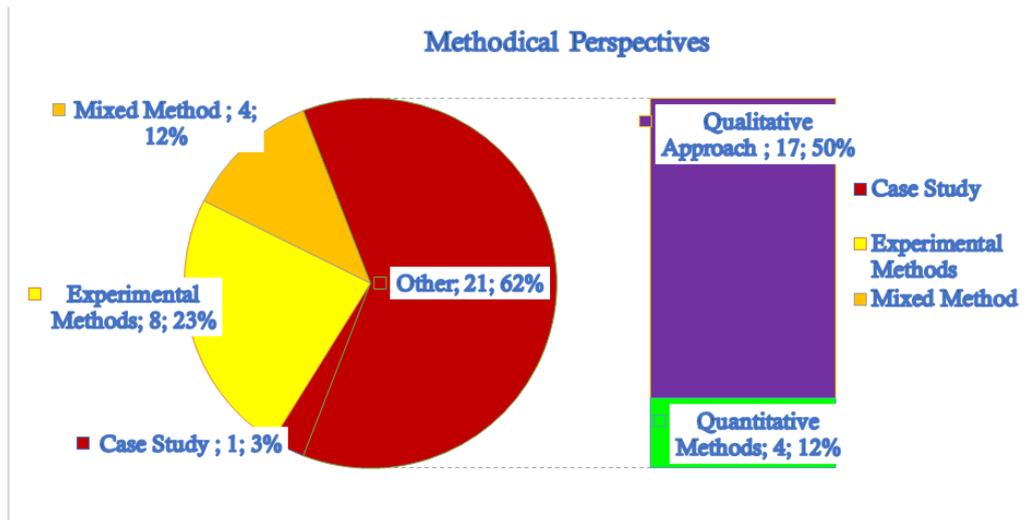
4.2.1. Methodical Perspectives

The examination of methodical perspectives used in MT research within the THMK context in Indonesia offers valuable insights into the research approaches, designs, and methods adopted by scholars in the reviewed publications. In response to *RQ2; -What are the methodical perspectives used in the MT research studies within THMK context?* - the researcher investigated the methodological approaches employed by various authors across the reviewed articles.

The findings indicate that a Qualitative approach emerged as the predominant research method utilized by various authors across the reviewed articles ($N=17$; 50%) (Alamsyah et al. 2022; Anggadwita et al. 2021b; Arifitama et al. 2019; Cahyadi et al. 2021; Castro et al. 2021; Idris et al. 2021; Kainde et al. 2022; Ortiz-Ramirez et al. 2021; Rahmawati et al. 2021; Setyowati et al. 2020; Sukron et al.n.d.; Untung et al. 2021; Wardijono et al. 2018). This observation suggests a strong emphasis on comprehending the subjective experiences, perceptions and behaviors of stakeholders within the tourism and hospitality industry regarding MT. This highlights the qualitative tradition aimed at conduct in-depth analysis to explore different perspectives and gain deeper understanding about the subject matter under investigation (Rahmawati et al. 2021; Anggadwita et al. 2021). The use of qualitative method also indicates that research on metaverse is still in a nascent stage.

The significant presence of experimental design ($N=8$;23%) across all reviewed studies indicates a growing interest in conducting controlled experiments or empirical studies to assess the effectiveness, efficiency, and usability of MT applications in real-world THMK scenarios (Satriawan et al. 2022; Alfalqi et al. 2022; Arifitama et al. 2019; Fendriani et al. 2022; Kawato et al. n.d.; Safitri et al. 2022). This trend suggests a desire among researchers to empirically test hypotheses, validate theoretical frameworks and generate actionable insights to inform MT solutions within THMK context.

Figure 9. Evolving Methodical Perspectives



Source: Researcher (2023)

Moreover, the utilization of mixed approaches (N=4;12%) across all reviewed studies reflects a recognition of the complementary nature of qualitative and quantitative approaches in understanding complex phenomena such as MT adoption and utilization in THMK contexts (Wardijono et al. 2018; Dirin et al. n.d.; Ronyastra et al., 2019). By integrating diverse methodological perspectives, researchers aim to achieve a more comprehensive and nuanced understanding of the multifaceted nature of MT phenomena and its applications in THMK practices. Additionally, the utilization of quantitative approaches (N=4;12%) across the reviewed studies indicates the growing interest of researchers to use numerical data to quantify phenomena, relationships, or trends related to MT usage, impact, or adoption MT within THMK context (Mahmudiono et al. 2021; Kurnia et al. 2022; Wahyuningtyas et al. 2022). This inclusion underscores the importance of statistical rigor and objectivity in understanding the complex dynamics of MT within the THMK landscape. The limited use of case study design (N=1;3%) among the reviewed studies suggests a minimal emphasis on in-depth, contextual analysis of specific instances of MT implementation within THMK context (Rachmawati et al. 2021). The inclusion of the case study in future research can offer valuable contextual understanding and practical implications for MT utilization within THMK practices in Indonesia.

4.2.2. Theoretical Perspectives

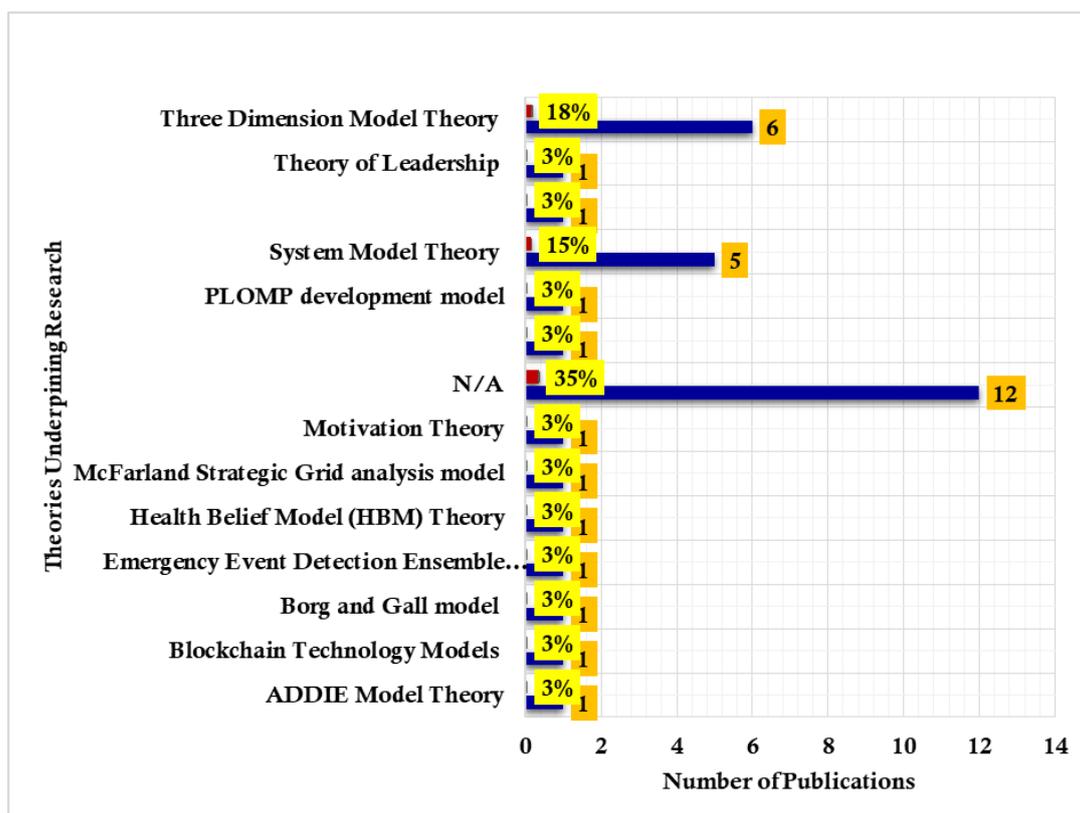
The researchers delve to the theoretical perspectives that underpin research studies on MT within THMK context in Indonesia. This analysis is guided by *RQ3: What are the involving theories that underpin research studies on MT in THMK context?* By examining the theoretical frameworks employed by authors in their studies this section aims to uncover the theoretical underpinnings guiding research efforts in understanding MT within the THMK context. Though this analysis insights into the conceptual foundations and theoretical lenses shaping MT research within THMK in Indonesia is gained.

The findings regarding *theoretical perspective reveal* a limited range of theoretical frameworks employed by authors across the reviewed publications to guide their research. Though theories are the foundation block for answering what, why, who, when, where, and how in research questions by Sutton et al., (1995) it is notable that a significant portion of publications (N=12;35%) did not specify explicitly any particular theoretical framework underpinning its foundation(Castro et al. 2021; Fendriani et al. 2022; Untung Rahardja et al. 2021; Sukron et al. n.d.; Safitri et al. 2022; Satriawan et al. 2022; Wardijono et al. 2018; Arifitama et al. 2019; Cahyadi et al. 2021; Ronyastra et al. 2019). While this suggest the possibility of the researchers'

reliance on implicit assumptions or common knowledge within the field without the need for explicit articulation of theoretical underpinnings or methodological orientation where the emphasis is placed on practical insights or real-world implications rather than theoretical abstraction, without clear articulation of theoretical foundations it becomes challenging to evaluate the conceptual frameworks guiding the research and to situate the findings within broader theoretical discourses. Therefore, future studies may benefit from a more explicit engagement with theoretical frameworks to enhance the rigor and coherence on MT research within the THMK context.

The three-dimension model theory emerges as the most prominent theory (N=6;18%) presence on all reviewed publications (Satriawan et al. 2022; Rahmawati et al. 2021; Wardijono et al. 2018; Arifitama et al. 2019; Dirin et al. n.d.; Kawato et al. n.d.). This finding suggests its importance as a conceptual framework for understanding MT research within the THMK context. However, its popularity may indicate its perceived relevance and applicability in addressing the complexities of integrating MT within THMK practices. Additionally, the prevalence of system model theory (N=5;15%) in the reviewed publications underscores its significance as a theoretical lens shaping MT research within the THMK context (Kainde et al. 2022; Rachmawati et al. 2021; Ortiz-Ramirez et al. 2021). This theory provides a structured framework for analyzing the interrelationships and dynamics within complex systems involving MT integration in THMK practices.

Figure 10. Evolving Underpinning Theories



Source: Researcher (2023)

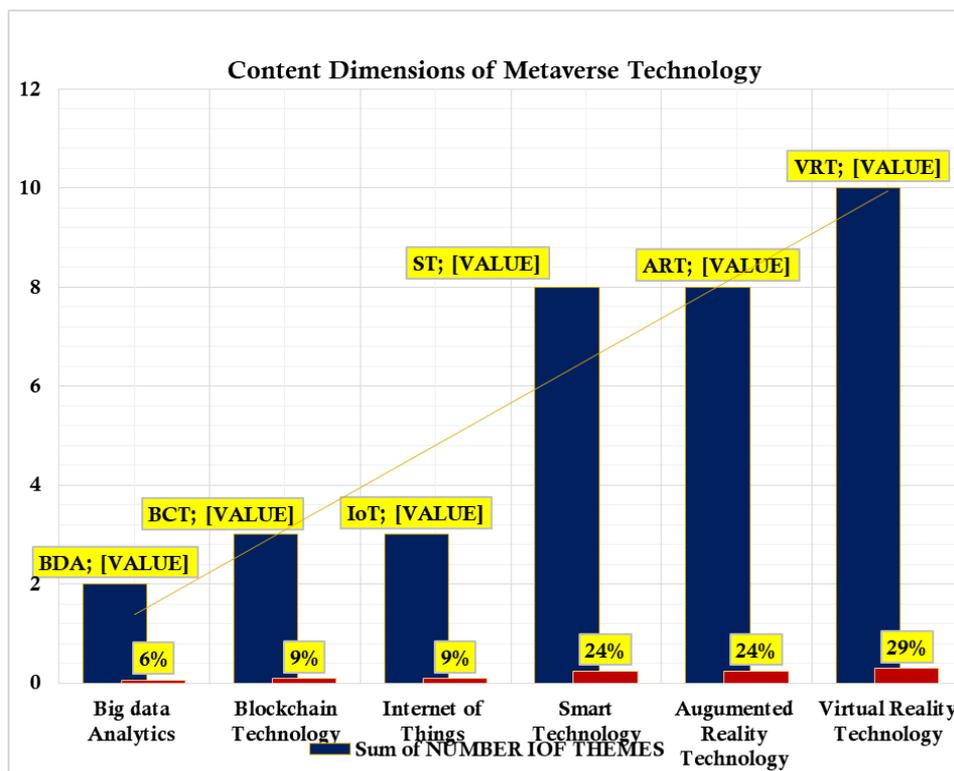
Other theories such as theory of leadership (Anggadwita et al. 2021), theory of destination image (Hidayah et al. 2022), ADDIE Model theory (Idris et al. 2021), Blockchain Technological Model (Setyowati et al. 2020), Borg & Gall Development Model (BGDM) Theory (Wahyuningtyas et al. 2022), Emergency Event Detection Ensemble Model (EEDM) Theory (Alfalqi et al. 2022), Health Believe Model (HBM) Theory (Mahmudiono et al., 2021b), Motivation Theory, Natural Resources Based View Theory, and PLOMP Model (Putra et al.

2022) each representing one publication (N=1;3%) across all reviewed publication. This suggests the diverse range of theoretical influences represented in MT research within THMK in Indonesia which underscores the complexity and multidimensional nature of this field. It also indicates that narrow theoretical approach may not capture the intricacies of this domain effectively rather researchers need a holistic and nuanced theoretical framework that can account for the diverse factors such as technological, organizational, social, economic, and cultural dimensions to provide more comprehensive understanding of MT's roles in transforming THMK practices to guide scholarly inquiry in this evolving field.

4.2.3. Content Dimensions of Metaverse Technology

Examining the content dimensions of MT within THMK context the researcher was guided by RQ4; *What are the content dimensions of MT investigated in the MT research studies within THMK context for the past ten years?* This analysis aimed to uncover the extensiveness and complexity of topics related to MT within THMK context, shedding light on the various dimensions of MT discussed in literature and its application within the industry. By categorizing and synthesizing the content dimensions explored in the literature, the researcher aimed to provide a comprehensive overview of the current state of MT research in THMK and identify potential areas for further investigations and development.

Figure 11. Metaverse Dimensions



Source: Researcher (2023)

Among the content dimensions investigated *virtual reality (VR)* emerges as the prominent with ten publications (N=10;29%) dedicated to exploring its implications within THMK. These publications attempt to utilize VR technology as a dimension of MT to create 3D virtual representations of tourism and hospitality products to enhance the visualization and immersive experience of THMK offerings (Rahmawati et al. 2021; Fendriani et al. 2022; Widita et al. 2021; Kurnia et al. 2022; Wardijono et al. 2018; Cahyadi et al. 2021; Kawato et al. n.d.). This dimension appears to have garnered significant attention from researchers who employ various research methods such as experimental, qualitative, quantitative, and mixed research methods to

explore the practical applications of VR technology within the THMK context to benefit both academia, industry practitioners and end-users alike. However, while there is significant potential for VR to revolutionize various sectors there are also limitations to be addressed to fully capitalize on its benefits. Therefore, future research could focus on addressing the limitations of VR technology within THMK context to maximize its full potential in Indonesia. This could involve investigating strategies to overcome infrastructure challenges such as improving internet connectivity, and access to VR devices as well as addressing cultural and societal factors that may impact the adoption and acceptance of VR technology within THMK context.

Augmented reality (AR) technology emerges as another significant content dimension in MT research within THMK context representing eight publications (N=8;24%) dedicated to exploring its applications and implications within THMK (Safitri et al. 2022; Arifitama et al. 2019; Dirin et al. n.d.; Ronyastra et al. n.d.). AR technology has been defined as derivative form of VR technology that integrates two-three-dimensional virtual objects into the real world interactively in real time (Rahmawati et al. 2021). It blends the real world with digital information which can be harnessed for THMK thereby providing users with interactive and immersive experiences (Dirin et al. n.d.). While VR technology bring users into synthetic environment that is designed to resemble the real-world environment, AR Technology bring users more to be able to imagine detailed objects in 3D-Modelling in the real-world environment which signifies a real meaning of metaverse application in THMK (Arifitama et al. 2019). The use of AR in THMK is a promising and growing field which provides additional information about the offering and enhancing customer's real-world experience in interesting ways (Ronyastra et al. 2019). Given the sustantation interest in AR technology within THMK context future research could focus on exploring the effectiveness of AR technology in different THMK settings and contexts such as Museum tourism, heritage and cultural tourism, tourism destination marketing and hospitality establishments. It could also add value to examine the technical challenges and limitations of AR technology within THMK context in Indonesia. Addressing these challenges could help to optimize the design and implementation of AR solutions for THMK in Indonesia.

Smart technology emerges as a significant content dimension in MT research within THMK context with eight publications (N=8;24%) dedicated to exploring its implications (Anggadwita et al. 2021; Rachmawati et al. 2021). Smart technology was firstly applied to transform urban cities to smart cities using information and communication technology (ICT) to improve the cities optimization of available resources and its operations across the cities. Transformation from tourism destination to smart tourism destination and from hospitality to smart hospitality require a strong and persistence network connectivity that can support the development of the MT within THMK. There is evidence that development of smart tourism destinations or hospitality requires the smart ecosystem in governance, branding, economy, living, society and business or natural environment (Rachmawati et al. 2021). Thus, the government needs to provide fast, precise, and accurate information services (Anggadwita et al. 2021). However, given the growing interest in smart technology within THMK context future research could focus more in exploring how smart technology can be integrated into THMK practices to enhance its operational efficiency, customer experiences and sustainability initiatives.

The *Internet of Things (IoT)* emerges as a content dimension in MT research within THMK context with three publications (N=3;9%) dedicated to exploring its implications (Wahyuningtyas et al. 2022; Sukron et al. n.d.). The IoT implies that all electronic devices or corporeal objects in metaverse era need to be actively linked to cyberspace access (Sukron et al.n.d.). Due to the use of electronic devices in tourism and hospitality industries which demand cyberspace connectivity bring the users at issues of data security and privacy management as log-out in metaverse would not help any longer. Given the nascent but promising role of IoT in THMK future research could focus on Exploring the scalability, interoperability, and security aspects of IoT deployments in THMK context in Indonesia. It also imperative for the future study to explore how IoT-enabled

smart devices can enhance operational efficiency and customer experience within THMK context in Indonesia.

The *Blockchain (BC) technology* represents a content dimension in MT research within THMK context with three publications (N=3;9%) dedicated to exploring its implications (Alamsyah et al. 2022; Castro et al. 2021; Setyowati et al. 2020). Managing the metaverse users' data security and province in a real time require BC Technology to increase benefits for both actors invoiced in metaverse industry (Rana et al. 2021). The future research is imperative to investigate how BC technology can address challenges such as fraud prevention, enhance transparency, security and efficiency in THMK operations and services. There is a need to assess the scalability, interoperability and regulatory framework of BC Technology implementation within THMK context to provide transformative insights of this technology in shaping the future of THMK practices in Indonesia.

Lastly *big data analytics* appear to be content dimension in MT within THMK context represented by two publications (N=2;6%) dedicated to explore its implications (Alfalqi & Bellaiche, 2022; Maulana et al., 2012). Even though the studies did not explicitly explore the application of big data analytics within THMK context but the application from other fields signifies its implications in THMK context if effectively utilized. The future researcher should focus more on how data analytics can be used to forecast tourism and hospitality products and services where predictive analytics algorithms can be used to analyze THMK trends to optimize pricing strategies in real time. There is the critical need to assess the ethical, privacy and security implication of big data analytics application in THMK context concerning data protection regulations customer consent and algorithmic biases. Additionally, researchers may investigate the organizational and technological challenges associated with big data adoption and implementation in diverse THMK context including issues related to data integration, data quality assurance and talent acquisition.

4.2.4. Implications of Findings to Future Research

Implications of the findings to future research are critical in guiding scholars towards avenues that require further exploration and addressing gaps in existing literature. In response to RQ5; - *What are the implications of the research findings for future the MT research studies within THMK context.*, it is evident that while there has been a significant increase in MT research publication in Indonesia over the past decade there remains a dearth of studies focusing on testing the application of MT in hospitality settings. Recalling the notable slight decrease in publication in 2020 was attributed to the global impact of the COVID-19 pandemic which diverted research priorities in Indonesia it is imperative for the future research to address the challenges posed by COVID-19 pandemic and explore innovative ways to collect data and engage participants in MT research within the THMK context.

Despite the fact that geographical distribution of the publication indicates concentrations in major cities and significant portion of publication did not specify its study locations which limit insights into regional variations or localized application of MT research within THMK context it is recommended that future research should focus on exploring regional dynamics towards enhancing geographical context in MT research within THMK context in Indonesia to provide more detailed information about the geographical context of MT research studies. The limited case study design among the revealed studies suggests a minimal emphasis on in-depth, contextual analysis of specific instances of MT implementation within THMK context. This lay the foundation of the future research to offer contextual understanding and practical implications for MT utilization within specific THMK setting to enhance the relevance and applicability of research outcomes.

The prevailing use of smartphones, tablets and websites for MT application within THMK underscores the need for diversification in device usage. The future research should prioritize the

exploration of alternative devices such as smart glasses to expand the scope and efficacy of MT research within THMK context. Since the diverse range of theories represented in MT research underscores the complexity and multidisciplinary nature of this field as well as narrow theoretical approach future research should focus on holistic and nuanced theoretical framework that can account for the diverse factors such as technological, organizational, social, economic and cultural dimensions to provide more comprehensive understanding of MT's roles in transforming THMK practices to guide scholarly inquiry in this evolving field. This study is also recommending the need for future researchers to significantly scope upon the existing theories, modifying or developing a new theory such as metaverse technology acceptance (META) theory that will be uniquely applicable to MT in THMK context.

In addition to exploring the conventional applications of MT in tour guiding, future researchers should expand their focus to investigate how MT can mutually benefit both tour guides and tourists during guided tours. This involves investigating into innovative ways in which MT can enhance the overall tour experience, facilitate better communication between guides and tourists and offer personalized immersive experiences tailored to individual preferences. By shifting the paradigm from mere direction-giving to a more interactive and enriching tour experience researchers can uncover novel opportunities for leveraging MT in the tourism industry.

Moreover, children and younger generations who are frequent users of computers, tablets, and smartphones have been the primary focus of previous research in this sector. The literature on MT's accessibility for the elderly and disabled, however, is noticeably lacking. Future studies should put inclusivity first by examining ways to improve MT's usability for senior citizens and those with disabilities. Investigating user interface design, assistive technology, and customized experiences are necessary to guarantee that MT-based travel and hospitality offerings are inclusive and meet the various needs of people of all ages and abilities.

Keeping in mind the database accessibility constraint that this analysis only included articles indexed in the ProQuest database, it is possible that other relevant literature on MT within the THMK context that was indexed in other databases such as MEDLINE, Cochrane Library, Scopus, EBSCO, Dimensions, and Web of Science was overlooked. Future researchers should adopt more comprehensive approach to bibliometric search strategy by utilizing multiple databases beyond ProQuest to provide extensive coverage of scholarly literature across various disciplines. The combination of keywords subject headings and boolean operators to retrieve relevant articles from these databases is imperative.

5. Discussion

This SLR was designed to investigate the current state-of-art-of-metaverse technology research in tourism and hospitality marketing in Indonesian context. The review of 34 papers suggests some progress toward the understanding of the MT in THMK. The analysis of the findings in response to RQ1 revealed that for the past decade there has been substantial increase of MT research innovations in THMK through there was also a relatively low or few studies in hospitality marketing setting. These findings agree with the findings done by Pratisto et al. (2022) on immersive technologies for tourism which record an increased number of journal articles published in the field of tourism and assert the fact that there is still little research covering immersive technology in hospitality sector. The phenomenon of few studies of MT in hospitality has been acknowledged also by other scholars such as Buhalis et al. (2022); Gursoy et al. (2022); Koo et al. (2022); Sharif et al. (2019). Buhalis et al. (2022) argue the industrial practitioners especially hospitality sector to strategically venture in metaverse technology investment if the industry really intends to compete and meet the needs of their customers in this dynamic and immersive world of technology. However, while the findings shed light on the current state of MT research and innovation within THMK, they may not fully achieve the aim of assessing

Indonesia's preparedness in harnessing MT effectively. On one hand, the study effectively assesses the progress of MT research within the THMK context by reviewing a substantial number of papers and identifying trends, methodologies, and theoretical frameworks employed in this field. To assess Indonesia's preparedness more comprehensively in harnessing MT effectively, future research could incorporate additional methodologies such as surveys, interviews, or case studies involving industry stakeholders.

The analysis of the findings in response to RQ2 revealed that for the past 10 years MT research innovations in THMK about 50% of the studies have been adopting qualitative method of conducting research. While the qualitative method was the most common form of data collection used from the reviewed articles, findings from Yung et al. (2017) on virtual reality and augmented reality in tourism research assert quantitative method as the most common form of data collection. This is because MT research innovations in THMK is an emerging trend and therefore more qualitative studies are essential to explore deeply into the subject under investigation.

The analysis of the findings in response to RQ3 revealed that there has been limited or narrow base of theories adopted by authors to understand the MT concept in THMK. These findings concur with the findings of Yung et al. (2017) highlighted the narrow and limited theoretical perspective in VR and AR research in tourism sector. No doubt that the use of narrow and limited theoretical perspective underpinning MT research in THMK is backed by the fact that MT is still at infancy stage limited with established theories (Yung et al. 2017). Consequently, hospitality academics should aim to develop, modify or scoping the use of available theories suitable to offer the clear understanding and adoption of this technology in both academia and industrial practitioners (Buhalis et al. 2022). Gursoy et al. (2022) discovered two metaverse dimensions based on experience in four quadrants. Including interactive and motivational metaverse experience. They assert that experience in metaverse interaction will be regarded as of high interactive experience if metaverse require the customer to actively participate in a live virtual environment in conducting the designed activities, but of low interactive experience if the metaverse require the customer to passively engage with products and services offered by the industry. Motivational metaverse experience is the second dimensional framework proposed by Gursoy et al. (2022). They assert that in motivational metaverse experience, customers may be hedonically motivated seeking for enjoyment and pleasure of the platform. Alternatively, customers may be urged by utilitarian motives to satisfy their functional or utilitarian needs in the metaverse world.

However, in this SLR paper the analysis of the findings in response to RQ4 contributed to the existing body of knowledge the technological dimensional of metaverse, which is fundamental for experiential metaverse dimensions presented by Gursoy et al. (2022) to function. This is because metaverse cannot work alone. It needs other associated technologies which form the basis of metaverse technological dimensions as listed in the findings section. This finding concurs with other current research findings from Emergen Research, (2022) and Precedence Research, (2022) asserting that metaverse should be supported by technologies such as blockchain technology (BC), Augmented Reality (AR), Virtual Reality (VR), Mixed Reality (MR) and Extended Reality (XR), Internet of Things (IoT), and Artificial Intelligence (AI) to create immersive and 3D user experience interacting with virtual objects in a real time.

This study also found the close relationship between metaverse technology and its associated MT dimensions. As metaverse intention is designed to give the visitor a real time experiments before, during and after metaverse experiential consumption, the need for real time data analysis is also of imperative making metaverse ineffective without big data analytics. Smart technology is necessary to support the transformation of existing infrastructures to smart infrastructure that is more favorable to metaverse technology. Lastly, real time for metaverse experience also needs to

be supported by real time transaction and security of the user's creating avenue for blockchain technology in metaverse.

6. Conclusion

This SLR conducted aimed to explore the current state-of-art-of metaverse technology (MT) research in the context of THMK in Indonesia. The purpose was to assess Indonesia's preparedness in harnessing MT effectively within its THMK context and to gauge the progress of MT research within this specific context. Through the vigorous analysis of thirty-four (34) papers significant insights were gained regarding the utilization of MT in THMK practices. This study revealed a substantial increase in MT research innovation over the past decade indicating a growing interest of the Indonesian to leverage MT within THMK context. Even though the results point to a significant rise in MT research innovation in the THMK setting, there remains a relatively low number of studies focusing on the hospitality marketing sector, suggesting a potential area for further exploration and investment. The examination of methodological perspectives highlighted the predominance of qualitative approaches, experimental designs, mixed methods, and quantitative approaches among MT research studies. This diversity in methodologies underscores the multifaceted nature of MT phenomena and the need for comprehensive research approaches to gain a deeper understanding of its applications in THMK practices.

The investigation into theoretical perspectives revealed a limited range of theoretical frameworks employed by authors, with the three-dimension model theory and system model theory emerging as the most prominent. While these theories provide valuable insights into the complexities of integrating MT within THMK practices, there is a need for future studies to engage more explicitly with theoretical frameworks to enhance rigor and coherence in MT research. The exploration of content dimensions of metaverse technology (MT) within the tourism and hospitality marketing (THMK) context, VR technology emerges as a prominent content dimension, with a notable focus on creating immersive experiences and enhancing visualization in THMK offerings. AR technology follows closely, providing interactive and immersive experiences by blending digital information with the real world. Both VR and AR present promising avenues for enhancing customer experiences in various THMK settings, from museum tourism to hospitality establishments. While this SLR provides valuable insights into the progress of MT research within THMK in Indonesia there are opportunities for future research to assess Indonesia's preparedness more directly in harnessing MT effectively by incorporating additional methodologies. By doing so, the research in MT will have a positive contribution toward the government effort to Wondeverse Indonesian through tourism.

7. Funding

This research received no external funding.

8. Conflicts of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship and or publication of this article.

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