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A systematic literature review on Gen Z's adoption of metaverse tourism in Malaysia: Models and research gaps

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Abstract

Metaverse tourism is an emerging technology that could change how people experience travel by using smart tourism systems with extended reality (XR) tools, such as virtual reality (VR) and augmented reality (AR). Interest in using Metaverse technologies in the travel industry has grown quickly, with more studies and businesses exploring this area. This review looks at existing research on how Metaverse tourism is adopted. Using the PRISMA method, 26 relevant studies were selected and analyzed based on specific criteria. Most of the research so far has used traditional models like the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) to understand technology adoption. The review points out that there are gaps in current research and suggests future directions. These include combining different theoretical models, studying specific contexts, and developing new frameworks to better understand what influences the adoption of Metaverse tourism.

Keywords: Frameworks, Metaverse Tourism, Metaverse, Model, Research Gaps, Systematic Literature Review.

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1. Introduction

The COVID-19 pandemic has caused an immense effect on the tourism industry. The lockdown and quarantine during this period have made individuals unable to endure the situation, triggering an urge for break and thus resulting in overtourism [1] resulting pollutions, environmental and local resources scarcity and climate change. This issue has caused

concern for the World Tourism Organization (UNWTO), facing the challenges to maintain and promote sustainable tourism. However, this concern has increased the growing demand for sustainable travel [2] particularly, Generation Z (Gen Z) [3].

In 2021, Meta, formerly Facebook, has launched the Metaverse, gaining the attractions among tech companies and even scholars. According to Meta's CEO, Mark Zuckerberg, Metaverse is the future and evolving internet that enables the user to connect, communicate, engage, and collaborate in the virtual world [4]. In response, few scholars [1, 5-7]. Predicted that the Metaverse could enhance the sustainability of tourism and fulfil the demand for future digital tourists, particularly, Generations Z and onwards [1]. According to Seyfi, et al. [3] Generation Z is an important cohort that born in a digital era and they are environmental conscious. They often described as digitally-centric, flexible and values-oriented, prioritizing the sustainability as important value.

According to the Go and Kang [1]. Metaverse tourism has potential to support Sustainable Development Goals (SDGs), focussing on Goal 4, Goal 14 and Goal 15, by providing lifelong learning opportunities through the preservation of heritage and culture, as well as the protection of endangered species and ecosystems both in underwater and on land. This subsequently influence the Goal 13, which is to take urgent action to combat climate change and its impact. In accordance with SDGs, Malaysia has launched the National Tourism Policy 2020 - 2030, seeking to transform current tourism towards digitalization through smart tourism, enhancing the competitiveness, partnership and tourism sustainability.

1.1. Research Objectives

Recent years, Metaverse tourism has been widely discussed by numerous scholars as a form of sustainable tourism. However, there is lack of studies related to Metaverse tourism adoption among Gen Z in Malaysia. Therefore, a systematic literature review is employed in this study to identify the research gaps of Metaverse tourism among Gen Z in Malaysia to address the following research questions:

- 1.What is the effective model or framework to study Metaverse tourism adoption?
- 2.What are the research gaps that can be identified in the literature on Metaverse tourism adoption in the Malaysian context?

1.2. Overview of Metaverse Tourism

Covid-19 pandemic has caused people to spend more time online and interact remotely during the pandemic. This has encouraged people to work, learn, and socialise using virtual tools such as video calls and Internet chat. The worldwide crisis has triggered changes in cultural habits and behaviours that are vital to the development of Metaverse. People are actively participating in these digital environments by using avatars, which are digital representations of themselves, and experiencing aspects of life through these simulated bodies, instead of merely viewing [8].

Meta means "beyond" and verse originates from "universe" [4, 9]. Metaverse is defined as mixed experience of physical and virtual environment Go and Kang [1] by utilizing the extended realities (XR) devices [9]. It is built on 360-degree virtual environment [9] that incorporates extended scope of experiences, for instance, providing near-realistic sensations [10]. It also involves multiple sensory interaction, enabling the use to deal with the tangible item within the virtual world [11].

According to Buhalis, et al. [11]. Metaverse tourism is an environment that provides tourists with travel experiences within a virtual world, showcasing tourist destinations, attractions, events and hospitality services through 3D modalities. To reduce the boundaries between physical and virtual world, Metaverse tourism interacts with synchronous interaction, enabling the tourists to behave and navigate within the virtual world as if they are in the physical world [11].

As an example of Metaverse tourism, The Korea Tourism Organisation recently launched a global virtual experience of Korea, using ZEPETO, a well-known mobile-centric 3D avatar creation app among youth, particularly the Generation Z [8]. ZEPETO is a platform that digitally brings Korean iconic landmarks closer to reality by allowing the international tourists to virtually travel the tourism destinations, as if they were physically present. For instance, Rainbow Fountain at Banpo Bridge (Figure 1) and Namsan N Tower (Figure 2).



Figure 1.
Rainbow Fountain at Banpo Bridge via ZEPETO.



Figure 2.
Namsan N Tower via ZEPETO.

1.3. Underlying Technologies of Metaverse

Metaverse is an incorporation of several technologies Kusuma and Supangkat [12] offering unique programme for each of the technologies, that contribute to the immersiveness, dynamic and seamless operation of the Metaverse. It provides users a sense of immersion in the virtual environment. These technologies include:

1.3.1. Virtual Reality (VR) and Augmented Reality (AR)

VR and AR technologies play essential role in operating Metaverse. These equipment help to bridge the gap between digital and actual experiences by offering immersive and interactive environments beyond traditional boundaries of current gaming platforms. The users can experience fantasization in the Metaverse by wearing haptic gloves and VR headsets (Figure 3) [9, 13-16] to communicate seamlessly as it can simulate and precipitate emotion to create real sensation in the virtual worlds, indirectly, achieving an actual and real-physical [10].



Figure 3.
Haptic gloves and VR headsets.

1.3.2. Artificial Intelligence (AI)

Artificial intelligence (AI) is capable of developing a realistic Metaverse. For instance, the AI algorithm helps to visualize the entire image of the actual environment in the virtual world using a computational imaging system. Furthermore, AI contributes to the multimodality of the Metaverse by giving the users real-time sensory feedback due to its multimodal is equipped with an 'in-sensor', providing the users with immediate sense and recognition in the Metaverse. Other than that, AI works with other computational technologies to power and run Metaverse. For example, it integrates cloud computing, edge computing, in-memory computing, and optoelectronic computing to ensure seamless and smooth operation in Metaverse. The researchers explained that these technologies facilitate AI in providing security, improving the Metaverse infrastructure by storing vast amounts of data memory information to mimic the dynamics of human brains [17].

1.3.3. Blockchain

Blockchain is a decentralized system that employs distributed ledger technology to facilitate peer-to-peer transactions without relying on financial institutions. The Metaverse relies on decentralized blockchain technology [12]. Blockchain supports Metaverse through its immutability, which helps secure users' privacy and data [16]. For example, the transparency and resilience afforded by blockchain's distributed ledger technology allow users to safely record and trace their telepresence data within the Metaverse, assuring both data integrity and privacy. Moreover, blockchain provides users with full control and ownership of their digital assets in virtual settings [18].

1.3.4. Digital Twin

According to Kusuma and Supangkat [12]. Metaverse can act as a digital twin by reflecting real-world environments, objects, and tangible products, enabling smooth commercial processes within virtual worlds. Mckinsey & Company [19] further clarified that a digital twin is interconnected with all parts of an organization, boosting simulation, planning, and decision-making while delivering users immersive experiences. Metaverse and digital twin are closely connected, as both

technologies work together to provide realistic and immersive experiences for consumers. Since digital twins can interact with real-time data from the physical world, people in the Metaverse are empowered to develop and produce items that may not be feasible in the real world.

1.4. Features of Metaverse Technology

There are several key features of Metaverse technology for the users to create a sense of presence in the virtual world. According to Abilkaiyrkyzy, et al. [20] current gaming platforms associated with the Metaverse are seen as early models of the future Metaverse. Therefore, it can be concluded as follows:

1.4.1. Persistence

Persistence means that the virtual world in the Metaverse continues to exist even if the users are offline. The users' avatar and progress are saved, providing a consistent and ongoing experience, and a sense of belonging to users. This is similar with saved progress in current video games platforms. In the Metaverse, the space will remain unchanged until the users log in to that space. This is to ensure the users experience the space consistency like the real world. In today's current gaming platform, it is a gesture local persistence which enables the users' avatar and virtual environment to stay the same every time the users log in, however, in the Metaverse, it is a new world that truly persistent and continuously evolves although the users are not logged in Abilkaiyrkyzy, et al. [20].

1.4.2. Social Interaction

In the Metaverse, it allows the users to build a sense of community. The Metaverse allows users to engage, communicate, and participate in shared activities in seamless real-time interaction within its social network. In other words, it enables the users to have synchronous interaction and with other users through their own avatar to feel near-realistic sensation and experience like the real world. For instance, similar real world, it enables the users to host real-life social events, such as hosting parties [20].

1.4.3. Avatar

An avatar is a digital representation of a user in the virtual world, created through VR and AR technologies. It reflects the user's identity and is essential for interacting with objects and other people in shared digital spaces. Avatar plays an important role in solving various problems associated with expanding virtual worlds. These difficulties include for continuous and large-scale user real-time interaction and involvement, the capacity to see the virtual world concurrently from devices or locations, and the incorporation of diverse of simulation engines. Thus, avatar helps in addressing all these factors to ensure a smooth, seamless and scalable virtual experience [20].

1.4.4. Virtual Economic System

Web 4.0 aims to seek a major technological development that will lead to a globally interconnected, intelligent, and immersive environment. The Metaverse has a potential to influence society dynamics. By bringing Web 4.0 and the Metaverse, this new strategy aims to create a more favourable and conducive environment for businesses where it has its own economy, enabling the users to trade virtual goods and services using virtual currencies. This system is linked to the real-world economy, allowing money transfers and purchases. Metaverse employs blockchain technologies like NFTs to secure and protect the ownership and transactions of the users within the digital environment [16, 21].

2. Methodology

Systematic Literature Review (SLR) methodology is a systematic procedure that collects, identifies and analyzes prior and existing studies. Prior to conducting SLR, it is essential to narrow down the research topic and establish clear research questions, which can be derived from the relevant literature [22]. Hence, this study employs Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) as a guideline for SLR to respond the study's research question: (1) identify the effective model or framework to study Metaverse tourism adoption and (2) identify research gaps in the literature on Metaverse tourism adoption in the Malaysian context.

2.1. Database and Search Terms

The database chosen was Scopus. It is a comprehensive database that provides significant coverage of scholarly literature, supported by evidence from peer review among academic and research institutions. Scopus selects publications based on strict criteria to ensure their quality and relevance to the indexation. Furthermore, it provides great functionality for convenient access to relevant information [23]. The research selection utilizes the Boolean operators "OR" and "AND" in the search term to narrow down the keywords [24]. By specifying search strings keywords, ("Metaverse") AND ("Tourism") AND ("Adoption") AND ("framework OR model") AND ("Gen Z") AND ("Malaysia") shown in Table 1, the research gaps on the Metaverse tourism adoption in the context of Malaysia is identified.

Table 1.

Search Terms for Systematic Literature Review.

Search Terms	No. of Studies
("Metaverse Tourism")	252
("Metaverse Tourism") AND ("Adoption")	53
("Metaverse Tourism") AND ("Adoption") AND ("Model OR Framework")	33
("Metaverse Tourism") AND ("Adoption") AND ("Model OR Framework") AND ("Gen Z")	2
("Metaverse Tourism") AND ("Adoption") AND ("Model OR Framework") AND ("Gen Z") AND ("Malaysia")	0
Total No. of Studies	340

2.2. Inclusion and Exclusion Criteria

This study limits the period range from 2022 to 2025 and the document types include journal articles, conference paper and review. The following criteria for paper inclusion and exclusion were established to help with selecting the most relevant paper for this study: (1) The paper must be written in English, (2) it must be related and relevant to the research topic; metaverse tourism adoption, and (3) it must be openly accessible for further study.

2.3. Search Result

PRISMA comprises three stages, involving identification, screening and inclusion. Initially, the identification phase found there are no duplication records, and no records marked as ineligible by automation tools for the search of Metaverse Tourism Adoption with a focus on frameworks or models, maintaining 53 publications before the screening phase. The identification record retrieved from the Table 1, with search terms of ("Metaverse Tourism") AND ("Adoption") is chosen.

In the screening phase, we screened the 53 publications to exclude according to the inclusion and exclusion criteria (the paper is written in English only, related and relevant to research topic and openly accessibly for further study). There is no foreign language found on the Scopus, remaining a total of 52 papers for retrieval shown in Figure 4. Then, the following report for retrieval of 1 paper were removed since it's unable to access due to fee subscriptions, resulting the remaining of 52 papers eligible for access.

However, we further analysed through filtering and narrowing to the main research topic, focusing on Metaverse tourism adoption or behavioural intention, resulting the removal of 26 papers. As a result, 26 papers were eligible and included in the final review for further analysis. Figure 3 presents the results of the systematic literature review conducted using the PRISMA guidelines to provide a comprehensive understanding of the selected studies.

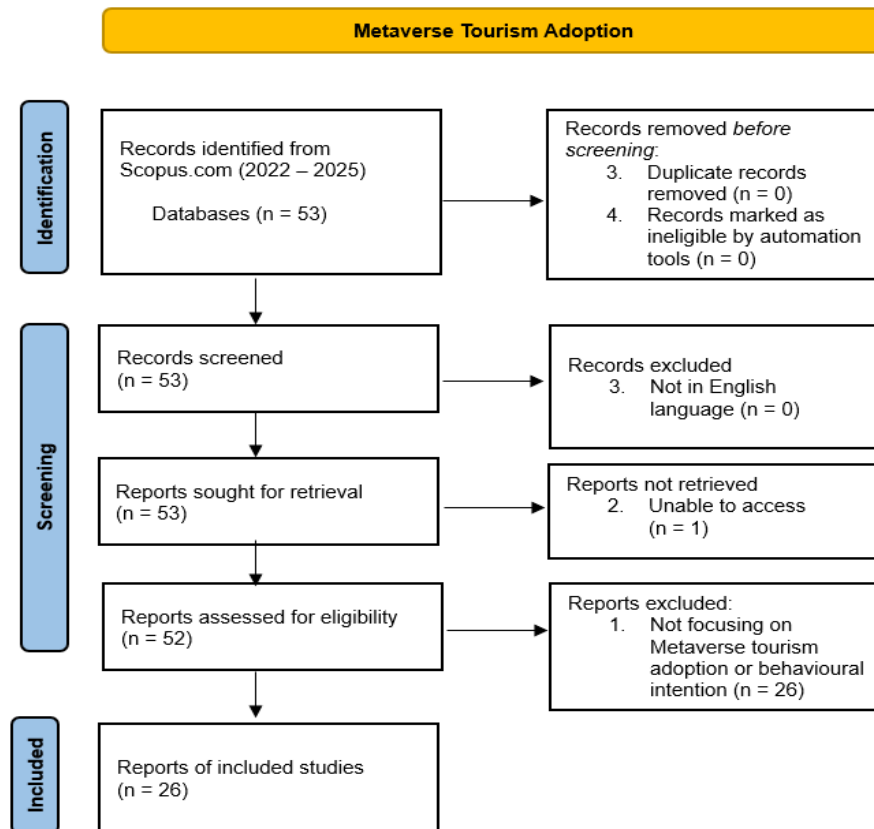


Figure 4.
PRISMA Diagram.

3. Findings and Analysis

This section presents an overview of the descriptive results of the included 26 records, focusing on document type and number of publications per year.

3.1. Document Type

The data obtained has been divided into three categories: journal articles, conference papers, and article review. According to Table 2, most of the publications are journal articles (20 publications or 77%), with four review articles (15.4%), and 2 conference papers (7.6%) as shown in Table 2.

Table 2.

Document Type.

Document Type	No. of publications	%(N=26)
Journal Article	20	77%
Review Article	4	15.4%
Conference Paper	2	7.6%
	26	100

3.2. Number of Publications Per Year

Figure 5 shows consistent upward trend in the number of publications on Metaverse tourism adoption, indicating that academic interest and research engagement in this topic has increased in recent years. This reflects that Metaverse tourism is potential to be a transformative emerging tool in the tourist sector, leading academics and tech experts to investigate its potential, applications, and consequences in deeper way.

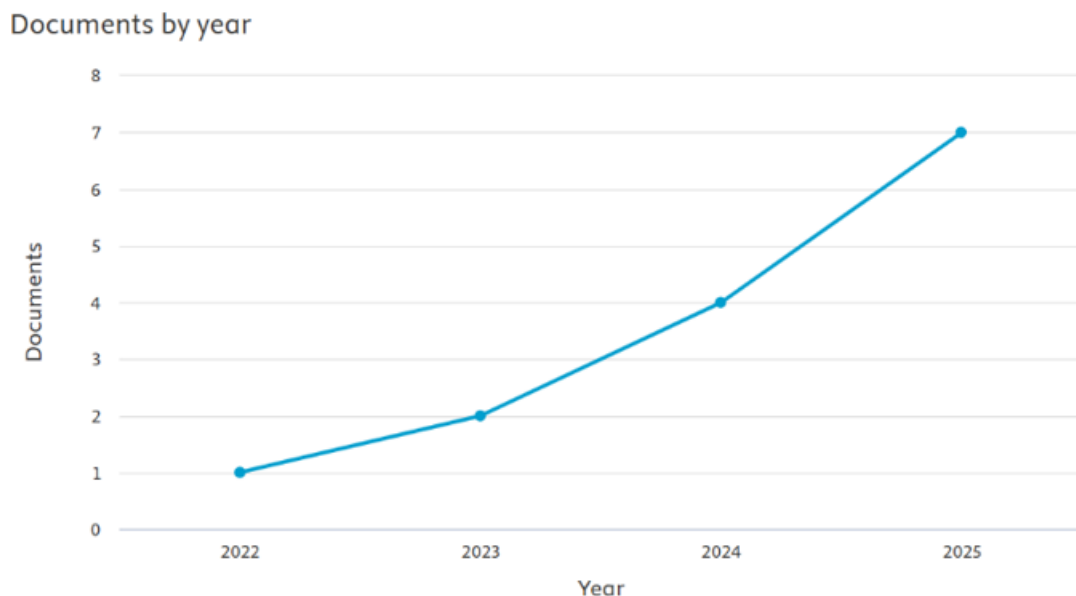


Figure 5.
Number of publications per year.

3.3. Citation Count

According to Table 3, the scholarly works present the highest citation counts derived from Scopus. Based on the table, the publication year trend is between 2022 to 2025, with the study by Gursoy, et al. [25] counts the highest citation. It indicates that this paper has been a benchmark to support future research or study in the context of metaverse in tourism. Examining this trend reveals that there is a growing academic interest in exploring and studying the Metaverse within tourism studies, highlighting its emerging significance as both a theoretical and practical domain in tourism and hospitality research.

Table 3.
Top 10 Highest Citation Count of Scholarly Works via Scopus.

Title	Author	Year	Citation Counts
The metaverse in the hospitality and tourism industry: An overview of current trends and future research directions	Gursoy, et al. [25]	2022	459
Metaverse tourism and Gen-Z and Gen-Y's motivation: "will you, or won't you travel virtually?"	Zhang, et al. [26]	2024	58
Metaverse in tourism: drivers and hindrances from stakeholders' perspective	Chen, et al. [27]	2023	47
Exploring the impact of metaverse tourism experiences on actual visit intentions: An integrated model of presence, the Technology Acceptance Model, and the Theory of Planned Behavior	Liu and Park [28]	2024	28
Investigating the Relationship between Users' Behavioral Intentions and Learning Effects of VR System for Sustainable Tourism Development	Su, et al. [29]	2023	19
Embracing the metaverse: cultivating sustainable tourism growth on a global scale	Adnan, et al. [30]	2024	15
Exploring new realms or losing touch? Assessing public beliefs about tourism in the metaverse—a big-data approach	Mahmoud, et al. [31]	2025	12
Metaverse adoption: a systematic literature review and roadmap for future research	Dhingra and Abhishek [32]	2024	11
Behavioral Intentions in Metaverse Tourism: An Extended Technology Acceptance Model with Flow Theory	Wu, et al. [33]	2024	4
Virtual World – Metaverse Governance Conceptual Framework	Grover and Shalender [34]	2023	2

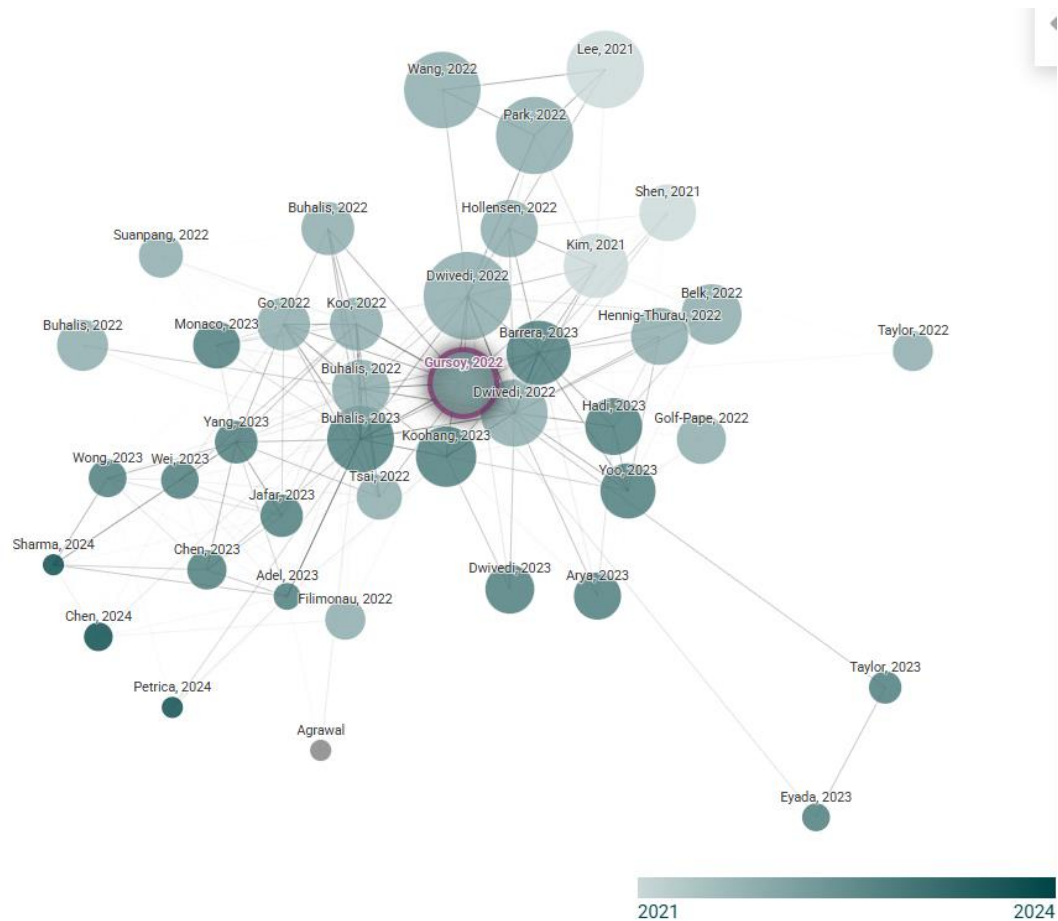
3.4. Connected Papers

This study conducted an in-depth examination to evaluate the highest citation of scholarly works derived from Scopus employing Connected Papers through "<https://www.connectedpapers.com>". The paper by Gursoy, et al. [25] is selected as the "origin paper" since it has the most citations from Scopus, allowing the system algorithm to create a graph of "Connected Papers" upon it. Figure 6 shows the graph results. According to Behera, et al. [35] the graph displays the analysis, demonstrating the co-relation between papers or similar paper, which can be identified by the node size, colour, and connecting lines.

The larger the node size represents the highest-cited paper, hence, the more influential the paper [36]. Based on Figure 6, the top three papers with larger node sizes, as determined by citation ranking on the "List View" feature of Connected papers, are Dwivedi, et al. [14]; Lee, et al. [37] and Park and Kim [38] showing that they are among the prominent and highly cited paper in this study area.

As for the node colour, it indicates the paper's timeline publication. The recent papers will appear as dimmer colour node, signifying contemporary trends in the field of research, meanwhile, the older papers will appear as bright colour node, reflecting as one the main study in this field of study. Figure 6 illustrates that the papers published between 2021 and 2022 are represented as brighter nodes, signifying the emergence of preliminary study and growing interest in the metaverse domain. The dimmer colour nodes emphasise the recent trend increases among academics in diversifying emerging papers across various fields.

Although the original paper by Gursoy, et al. [25] is not among the highest cited in "List View," nevertheless, it still highlights as a significant and impactful paper, particularly in its initial studies within the field of metaverse in tourism and hospitality. The medium size and moderate colour of the node indicate that the paper is recent and significantly influential.

**Figure 6.**

Graph version via Scopus.

Source: Lee, et al. [37]; Park and Kim [38]; Buhalis and Karatay [39]; Chen, et al. [27]; Chen [5]; Dwivedi, et al. [14]; Gursay, et al. [25]; Go and Kang [1] and Yoon and Nam [8]

Furthermore, connecting lines in Connected Papers help to identify and evaluate the similarity contents among papers. The thicker the connecting lines, reflecting the higher similarity content between origin paper and connected papers. As shown in Figure 6 papers by Koo, et al. [40]; Buhalis, et al. [10] and Buhalis, et al. [11] are the papers that reflect high similarity content to the origin paper, retrieved by “List view”. The list is shown in Table 4 highlighting the top five papers with similarity percentage content to the origin paper.

Table 4.

Similarity Percentage Content of Paper via Connected Papers.

Title	Author	Year	Similarity Percentage
Metaverse tourism: conceptual framework and research propositions	Koo, et al. [40]	2022	33.1
Metaverse as a disruptive technology revolutionising tourism management and marketing	Buhalis, et al. [10]	2023	30.4
Metaverse as a driver for customer experience and value co-creation: implications for hospitality and tourism management and marketing	Buhalis, et al. [11]	2022	29.9
Metaverse tourism for sustainable tourism development: tourism agenda 2030	Go and Kang [1]	2022	24.2
Mixed Reality (MR) for Generation Z in Cultural Heritage Tourism Towards Metaverse	Buhalis and Karatay [39]	2022	22.5

Other than that, Connected Papers provide a guidance to map out the “Prior Works” to the origin paper, serving as the foundation of the concept, methodologies and theories associated to the area. According to the analysis of the Connected Papers, studies by Dionisio, et al. [41]; Duan, et al. [42] and Buhalis [43] are among the top three prior works that serve as the foundation to this research area with the highest citation count and graph citation. Table 5 shows the top five “Prior Works” derived from Connected Papers feature.

Table 5.
Top 5 “Prior Works” via Connected Papers.

Title	Author	Year	Citation Count	Graph Citation
3D Virtual worlds and the metaverse: Current status and future possibilities	Dionisio, et al. [41]	2013	801	12
Metaverse for Social Good: A University Campus Prototype	Duan, et al. [42]	2021	630	9
Technology in tourism-from information communication technologies to eTourism and smart tourism towards ambient intelligence tourism: a perspective article	Buhalis [43]	2019	449	9
What is XR? Towards a Framework for Augmented and Virtual Reality	Rauschnabel, et al. [44]	2022	490	8
A tourist typology of online and face-to-face social contact: Destination immersion and tourism encapsulation/decapsulation	Fan, et al. [45]	2019	103	8

Conversely, “Derivative Works” in Connected Papers facilitates to identify the subsequent papers that have cited from origin paper by extending, refining, or applying its findings into new contexts. Based on Connected Papers analysis, studies by Hassan and Saleh [46]; Casais, et al. [47] and Bruni, et al. [48] are among the top three papers that have highest graph references related to the origin paper. Table 6 shows the top five “Derivative Works” identified from Connected Papers feature. These both “Prior Works” and “Derivative Works” provide a guidance to the researcher through graphical illustrations in understanding both the conceptual history of the paper and its impact on future developments in the field.

Table 6.
Top 5 “Derivative Works” via Connected Papers.

Title	Author	Year	Citation Count	Graph References
Tourism metaverse from the attribution theory lens: a metaverse behavioral map and future directions	Hassan and Saleh [46]	2023	15	17
Sensory marketing in the metaverse for tourism preview and tourism pre-experience: the effect on the intention to visit tourist destinations	Casais, et al. [47]	2025	0	16
Defining the Metaverse with challenges and opportunities in the business environment	Bruni, et al. [48]	2023	12	16
Metaverse for tourists and tourism destinations	Ioannidis and Kontis [49]	2023	25	16
Metaverse in services marketing: an overview and future research directions	Gursoy, et al. [50]	2023	35	16

4. Discussion

This section provides the theoretical framework derived from the conducted SLR and PRISMA, explaining the research gaps indicated in the included publications.

4.1. Theoretical Framework

In evaluating the adoption of metaverse technologies in tourism, there are several theories related to technology have been widely used particularly in technology adoption and intentions. These models help to explain the behavioural intentions of user to adopt and use of developing technology in the future. This section discusses the theoretical framework which have been employed in the context of metaverse tourism retrieved from 26 papers identified from PRISMA.

4.2. Technology Acceptance Model (TAM)

Technology Acceptance Model by Davis [51] has been widely used extensively in information and communication technology (ICT) adoption research due to its clear structure, predictive strength, and relevance across multiple technological contexts. The constructs of the model, perceived usefulness (PU) and perceived ease of use (PEOU), effectively describe users' behavioral intention to adopt new technologies, making it widely relevant in both organizational and consumer settings. Its straightforwardness enables researchers to extend or relate it with other models, resulting in broad use in fields, particularly, adoption of metaverse technologies [28, 30, 31, 52, 53].

4.3. Unified Theory of Acceptance and Use of Technology

The Unified Theory of Acceptance and Use of Technology (UTAUT) was established by Venkatesh, et al. [54] which is one of the most widely used models in ICT adoption research due to its comprehensive nature, predictive strength, and flexibility across multiple technology contexts. It combines features from eight previous models, including TAM, TPB, IDT, TRA, MM, C-TAM-TPB, MPCU and SCT. It incorporates four essential constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions. The incorporation of UTAUT in social and organisational aspects have made it most relevant theories related to adoption intention of new and advanced, particularly in metaverse tourism

contexts [52, 55, 56]. It then has extended to UTAUT-2 by expanding its usefulness to consumer behaviour research by include Hedonic Motivation, Price Value, and Habit [57].

4.4. Theory of Planned Behaviour (TPB)

The Theory of Planned Behaviour (TPB), developed by Ajzen [58] is an extension of the Theory of Reasoned Action. It focusses on an individual's intention to perform certain behaviour, which is influenced by both external and internal factors. In other words, it represents the effort of an individual in performing the behaviour. TPB identifies three key determinants of behavioural intention: attitude towards the behaviour, referring to the individual's positive or negative evaluation of performing the behaviour; subjective norms, which refer to the perceived social pressure from others to perform or not perform the behaviour; and perceived behavioural control, reflecting the individual's perceived of ease in performing the behaviour. In general, a person's intention to carry out a particular activity is stronger when their attitude, subjective norms, and perceived behavioural control are more positive. Several scholars [26, 30, 53] have employed the Theory of Planned Behaviour (TPB), particularly in the context of Metaverse tourism adoption. This is because a person's choice and intention to engage in a virtual immersion experience are impacted by both internal and external circumstances.

4.5. Innovation of Diffusion Theory (IDT)

The Innovation Diffusion Theory (IDT), proposed by Rogers [59] explains how new ideas and technologies expand among people over time. In other terms, it examines how fast the acceptance of some individual towards new things. Rogers [59] further mentioned that communication, time, and social influence play crucial to determining the people to adopt innovations. Rogers [59] also described five types of adopters: innovators, early adopters, early majority, late majority, and laggards in adopting new innovation of technology. Furthermore, the characteristics in IDT, for instance, relative advantage, compatibility, complexity, trialability, and observability have impact in each group to adopt new technology at different speeds, and this evaluates the progress on how new technology becomes widely accepted and used in society. Several scholars [26, 31, 60] believe that by employing IDT, it evaluates and explains the importance factors of acceptance to adopt new technology particularly Metaverse tourism technology.

4.6. Innovation Resistance Theory (IRT)

The Innovation Resistance Theory (IRT), developed by Ram and Sheth [61] explaining the understanding of customer resistance behavior. According to Kaur, et al. [62] innovation resistance is defined as the hesitation to adopt a new idea, innovation or technology, due to the thoughtful consideration. This happened because innovation or technology is seen as disruptive to the existing way of life or disagree with an individual's current beliefs, values, or routines. Ram and Sheth [61] further explains that the consumer resistance plays a crucial role to determine the innovation successfulness. Zhan, et al. [63] explains that in the Metaverse context, innovation resistance may be correlated with psychological factors like fear and uncertainty about adopting or using technology because of perceived platform risk. For this reason, the researcher used IRT to determine and assess the user's intention to use Metaverse tourism.

4.7. Behavioural Reasoning Theory (BRT)

The Behavioural Reasoning Theory was popularized by Westaby [64]. This theory explains that there is a relationship between the reasons of every individual for their decisions and behaviours and their beliefs, general motives, intentions, and actual behaviours. These factors assist individuals to justify and explain themselves. BRT also differentiates between global motives, for instance, attitudes, societal norms, and perceived behavioural control and context-specific reason. For example, in the context of metaverse tourism, individuals may have positive opinions toward metaverse technology (a global motive) yet oppose the adoption owing to specific concerns such as realism, accessibility, or ethical issues (context-specific reasons). Hence, study by Himanshu, et al. [65] applied BRT to assess the individual behavioural intentions in adopting metaverse tourism.

4.8. Self-Determination Theory (SDT)

Self-Determination Theory (SDT) is a prominent motivational theory developed by Ryan and Deci [66] exploring the reason of the individual participating in physical activities. This theory evaluates the fulfillment of individual motivation based on three basic psychological needs: autonomy (freedom to choose), competence (capability and effectiveness), and relatedness (connection to other well-beings). Several researchers [26, 30, 67, 68] have employed SDT to explore and investigate the adoption of metaverse tourism. In the context of metaverse tourism, SDT provides insight into the reasons that individuals engage in virtual travel experiences. Users, for example, may experience autonomy by freely choosing to explore a virtual environment, competence by effectively navigating and engaging in a virtual environment, and relatedness by sharing their experiences with others via avatars in the virtual world. When these requirements are met, people are more likely to appreciate and use metaverse tourist technology.

4.9. Use and Gratification Theory (UGT)

Use and Gratification Theory was developed by Katz, et al. [69]. This theory investigates the reason of individuals purposely choose specific media to satisfy their personal preference. UGT determines the users to identify their media content that suit with their personal identity and psychological attributes. In the context of Metaverse tourism adoption, UGT provides valuable insight into user motivations through visiting the virtual tourism and engage with other users in immersive platforms, by representing themselves as avatars from remote place. Therefore, scholar by Chakraborty, et al.

[70] implements UGT to obtain understanding of Metaverse tourism adoption by focussing on psychological and gratifications of users through immersive virtual experiences.

4.10. Integrated Approach

In the context of technology adoption, an integrated approach refers to merging several theoretical frameworks in order to acquire a more comprehensive understanding of the elements that influence user behaviour. This is because there is no single explanation can properly address the complexity of technology adoption; consequently, many scholars commonly integrate models such as the SDT and TPB [26], TAM, TPB and SDT [30], TAM and IDT [31], UTAUT with TAM [52], TAM with TPB [53] and other theories. By integrating multiple perspectives, it enables researchers to study various factors of technology adoption, offering a more comprehensive understanding of user acceptance and adoption intention.

4.11. Grounded Theory

Grounded Theory, developed by Glaser, et al. [71] is a qualitative research methodology emphasised at developing theory from empirical evidence rather than testing existing frameworks. It is useful in studying new or rapidly growing fields, for instance, Metaverse tourism, where theoretical understanding is still limited. By collecting data through interviews, observations, or open-ended surveys, researchers can find patterns that influence user behaviour. Scholar by Choubey, et al. [72] utilise Grounded Theory to investigate the growing adoption of Metaverse in tourism by investigating users' intentions in choosing a tourist destination and accommodation for vacation. As a result, it provides valuable data for developing theories based on real-world experiences.

5. Gaps

From the result of SLR that has been conducted, there are several gaps identified to motivate this study. This study aims to identify the effectiveness of models or frameworks in the context of Metaverse tourism adoption among Gen Z perspectives. From the PRISMA Diagram as shown in Figure 1, the included papers generated 26 publications that appropriate with metaverse tourism adoption context. Nevertheless, we found that the most widely used models or frameworks to study the intention of adoption for metaverse tourism context are integrating approach between TAM, UTAUT.

Based on the search term on ("Metaverse Tourism") AND ("Adoption") AND ("Model OR Framework") AND ("Gen Z") AND ("Malaysia") via Scopus, there is an absence of study in the context of Metaverse tourism adoption in Malaysia. Nevertheless, according to Venkatesh [73] and Neves, et al. [74]. UTAUT is the most effective model or framework to describe the behavioral intention to adopt and use since it covers the eight models, including TAM and relevant to the newest technologies. Therefore, in the context of Malaysia we will develop the adoption intention of Metaverse tourism by underpinning the UTAUT 2.

Furthermore, current research on Metaverse tourism in the context of Malaysia and the perspective of Generation Z is limited with only one study exploring into this growing field. For example, one of the few efforts to address this gap is the study conducted by Zhang, et al. [26] which employs an integrated framework that combines Self-Determination Theory (SDT) and the Theory of Planned Behaviour (TPB) to comprehensively explore and examine the motivational and behavioural factors influencing the intention to use metaverse technology in tourism among both Generation Z and Generation Y.

6. Limitation and Future Direction

Despite the systematic literature review employed in this study, a few limitations should be highlighted. First, the literature search was limited to specific databases, focusing on Scopus, which limit the papers indexed elsewhere, such as Web of Science, IEEE Xplore, or other high-quality databases. This could result in a partial representation of existing research on adoption intention of metaverse tourism.

Furthermore, while the PRISMA approach found 26 relevant research, the body of literature particularly focussing on Generation Z's perspective in the context of metaverse tourism adoption is still limited. The findings show that the Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT), Innovation of Diffusion Theory (IDT) and Theory of Planned Behaviour (TPB) frameworks are clearly dominant, whereas another alternative theory such as Innovation Resistance Theory (IRT), Behavioural Reasoning Theory (BRT) and Uses and Gratification Theory (UGT), are underutilised.

Future research should consider looking into expanding theoretical frameworks beyond standard models like TAM and UTAUT by incorporating more comprehensive approaches like UTAUT-2 or integrated models that include motivational factors like Self-Determination Theory (SDT). Furthermore, since there is limited research on Generation Z, particularly in the context of metaverse tourism in Malaysia, more further studies or research should be focussing on the group are necessary for better understanding behavioural patterns and future trends. Moreover, the future researcher should employ a variety of methodology, such as longitudinal and mixed-method approaches, in order to help researchers to gain holistic overview of the emerging metaverse technologies in tourism.

7. Conclusion

The purpose of this systematic literature review was to examine the existing research in the context of metaverse tourism adoption in order to identify the effectiveness of model or framework and identify research gaps appropriate to the research topic. A total of 26 appropriate studies were examined using a PRISMA. The findings show that there is

significant improvement has been achieved in understanding the subject, however, there are still significant gaps in theoretical framework among the previous study and in the context of Malaysia, for instance, lack of Gen Z's perspective and methodological approaches.

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