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**MASTER UNIVERSITARIO EN INVESTIGACIÓN DE DIRECCIÓN DE EMPRESAS, MARKETING Y CONTABILIDAD**

# TRABAJO FIN DE MASTER

***Metaverse, a new channel for the future retail sector?***
***A systematic literature review on***
***Virtual World and Metaverse retailing***

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# Resumen

El Metaverso ha sido un sueño desde siempre, pero hoy en día es una posibilidad real gracias a los avances tecnológicos. Muchas empresas se han centrado en este nuevo canal potencial y es crucial entender cómo se comportan los consumidores dentro del Metaverso. Este trabajo de fin de máster tiene como objetivo la revisión de la literatura existente desde 2013 hasta 2022 sobre el Metaverso como canal de distribución. El trabajo responde a diez preguntas de investigación sobre el concepto, las teorías, las metodologías y los resultados relacionados con el Metaverso. Para responder a estas preguntas de investigación, se realizó primero un análisis bibliométrico seguido de una revisión sistemática de la literatura. Las contribuciones principales de este trabajo son dos. La primera es ofrecer una descripción evolutiva del concepto de Metaverso y su clasificación y la segunda es una agenda de investigación en relación con el retail en Metaverso.

**Palabras claves**

Metaverso, mundo virtual, distribución en el metaverso, realidad virtual, revisión sistemática de literatura

# Abstract

The Metaverse has always been a dream, but today it is a real possibility thanks to technological advances. Many companies have focused on this potential new channel, and it is crucial to understand how consumers behave within the Metaverse. This master thesis aims to review the existing literature from 2013 to 2022 on the Metaverse as a distribution channel. The work answers ten research questions about the concept, theories, methodologies, and results related to the Metaverse. To answer these research questions, a bibliometric analysis was first conducted, followed by a systematic literature review. The main contributions of this paper are twofold. The first is to provide an evolutionary description of the Metaverse concept and its classification, and the second is a research agenda in relation to Metaverse retailing.

**Keywords**

Metaverse, virtual world, metaverse retailing, virtual reality, systematic literature review

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# 1. INTRODUCTION

Have you ever imagined that one day you could buy physical products inside a Virtual World (VW), assessed by a virtual assistant as in the real world and without leaving your home? We no longer live in a society where shopping merely means going to a physical store or a website to buy products. With new technologies, new channels are opened, and consumers demand other ways of consumption and living. Consumers are expressing a growing demand for a more engaged purchasing experience. This means that customers have higher expectations of technological developments that can help them and, at the same time delight them (Papagiannidis, 2017).

In the 2000s, numerous studies already aimed to research Virtual Worlds (Spiers et al., 2008; Jin, 2009; Li et al.,2010) due to their potential to become a new sales channel for retailers. In 2022, the concept of Virtual Worlds had evolved into a more sophisticated and broader version of it. With immersive technologies and advances in Virtual Reality (VR), Augmented Reality (AR) and Extended Reality (XR), sensory simulation devices such as Head Mount Devices (HMD), haptic equipment and surround sound systems, etc., we are now capable of creating parallel virtual spaces with higher immersiveness and telepresence to offer unique and exciting shopping experiences to customers. The interest in a Virtual World capable of fulfilling the desires of humans to live and do social activities is persistent, and technological improvements increased the interest. Thus, Metaverse appeared as an approach to a Virtual World where we interact in social, economic, political, and cultural activities (Park and Kim, 2022) that englobes all the technologies studied years before (Interactive technologies, videogames development and web 2.0 technologies) with improved versions and adding new technologies (Blockchain technologies, Artificial Intelligence, Machine Learning, etc.).

It is exciting that we are closer than ever to taking social and economic interactions to a new whole level with higher immersiveness and telepresence in Virtual Worlds. Harwood and Ward (2013) raised the importance of researching inside Virtual Worlds for technological, marketing, and social reasons, representing a new relevant research field. Thus, research related to Virtual World to understand how users will behave is crucial and necessary for better development of the Metaverse. To experiment in the new environment is essential to have a holistic view of existing literature around retail inside Virtual Worlds, what we already know and still need to understand. This master thesis focuses on the literature review of Virtual Worlds and Metaverse retailing to understand the state of the art and develop a research agenda for future research around Metaverse.

The findings of this master thesis will have implications for managers to help them find possible directions to develop better company strategies within this new channel and understand better Consumer

Behaviour inside Metaverse retail environment. It also will help future Metaverse researchers aim their studies better to obtain more accurate results.

## 1.1 Background and concepts

In this section, multiple conceptions are introduced and explained, related to Metaverse and providing readers more clarity in following this master thesis.

**Social Virtual Worlds**

Social Virtual Worlds (SVW) such as Second Life and The Sims were created with the Internet and World Wide Web growth. Jung (2011) categorised SVWs as one type of Virtual World, characterised by spatial metaphor (walk freely inside the world), persistency (keep your data when you log out) and social interaction (human to human interaction), differing from Gaming Virtual World (GVW), where it has a predefined structure and quest-driven behaviours. SVWs allow players a unique avatar capable of living and socialising inside the Virtual World. Several investigators have sought to research the characteristics of SVWs and how they may be used for commercial applications, although these studies were mainly exploratory, where challenges and opportunities were discussed (Hassouneh and Brengman, 2015). In this master thesis, Virtual Worlds refers to SVWs.

**3D virtual stores**

In the early research stage in 3D Virtual Retail Environments (VRE), computer-generated 3D virtual stores were the first approach to creating virtual shopping experiences for consumers. Liu et al. (2009) define a 3D virtual store as a virtual space inside a computer-generated world where customers can interact with goods and perform other activities. It has been suggested that 3D environments could be used to improve the virtual shopping experience (Miles et al., 2000). Within the literature, Vrechopoulos et al. (2009) indicate that three-dimensional (3D) retail stores, also known as 3D Virtual Reality Retail (VRR) stores, offer a novel and exciting way to shop, with tremendous possibilities for both retailers and customers

**Immersive technologies**

Immersive technologies are all that replicate visual, acoustic, haptic, and motion realism in isolation from the Reality–Virtuality spectrum (Suh and Prophet, 2018). All these technologies enable new possibilities. Virtual Reality is one of the immersive technologies that became relevant in the last decade. In its most formal definition, Virtual Reality uses three-dimensional computer technology to create a Virtual Environment (VE) in which users can navigate and interact. For marketers, Virtual Reality is a novel option. Virtual Reality can generate a new consumer touchpoint to be exploited by marketing

professionals, and this experience does not require a customer's physical presence and participation. (Lee, 2020). Another immersive technology that turned out to be popular is Augmented Reality (AR). Augmented Reality is defined by digital content on the user's natural surroundings. In other words, the actual content is superimposed on the user's virtual environment (Flavián et al., 2019).

**Web 3.0**

The Internet has been evolving since its creation. Beyond the first generation of the Web (Web 1.0), which primarily made static resources available, Web 2.0 environments have enabled users to create and share new content in a collaborative dimension, paving the way for the third generation of intelligent Internet-based services (Web 3.0), which emphasise machine-facilitated understanding of information to provide a more fruitful, personalised, and intuitive user experience.

As the name indicates, Web 3.0 is the upcoming third version of the Internet, based primary on blockchain technologies. In this future version, webs and apps will be able to do information processing in their way, acting humanly using Machine Learning (ML), Big Data, Artificial Intelligence (AI), etc. Web 3.0 was called firstly Semantic Web by the inventor of the World Wide Web, Tim Berners-Lee. The objective was to transform the Internet into a more autonomous, intelligent, open, and decentralised Internet.

**Metaverse**

The concept of the Metaverse firstly appeared in a novel named "Snow Crash", written by Neal Stephenson (1992), where the author suggested Metaverse as "A world where humans as avatars (audiovisual bodies) communicate with each other". After three decades, this concept has been improved under constant changes and modifications due to technological advances, which allowed us to emulate more real experiences and interactions in the Virtual World. Mark Zuckerberg, CEO of Meta, described Metaverse as *"…an embodied internet, where instead of just viewing content — you are in it. And you feel present with other people as if you were in other places, having different experiences that you couldn't necessarily do on a 2D app or webpage, like dancing, for example, or different types of fitness."* (Newton, 2021).

The definition of the Metaverse in literature is not consistent and evolves as the scope of the Metaverse grows. Some researchers define it as an immersive, 3-dimensional, Virtual World where people interact socially and economically, no matter where they are (Arcila, 2014; Díaz et al., 2020; Owens et al.,2011). Others describe Metaverse as environments and visualisations where physical and digital objects co-exist and interact in real-time, using a screen or a Virtual Reality device (Dascalu et al.,2014; Siyaev & Jo, 2021). Authors agree that Metaverse is a virtually created world where we interact in many ways.

An interesting point of view to define the Metaverse is adapted from Future a16z (2022). Table 1 shows that Metaverse is considered open, whereas the Virtual Worlds we know until now (e.g., Second Life)

are close. One of the essential features of Metaverse is decentralisation, and with the help of Web 3.0, it is possible to be enhanced in terms of security with blockchain technologies. In this supposition, the Metaverse is a govern-less world, in other words, not legislated by any nation's government. Hence, it translated as more freedom in many ways, and most of the content is user generated.

**Table 1. Critical dimensions of Metaverse vs Virtual World**

| | **Virtual World (Close)** | **Metaverse (Open)** |
|---|---|---|
| **Structure** | Centralised | Decentralised |
| **Code** | Company insiders | Open-source |
| **Data** | Obscure | Transparent |
| **Access** | Permissioned | Permissionless |
| **Ownership** | Firm | Community |
| **Identity** | Centralised identity providers | User-controlled |
| **Policies** | Platform determined | User-controlled |
| **Social** | Mediated | Direct |
| **Display system** | Limited hardware | Diverse |

Source: Adapted from Future.a16z.com

One of the values missing with online shopping using a virtual representation of authentic products is the experience associated with the real offline world, and Metaverse retailing can solve this by restoring the store atmosphere to online shopping (Papagiannidis et al., 2013).

Park and Kim (2022) believe that the novel Metaverse definition differs from the earlier Metaverse concept in three ways. Firstly, deep learning and generative models could improve immersiveness. Secondly, access to the Metaverse has been dreadfully improved; we can connect to the Internet anytime with our mobile phones and no longer depend on computers to enter a Metaverse. Lastly, now we can program code inside the Metaverse and be more attached to real-life through cryptocurrencies. Thus, the novel Metaverse is an integrative virtual universe with more immersiveness, better accessibility, and a more active real-virtual connection.

We are still in an early research stage with this subject, and definitions are so far ambiguous and incipient. It is vital to concise a common conceptualisation to aim future research directions better.

## 1.2 Research structure

The present research work has been structured and developed in a total of eight sections distributed as follows:

1) The first section introduces the content of the work. It includes an introduction, the reason for this master thesis, objectives, and implications for managers.

2) Section two explains the methodology and structure of this master thesis. It contains the methodologies used to complete this thesis and the structure.

3) The third section explains the data collection procedure. How data were collected is explained in deep within this section, including data origin, filters used, eligibility criteria, etc.

4) The fourth section reports the bibliometric analysis, where literature found will have a more profound analysis such as co-occurrence analysis, motor themes, and more.

5) The fifth section is the core of this master thesis, the literature review. In this section, the evolution of the concept of the Metaverse is reviewed in detail, showing the theories, methodologies, and findings regarding Metaverse retailing are used and found.

6) The sixth section suggests a research agenda with four sub-agendas which provide an overview of future possible research directions.

7) The seventh section comprises the discussion, which summarises this work's main ideas and findings.

8) The last section is a conclusion which resumes all the aspects discussed in this present thesis. Also, some limitations are discussed. And lastly, some personal opinions are given.

# 2. OBJECTIVES AND METHODOLOGY

This master thesis starts from a social science view of the novel Metaverse. Beginning from the evolution of the concept of Metaverse and extending to a review of state the art for Virtual World and Metaverse retailing. The objective is to create a research agenda to help future studies better aim their research regarding this topic. We will conduct a bibliometric analysis of the existing literature and then a systematic literature review. The bibliometric analysis will detect possible trends in articles and journals, relevant authors to the subject and publications with great relevance to the subject to be studied. The bibliometric analysis provides an external analysis of the topic. Then, a systematic analysis of the literature will help us find what subjects were relevant in the past and the present, what methodologies were used to conduct the studies, what theories were employed and what conclusions and implications they extracted. The systematic literature analysis is an internal analysis that focuses on the contents of articles.

To reach the objective suggested below, ten research questions are proposed that will be answered throughout this master thesis:

RQ1: What has been the evolution of academic papers published related to Virtual World and Metaverse retailing?

RQ2: Which Journal published more Virtual World and Metaverse retailing articles?

RQ3: Who are the most relevant authors on this topic?

RQ4: Which articles have achieved the highest impact in terms of citations?

RQ5: What are the most important themes?

RQ6: What is the evolution of conception regards Virtual World and Metaverse?

RQ7: What are the relevant theories in the articles and conference papers?

RQ8: What are the methodologies used in the articles and conference papers?

RQ9: What are the relevant findings in the articles and conference papers?

RQ10: What are the future research directions?

# 3. DATA COLLECTION

When collecting data, two primary databases, Web of Science (WoS) and Scopus are used to find academic papers related to the topic. According to Mongeon and Paul-Hus (2016), these databases are remarkable for including all types of articles and indexing all authors, institutional addresses, and bibliographic references for each article. Until the creation of Scopus and Google Scholar in 2004, Web of Science was the only tool for citation analysis. However, Google Scholar's low data quality raises concerns about its suitability for research evaluation. As a result, Web of Science and Scopus remain the primary sources of citation data today, which is why these two databases are used in the present master thesis.

## 3.1 Search strategy

The keywords used for the search were: (Metaverse OR Virtual World) AND (Retail or Shop or Store or Supermarket). These combinations of words will englobe most of the Virtual World and Metaverse retailing results. The type of documents was limited to articles and conference papers. The latter was included for two reasons. Firstly, due to the novelty of this topic, few articles were found and secondly, the possibility to find high-quality content even though it was a conference paper pending to be modified. The time was set from 2013 to 2022, a complete decade. There are more contributions before 2013, but the main goal of the present master thesis is to focus on the novel Metaverse, and other virtual environment studies will exceed the objective of this work. The subject area was limited to Business Management, Social Sciences, and Behavioural Sciences. Finally, the language was set for English.

## 3.2 Bibliometric analysis data collection

For the bibliometric analysis, a higher number of articles are needed to get more relevant results. We will not apply a second filtering process once we get the results from databases to have broader and more generic content.

Concerning Web of Science search criteria, the search field are filled with "(METAVERSE OR VIRTUAL WORLD) AND (RETAIL* OR STORE OR SUPERMARKET OR SHOP*)", document types are set to "Articles" and "Proceedings papers". The time range is between 2013 and 2022. Then subject areas are configured as "Business management" and "Social sciences". With this criteria, 67 documents are obtained from the WoS database.

Meanwhile, regarding Scopus search criteria, exact field text is introduced, "(METAVERSE OR VIRTUAL AND WORLD) AND (RETAIL* OR SHOP* OR STORE OR SUPERMARKET)",

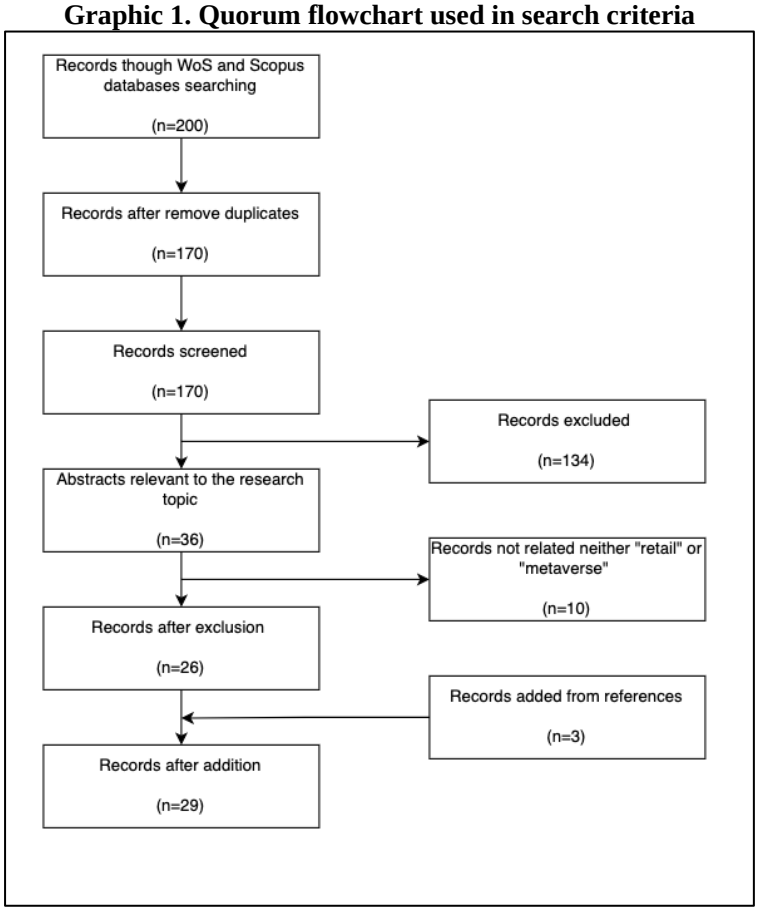
document types are "Articles" and "Conference papers". The same year range between 2013-2022, and the subject areas are "Business" and "Management". The search finished with 133 documents in total.

By merging both database results using the mergeDbSources function in RStudio, we obtained 170 articles excluding duplicates (-30 items). This is the total number of articles and conference papers used for the bibliometric analysis.

## 3.3 Literature review data collection

Meanwhile, the data collection for the literature review followed Petticrew and Robert's (2008) recommendations to use a Quorum flowchart to specify the search criteria (Graphic 1). First, we start by searching the databases for potentially relevant studies related to our topic, using keywords and databases detailed in the search strategy (n=200 articles) and detailed text input see Appendix 1. After that, we proceed to remove all the duplicate records in our findings (n=170). Therefore, articles with abstracts unrelated to business are removed (n=36). Then with a second filter, we remove all the articles that are not related in any way to "retail" nor to "metaverse" (n=26). Finally, we identify references that are in relation to our topic and add them to our literature review database (n=29).

**Graphic 1. Quorum flowchart used in search criteria**



# 4. BIBLIOMETRIC ANALYSIS

In recent years, bibliometric analysis has gained popularity in business research (Khan et al., 2021). Researchers opted for a bibliometric analysis for multiple reasons, such as identifying developing trends in articles and journal performance, collaboration patterns, and investigating the intellectual structure of a specific area in the existing literature (Verma and Gustafsson, 2020; Donthu et al., 2020). It also highlights the most productive writers, the evolution of publications over time, the most important papers, and authors in a particular collection of studies, and the most closely linked subjects to a specific study field (Milian et al., 2019).

Following the bibliometric analysis done by Veloutsou and Ruiz Mafe (2020), where they focused on authors (country and names), the source (journals) and keywords, VOSviewer and Bibliometrix have been used for the bibliometric coupling, co-occurrence of keywords, thematic map, and other data analysis. VOSviewer is a free licence software for constructing bibliometric networks. These networks can be viewed at rates and scales that are impossible to achieve with traditional software or manual approaches (Van Eck and Waltman, 2014). By finding items that share the same references, *bibliographic coupling* establishes the similarity between documents. The number of times two keywords are used together in the sample articles is called *co-occurrence*, reflecting focus similarity. It examines the conceptual framework of a research field by looking at the essential words or keywords in papers (Callon et al., 1983). Bibliometrix is an R statistical programming language package for quantitative research in scientometrics and bibliometrics. It is highly useful for the graphical representation of analysis results (Aria and Cuccurullo, 2017).

## 4.1 Analysis and results

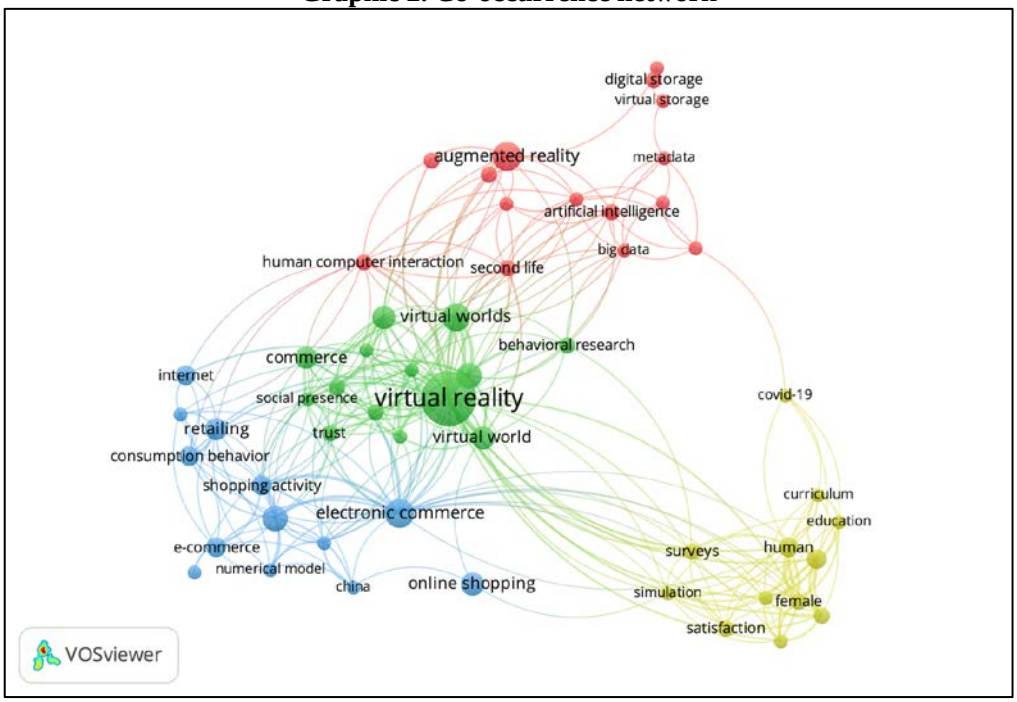
Firstly, a co-occurrence analysis in VOSviewer has been run up to have a broader view of the topic. As mentioned in the previous section, a sample of 170 articles has been used. There is a neat formation of four clusters, referring to the following topics:

-Green: Virtual Reality, Virtual World(s), commerce, behavioural research
-Blue: Electronic commerce, online shopping, retailing, e-commerce
-Red: Augmented Reality, artificial intelligence, human-computer interaction, second life
-Yellow: Human(s), satisfaction, female, covid-19

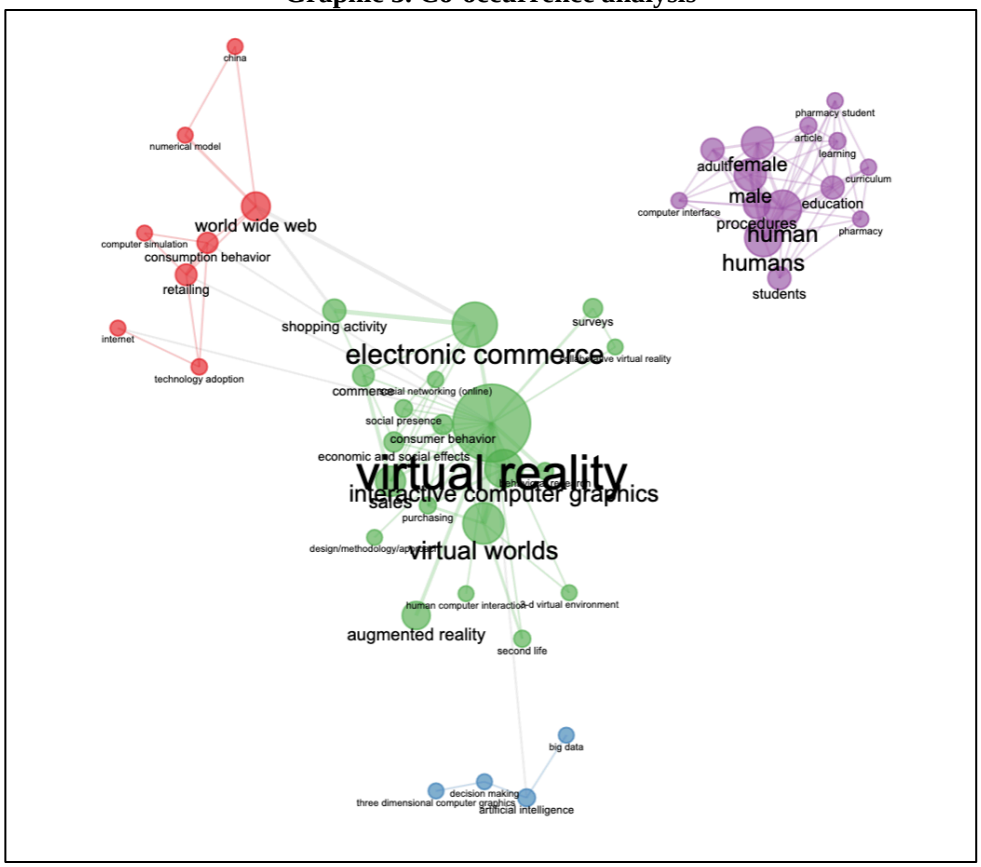
Clusters separate four clear topics. The colour green is a Virtual Reality and Virtual Worlds related topic. The colour blue combines retail-related keywords, the colour red is closer to Artificial Intelligence and Augmented Reality, and the colour yellow refers to Humans and Education in general.

In Graphic 2, the co-occurrence network graphic is shown. The keyword Virtual Reality predominated with 27 occurrences, followed by electronic commerce and Augmented Reality with ten occurrences. Both immersive technologies, Virtual Reality and Augmented Reality, should be in the same cluster, but the result was the contrary. Thus, a second co-occurrence analysis is done using Bibliometrix (Graphic 3) to have a better comparison. In this case, Virtual Reality and Augmented Reality are in the same cluster but also electronic commerce. By merging both results, we can obtain a conclusion that one cluster is related to all the Virtual World and immersiveness (includes Virtual World, Virtual Reality, Augmented Reality, etc.), another cluster with e-retail and consumption in general (includes Electronic Commerce, Consumption behaviour, Shopping activity, etc.), one with education and humans (includes Education, Human(s), Female, Male, etc.) and last one related with other novel technologies (includes Big Data, Artificial Intelligence, Human-Computer Interaction, etc.). The most critical cluster (the more significant cluster) is Virtual Reality, Augmented Reality and Virtual Worlds, which means immersive technology significantly impacts Metaverse retailing, being the pillar of present studies. The Electronic Commerce cluster is the second biggest cluster. In other words, e-retail play also has a vital role in Metaverse retailing.

**Graphic 2. Co-occurrence network**

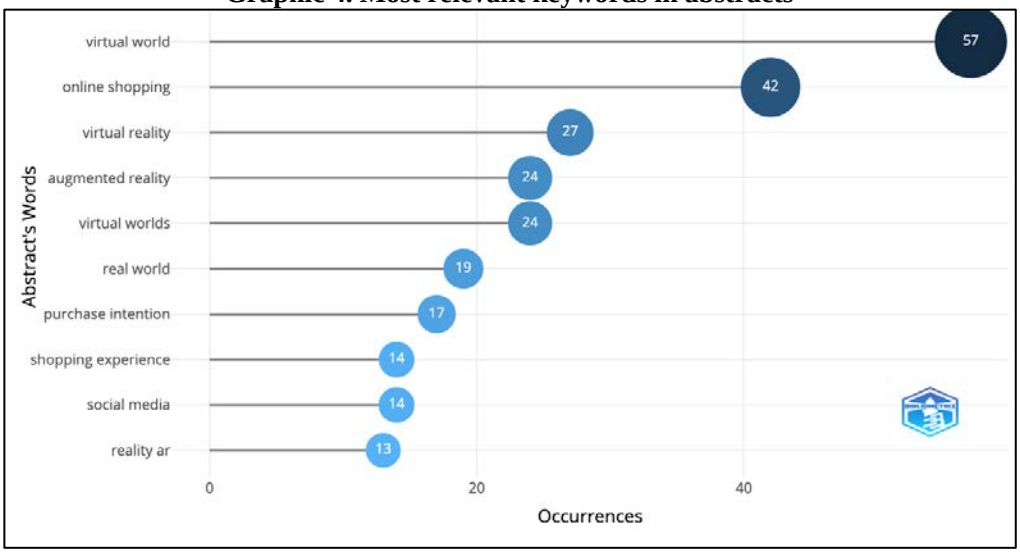


**Graphic 3. Co-occurrence analysis**



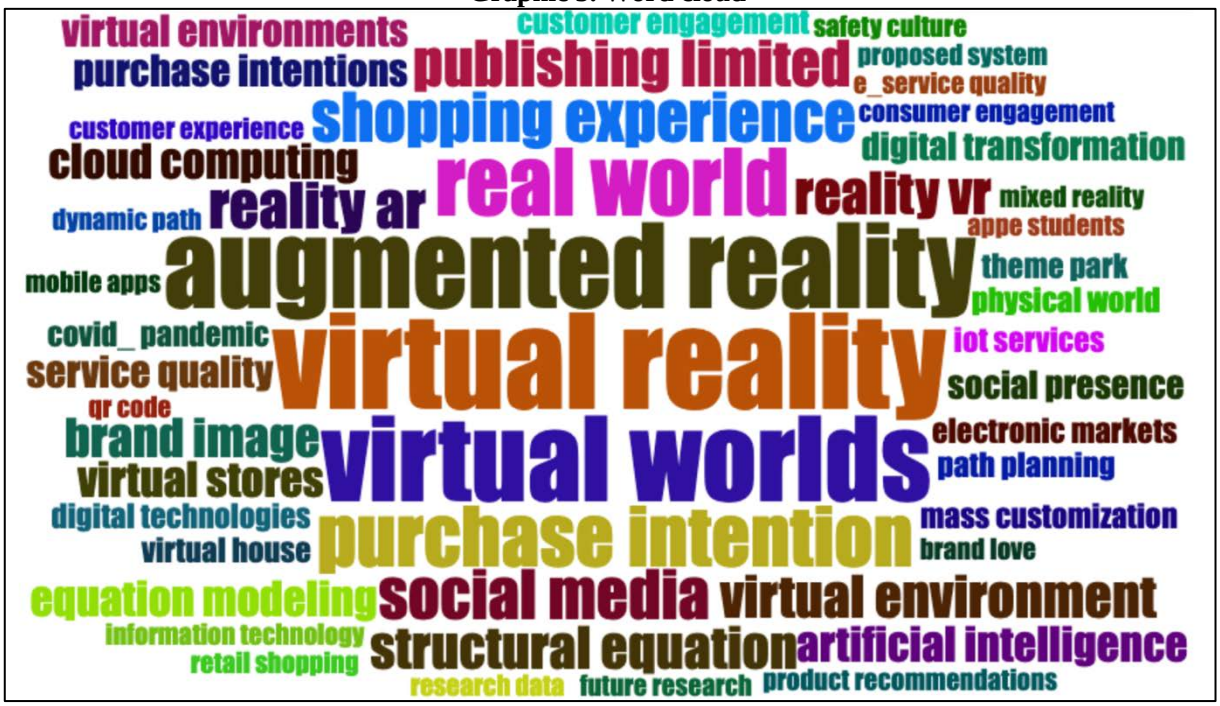

The most relevant compound keyword was Virtual World. Bi-grams was the technic used, which means words composed of two separate words, and the reason that Uni-grams (one word) were discarded is that the algorithm will only look for one part of compound words, such as `Virtual´ of Virtual Reality. Furthermore, compound words are more important in our case, as observed in the previous co-occurrence analysis. Followed by Online Shopping and Virtual Reality (Graphic 4). These are words primarily mentioned in abstracts, meaning they are mainly the core content of these studies and are relatively more important.

**Graphic 4. Most relevant keywords in abstracts**



We observed other interesting keywords in the word cloud (Graphic 5), such as shopping experience, purchase intention, virtual environments, etc. The technique of Bi-grams is used again in the word cloud. These words will give us a better idea of which thematic are mentioned in the articles.

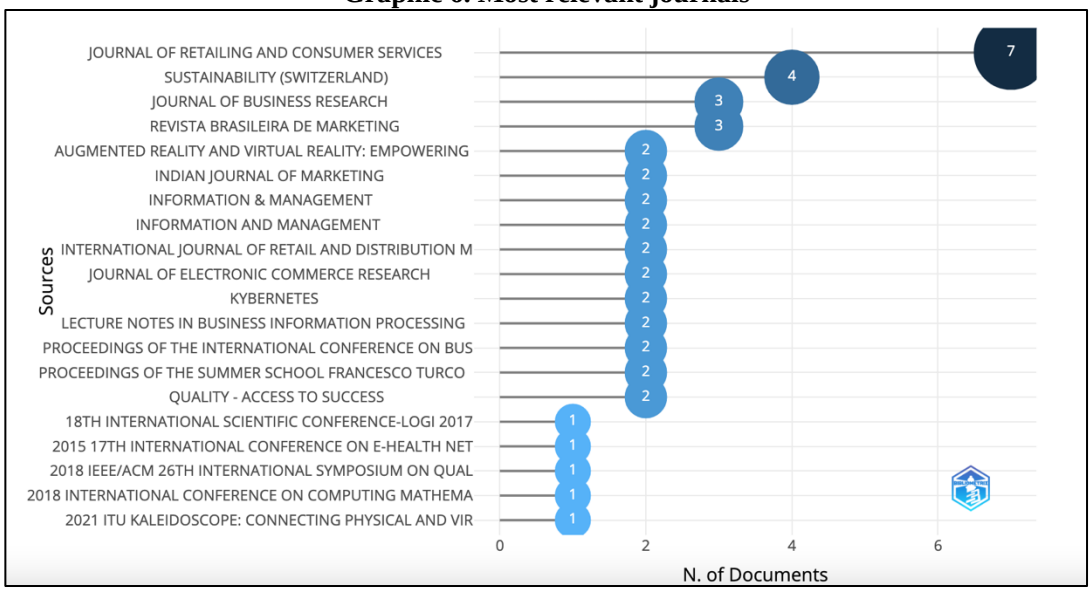
**Graphic 5. Word cloud**




The most prolific Journal was the Journal of Retailing and Consumer Services (indexed in SJR Q1 Marketing, with an Impact Factor[1] of 7,135 in 2021) shown in Graphic 6, with seven articles during the last ten years. This Journal is dedicated to researching and discussing the rapidly evolving retailing and service studies fields. It focuses on Consumer Behaviour as well as policy and management decisions. Then followed by the Sustainability Journal (Cross-disciplinary, indexed in SJR Q2 Management, with an Impact Factor of 3,251 in 2021) with four articles. In the third place, with three articles, the Journal of Business Research (Multidisciplinary, indexed in SJR Q1 Marketing, with an Impact Factor of 7,38 in 2021) and Revista Brasileira de Marketing (Indexed in SJR Q3 Business). Answering the RQ2, the Journal of Retailing and Consumer Services is the journal that published more articles related to Virtual World and Metaverse retailing.

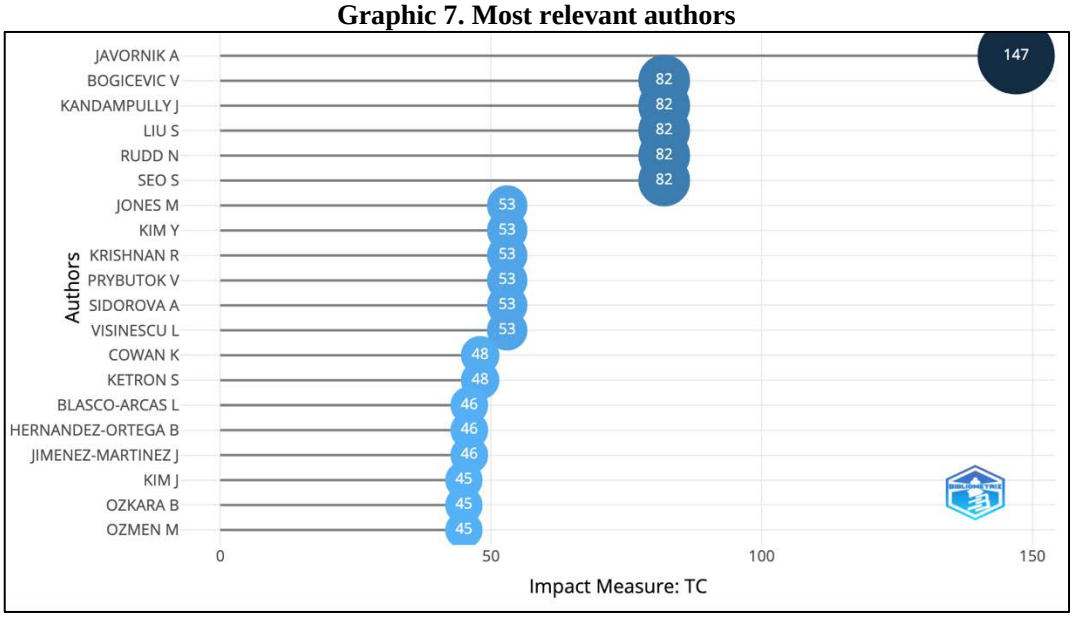
[1] **Impact Factor** is a scientometric index calculated by Clarivate that is useful in clarifying the significance of absolute (or total) citation frequency. Generally, a score above 3 is considered good and above 10 is considered excellent. (Clarivate, 2022)

**Graphic 6. Most relevant journals**




Regarding the most relevant author within the last decade (Graphic 7), Javornik A. placed first with 147 citations. Her work is about Augmented Reality and the Self. In the second place, there are five authors with 62 citations, which means they are authors of the same article related to Virtual Reality in tourism. In the third place, six authors with 53 citations, their work is related to the effects of 3D websites on customer experience. Furthermore, in fourth place, Cowan and Ketron (2019a) had 48 citations for their work regarding Virtual Reality in retail. Virtual Reality and Augmented Reality still are the most relevant topics. Thus, a higher impact will have on Metaverse retailing in general.

**Graphic 7. Most relevant authors**




In Table 2, the USA is the most prolific country in terms of articles and conference papers production-related, with our topic having 40 articles and conference papers. Followed by India with 20 articles and

conference papers, then the UK counting 14, China with 10 and Brazil and South Korea with 9 articles and conference papers.

**Graphic 8. Scientific production by countries**

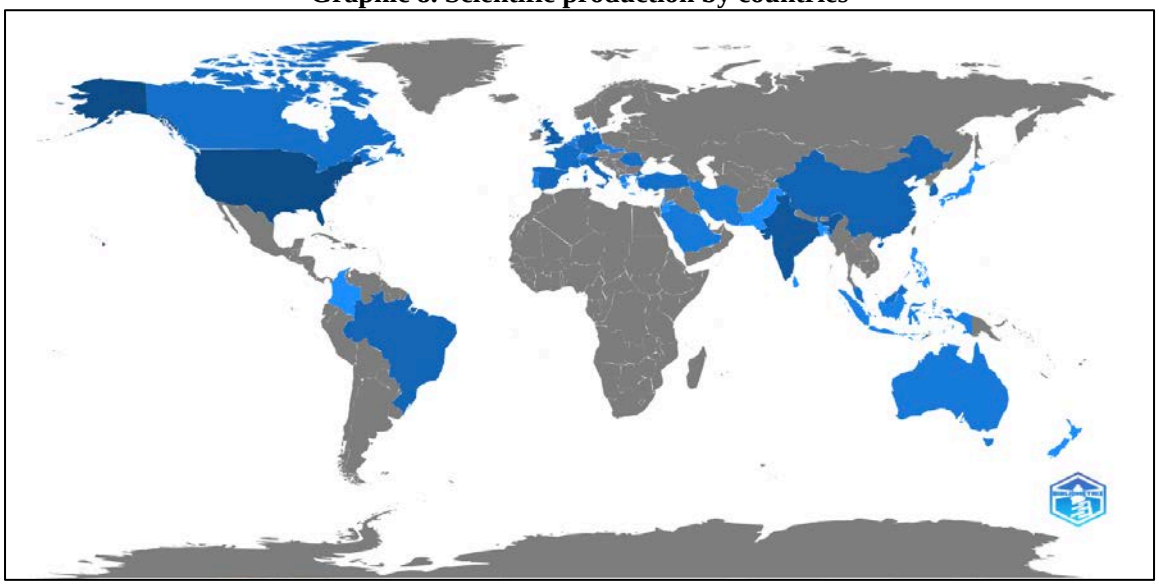
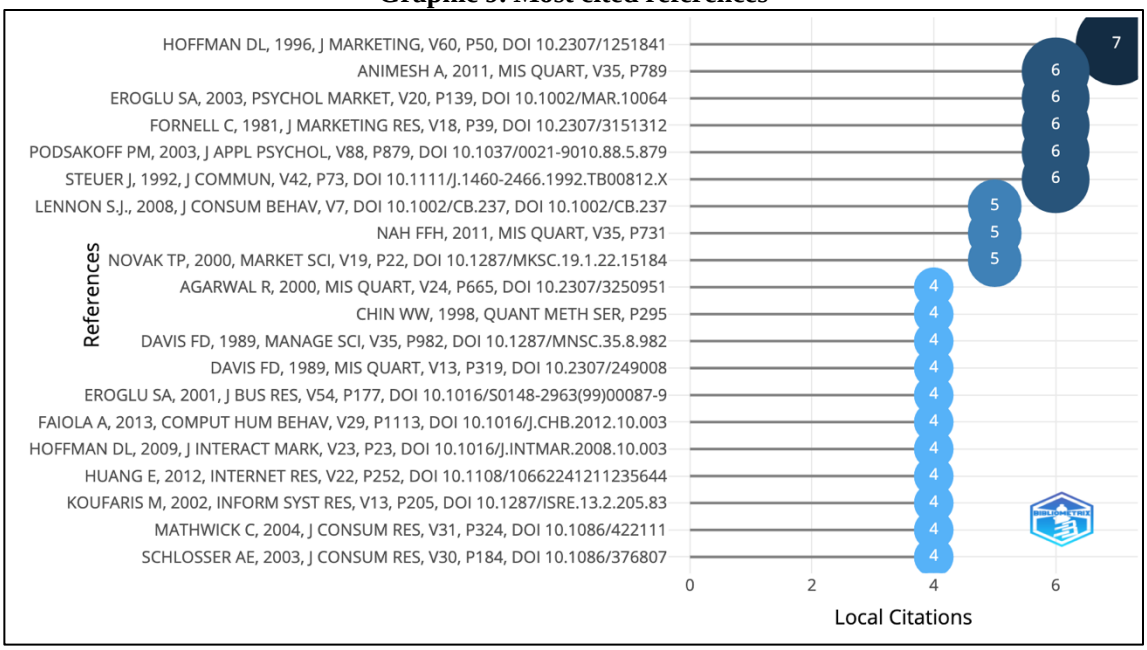


**Table 2. Scientific production table by countries**

| region | Freq |
|---|---|
| USA | 40 |
| INDIA | 20 |
| UK | 14 |
| CHINA | 10 |
| BRAZIL | 9 |
| SOUTH KOREA | 9 |

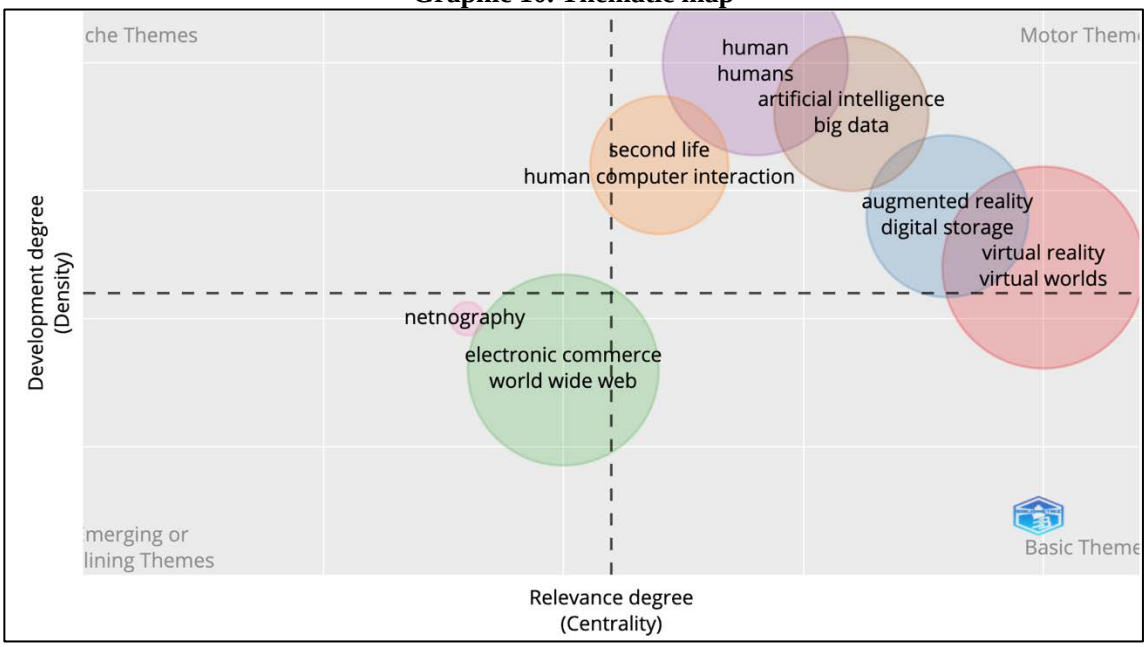
One attractive index is the most relevant reference cited in these 170 articles and conference papers. We can better understand which scientific articles or conference papers have been used to help their hypothesis proposition. As we can identify in Graphic 9, the most cited reference was Hoffmann (1996), cited by 7, which acted as a foundation for research in virtual environments. Then, Animesh et al. (2011) explores the Virtual World by studying consumer purchase intention with virtual products. Other relevant articles such as Eroglu (2003), which talks about online store atmospherics and shopper responses, and Podsakoff et al. (2003) focus on the effect of method biases on behavioural research. These references are obviously out of the reviewed time but are still relevant today, establishing the necessary theoretical foundation.

**Graphic 9. Most cited references**



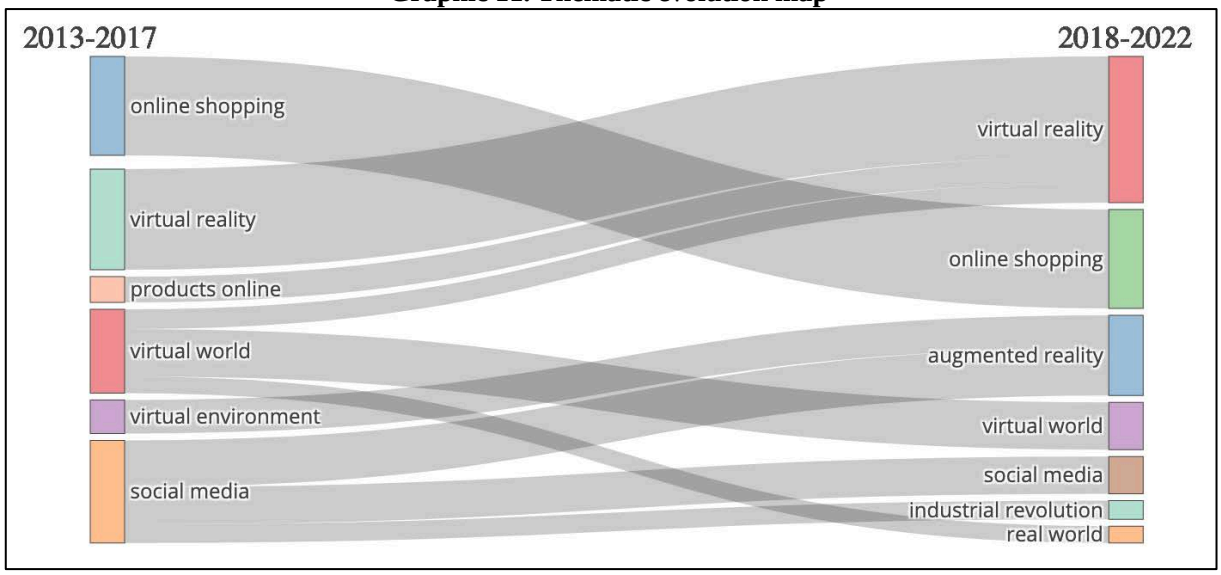

The thematic map shows that the primary motor themes are five, represented by circles. The theme is related to Virtual Reality and Virtual Worlds in the colour red. Augmented Reality theme in blue, all related to AI and Big Data in colour brown, Humans in general in purple and finally the Human-Computer Interaction and 3D Virtual Environments such as Second Life in orange. Electronic Commerce and World Wide Web, which could be categorised as internet web 2.0, are in green in the emerging or declining themes quadrant.

**Graphic 10. Thematic map**



With the thematic evolution map shown in Graphic 11, we can have a brief idea of the evolution in Virtual World and Metaverse retailing research during the last decade, splitting into two time slices of five years each, themes like Augmented Reality have become relevant, and Virtual Reality has become even more relevant. Themes such as Virtual World, Online Shopping and social media were relevant in the last five years of research.

**Graphic 11. Thematic evolution map**



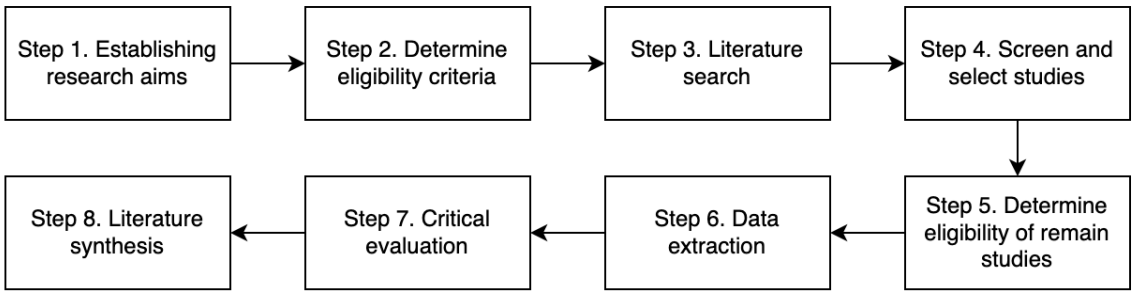

From diverse evidence shown in the bibliometric analysis, Virtual Reality has grown in relevance within the research area of Virtual World and Metaverse retailing. Thus, this technology's importance will have a more significant impact on the future development of the Metaverse. Augmented Reality also has increased its importance during these years. Immersive technologies are composed mainly of Augmented Reality and Virtual Reality (Suh and Prophet, 2018), which means immersiveness plays a considerable role in Metaverse retailing. Observing the evolution, they are becoming even more critical in these recent years.

# 5. LITERATURE REVIEW

A systematic review of the literature is a research method and procedure for locating and critically evaluating relevant research, as well as gathering and analysing data from that study (Liberati et al., 2009). A systematic review aims to find all empirical data that answers a particular research question and meets the pre-specified inclusion criteria (Snyder, 2019). This method has been used to investigate a variety of upcoming topics in information system research, including the use of Virtual Reality and Augmented Reality in tourism (Yung and Khoo, 2019), Consumer Behaviours in virtual commerce (Shen et al., 2021), and social commerce (Busalim and Hussin, 2016).

The present master thesis will follow the guideline of Petticrew and Roberts (2008). It entails establishing the question, doing a literature search, screening the identified literature, determining the eligibility of the remaining studies, conducting data extraction, critical evaluation, and finally, a literature synthesis (see Graphic 12.).

**Graphic 12. Steps of literature review**




Source: Adapted from Petticrew and Robert (2008)

## 5.1 Conceptualisation and classification of Virtual Worlds and Metaverse

These two concepts are, in most cases within the literature of the last decade, treated as the same conception. However, Metaverse has diverged into something different, much more extensive, and broader in the last two years. The current Metaverse, its architecture englobes Virtual Worlds as theorised by Duan et al. (2021), which is based mainly on the social values of Generation Z.

Two mains different Metaverse definitions were observed, where the traditional Metaverse definition took form from Virtual World, how it was built and its content. Virtual World definitions also are separated into two-time stages. Wherein the definitions will be observed as well (Table 4), the first one centred on the development of a 3D environment with less immersiveness (limited to 2D screens digital worlds) and the latter with more immersion (bringing immersion into definitions with mention of immersive technologies such as Virtual Reality). After reviewing the literature on the last decade, different conceptualisations regarding Virtual Worlds and Metaverse are detailed in the following lines.

Virtual Worlds began as entertainment platforms but gained popularity for business and education. Virtual Worlds, in general, are computer-based digital worlds that use streaming technology and grid computing to imitate the real world (Krishen et al., 2013). Others referred to Collaborative Virtual-Environment (CVE) as Virtual World or Metaverse (Gadalla et al., 2013), defined as computer-generated, multi-user, 3D interfaces in which users can sense the presence of other players in the environment. Virtual Worlds users communicate with others via an avatar, which is an animated person that appears in Virtual Worlds (Krasonikolakis et al., 2014; Lin and Wang, 2014). Users participate in activities such as sharing information, connecting with friends, making new ones, playing games, developing new services, constructing virtual items, buying, and selling things, and more. Virtual Worlds are fundamentally immersive due to higher levels of perceptual engagement and the ability to have richer social interactions (Baker et al., 2019).

Cheon (2013) proposed that Virtual World can be broadly divided into game-oriented Virtual Worlds, such as World of Warcraft and EverQuest, and open-ended Virtual Worlds, such as Second Life and There. Years after, Cowan and Ketron (2019a) defined Virtual Worlds as spatial computer-simulated environments that allow users to communicate via avatars and are divided into two categories: Social Virtual Worlds (SVWs) and Massively Multiplayer Online Role-Playing Games (MMORPGs). The five main characteristics of the Virtual World are suggested by Harwood and Ward (2013): Avatars, 3D explorable spaces, real-time interaction, a persistent world, and multichannel communication. According to Cowan and Ketron (2019b), Virtual Worlds are analysed from three themes: application quality, interactivity, and avatar. Related to *application quality*, Virtual Worlds incorporate games and

challenges, making them more entertaining, engaging, and appealing, contributing to increased immersion according to the flow theory.
Meanwhile, *interactivity*, due to the nature of the Virtual World, all users are active participants in creating the experience, including virtual store shopping and brand storytelling. Interactivity is also experienced by users when they interact (i.e., social connections). *Avatar* appearance reflects a rational decision to represent oneself in a virtual environment and is one level of self-concept manifestation in Virtual Worlds.

In the meantime, the novel Metaverse is much more than a digital world. Its scope grew and englobed Virtual World. It is considered aimed at the social interaction aspects, mainly addressed to Generation Z and their interests exchange between parts, including political, economic, social, and cultural activities (Park and Kim, 2022).

According to Jeon (2021), the novel Metaverse definition is a three-dimensional Virtual World with collapsed Reality and Virtual boundaries and technological advancements like Virtual Reality and Augmented Reality. New technologies concepts were added. Park and Kim (2022) mentioned that previous research on the Metaverse focused on the Virtual World's composition (e.g., games). However, it is now commonly used as a medium for exchanging interests and social interaction centred on content.

Metaverse is enabled by eight pillars of technology: Network, Edge/Cloud, Artificial Intelligence, Computer vision, Blockchain, Robotics/IoT, User interactivity and Extended Reality (Lee et al., 2021). Jeon (2021) suggests that Metaverse are composed of and, at the same time, categorised into four key components, Virtual Worlds, Mirror Worlds (MW), Augmented Reality and Lifelogging (see Table 3). Two previous criteria have been used by Lee et al. (2011): Design and User Experience (UX). Design is separated into simulation and augmentation. Simulation technology virtually models Reality, whereas augmentation refers to technology that enhances the functionality of existing systems.
On the other hand, User Experience is divided into external and internal. External User Experience refers to technologies that give users information and control over the world around them. Internal concentrate inwardly on an individual's or object's identity and actions.
Informationally enhanced virtual models or "reflections" of the physical world are known as Mirror Worlds. One example is a GIS system such as Google Earth, which models our real world instead of creating new dimensions. Virtual Worlds are characterised by the existence of an avatar. By using location-aware systems and interfaces and network layers of information on top of our everyday perception of the world, Augmented Reality improves people's external physical worlds (e.g., AR function of GPS). Object- and self-memory, observation, and behaviour modelling are all supported by Lifelogging technologies, which record and report objects' and users' intimate states and life histories.

**Table 3. Metaverse components**

| | | Design | |
|---|---|---|---|
| | | **Simulation** | **Augmentation** |
| **UX** | **External** | Mirror World | Augmented Reality |
| | **Internal** | Virtual World | Lifelogging |

Source: adapted from Jeon (2021)

Ffiske (2022) believes that two types of Metaverses will appear in the future, one with multiple micro-metaverses having smaller scopes and roles dedicated to single tasks. Another one with a single macro-metaverse referring to it as the successor of the Internet and will be very similar to the world of Ready Player One[2].

In Table 4, definitions and characterization of Metaverse done by different authors are shown in detail. In sum, clear evolution is observed, where definitions from 2013 to 2016 are based on a Virtual World perspective. As shown in Table 5, some relevant characteristics are identified, such as 3D environments, Avatar, Computer-generated, Social interactions, and others. In 2016, due to immersive and web technology advances, authors started to add immersiveness and persistency into their definitions. In 2021 definitions start to diverge. Some authors add new concepts, such as Augmented Reality, Extended Reality, and Decentralization. Others prefer to stay with previous academics' definitions highlighting social interactions and immersiveness.

**Table 4. Summary of definitions proposed by different authors**

| Author | Definition |
|---|---|
| **Harwood and Ward (2013)** | A cyberspace where multiple participants can simultaneously experience a rich 3D environment for both recreational and commercial purposes |
| **Krishen et al. (2013)** | A three-dimensional, Web-based environment where users interact with a virtual representation of themselves is known as an "avatar." |
| **Papagiannidis et al. (2013)** | Virtual Worlds add new dimensions and domains to our physical universe for economic, social, and leisure activities. |
| **Gadalla et al. (2013)** | A collaborative virtual environment is created in a computer-generated, multi-user, three-dimensional interface where users can also presence other users in the same environment. |
| **Cheon (2013)** | Are computer-based digital worlds that simulate the real world using streaming technology and grid computing. |

[2] Science fiction novel created by Ernest Cline in 2011.

| Author | Definition |
|---|---|
| **Ramanathan and Purani (2014)** | A three-dimensional social space inhabited by avatars that is synthetic, non-game-centric, synchronous, and persistent. |
| **Krasonikolakis et al. (2014); Barnes et al. (2015)** | A computer-simulated three-dimensional environment |
| **Pookulangara et al. (2014)** | Virtual Worlds, such as Second Life, are computer-based simulated environments inhabited by "avatars," or 3D representations of users |
| **Peng and Ke (2015); Bleize and Antheunis (2019); Cowan and Ketron (2019a)** | Are computer-based simulated environments intended for its users to inhabit and interact via avatars represented. |
| **Dad et al. (2016)** | A developed, interactive, and collaborative Virtual World that users perform real-life activities in it |
| **Papagiannidis et al. (2017); Lee (2020)** | An immersive, persistent, shared, computer-mediated 3D environment, designed for real-time social interaction (in the context of varying applications such as education or business) and entertainment, where individual avatars represent the users |
| **Munir et al. (2018)** | It is gifted by the merger of two technology-based concepts: Virtual Reality and the gaming world |
| **Zhang and Dholakia (2018)** | A place with its own characteristics that are different from Reality, with the intent to immerse the users; |
| **Baker et al. (2019)** | A fundamentally immersive Virtual World because of the higher levels of perceptual engagement and the capability of richer social interaction |
| **Jeon (2021)** | Three-dimensional virtual space that uses the metaphor of the real world. It combines Virtual Worlds, Augmented Reality, and the Internet. |
| **Lee et al. (2021)** | A virtual environment blending physical and digital, facilitated by the convergence between the Internet and Web technologies, and Extended Reality (XR) |
| **Wiederhold (2022)** | Virtual World where our digital avatars come together to work, shop, attend classes, pursue hobbies, enjoy social relations etc. |
| **Park and Kim (2022)** | A three-dimensional Virtual World where avatars engage in political, economic, social, and cultural activities |
| **Kun (2022)** | A future, persistent, and decentralised online three-dimensional virtual environment that simulates reality. |

**Table 5. Table of concepts mentioned in reviewed definitions**

| Author | 3D environment | Commercial purposes | Avatar | Virtual Worlds | New dimensions | Multi-user | Computer-generated | Presence | Simulated environment | Real world simulation | Streaming technology | Grid computing | Non-game centric | Synchronous | Persistent | Second life | Social interactions | Inhabit | Collaborative | Real life activities | Immersive | Virtual reality | Gaming world | Perceptual engagement | Augmented Reality | Internet | Future | Decentralized | Web tech | Extended reality |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Harwood and Ward (2013) | ● | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Krishen et al. (2013) | ● | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Papagiannidis et al. (2013) | | | | ● | ● | | | | | | | | | | | | | | ● | | | | | | | | | | | |
| Gadalla et al. (2013) | ● | | | | | ● | ● | ● | | | | | | | | | | | | | | | | | | | | | | |
| Cheon (2013) | | | | ● | | | ● | | | ● | ● | ● | | | | | | | | | | | | | | | | | | |
| Ramanathan and Purani (2014) | ● | | ● | | | | | | ● | | | | ● | ● | ● | | | | | | | | | | | | | | | |
| Krasonikolakis et al. (2014); Barnes et al. (2015) | ● | | | | | | ● | | | | | | | | | | | | | | | | | | | | | | | |
| Pookulangara et al. (2014) | | | ● | | | | ● | | ● | | | | | | | ● | | | | | | | | | | | | | | |
| Peng and Ke (2015); Bleize and Antheunis (2019);Cowan and Ketron (2019a) | | | ● | | | | ● | | ● | | | | | | | | ● | ● | | | | | | | | | | | | |
| Dad et al. (2016) | | | | | | | | | | | | | | | | | | | ● | ● | | | | | | | | | | |
| Papagiannidis et al. (2016); Lee (2020) | ● | | ● | | | | ● | | | | | | | | ● | | ● | | ● | | ● | | | | | | | | | |
| Munir et al. (2018) | | | | | | | | | | | | | | | | | | | | | | ● | ● | | | | | | | |
| Zhang and Dholakia (2018) | | | ● | | | | | | | | | | | | | | | | | ● | | | | | | | | | | |
| Baker et al. (2019) | | | | | | | | | | | | | | | | ● | | | | ● | | | ● | | | | | | | |
| Jeon (2021) | ● | | | | | | | | | | | | | | | | | | | | | | | ● | ● | | | | | |
| Park and Kim (2022) | | | ● | ● | | | | | | | | | | | | ● | | | ● | | | | | | | | | | | |
| Yue (2022) | ● | | | | | | | | | ● | | | | | ● | | | | | | | | | | | ● | ● | | | |
| Lee et al. (2021) | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | ● | |
| Wiederhold (2022) | | | ● | | | | | | | | | | | | | ● | | | ● | | | | | | | | | | | |
| **Total count** | **8** | 1 | **8** | **3** | 1 | 1 | **6** | 1 | **3** | 2 | 1 | 1 | 1 | 1 | **3** | 1 | **5** | 1 | 2 | **4** | **3** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

## 5.2 Theories of Virtual Worlds and Metaverse retailing

As the Virtual World and Virtual Reality technologies gain in popularity and technological advancement, businesses increasingly utilise e-shopping channels as e-commerce options (Baker et al., 2019).

In the 29 reviewed articles and conference papers, many relevant theories were constantly mentioned, utilised, and adapted. In Table 6, all theories are enlisted. Some relevant theories are explained in detail below. By examining the theories, insights could be extracted, which will help future academics better develop their theoretical frameworks when contributing to Metaverse related research topics.

### 5.2.1 User inner experiences

***Flow Theory***

This is the most mentioned theory in the reviewed articles (n=6). Mihaly Csikszentmihalyi proposed the Flow Theory in 1975. Later Csikszentmihalyi (1990) defined "flow" as '*the state in which people are so intensely involved in an activity that nothing else seems to matter; the experience itself is so enjoyable that people will do it even at significant cost, for the sheer sake of doing it*. Flow on the web was firstly defined by Novak, Hoffman, and Yiu-Fai Yung (2000) as a cognitive state characterised by: (1) high levels of skill and control, (2) high levels of challenge and arousal, (3) focused attention, and (4) being enhanced by interactivity and telepresence. Users who enter a state of flow and find the online experience compelling become so engrossed in the act of online navigation that non-navigational thoughts and perceptions are filtered out (Papagiannidis et al., 2013). According to the Flow theory, shopping in Virtual Environments (or Virtual Worlds) can elicit a flow state (Bleize and Antheunis, 2019). Consumers continue to browse and eventually purchase products. Flow theory originally had nine dimensions, but it is now commonly measured with fewer constructs. Koufaris (2002) used three important constructs to measure flow: perceived enjoyment, perceived control, and perceived concentration. Perceived enjoyment describes how enjoyable or fun a Virtual World is to users, and perceived control describes how much control users have over the Virtual World. Perceived concentration describes how intense users' focus is on a specific task.

***Presence and immersion***

The Oxford Dictionary defines presence (2022) as '*the state or fact of existing, occurring, or being present.*'. Presence can be categorised into several types, where social presence and telepresence are technology-involved presences (Lombard and Jones, 2015). Social presence refers to the feeling that another person is "real" and "there" when using a communication medium, which means the sensation

of "being there together with another" (Short et al.,1976). Telepresence focuses on the sensation of "being there", enabled by technologies that allow users to interact in a distant or virtual location as if physically present (Minsky, 1980).

Previous studies have confirmed the importance of presence and immersion in computer-simulated virtual environments (Peng and Ke, 2015). The relation between presence and immersion is direct and positive, which means a higher level of immersion will get a higher level of presence (Slater and Wilbur, 1995; Slater et al., 1996).

### 5.2.2 Communication

***Media Richness Theory (MRT) and Media Naturalness Theory (MNT)***

The Media Richness theory or the Information Richness Theory (Daft and Lengel, 1986) proposes the efficient use of a medium as well as task ambiguity (Ishii et al., 2019). According to Daft and Lengel (1986), the more varied the media format, the more influential the communication for completing a task will be, and by far, face-to-face interaction is the most decadent type of communication medium. Peng and Ke (2015) suggest that in terms of communication media, 3D Virtual Worlds offer a richer medium in terms of 3D computer interfaces where users can watch virtual settings vividly and interact with others as if they were acting "in person" when compared to two-dimensional (2D) websites.

Meanwhile, the Media Naturalness Theory was developed by Kock (2004) and was built on Media Richness Theory. It states that using communication media that suppress key elements of face-to-face communication, as many electronic communication media do, creates cognitive barriers to communication, especially in the case of complex tasks (e.g., business process redesign, new product development, online learning), because such tasks appear to require more intense communication over more extended periods of time than simple tasks.

### 5.2.3 Consumer Behaviour

***Theory of Reasoned Action (TRA), Theory of Planned Behaviour (TPB)***

The Theory of Reasoned Action (Fishbein and Ajzen, 1975) suggest that a person's behaviour is determined by their desire to perform the behaviour, which is a function of their attitude toward the conduct and subjective norms. In other words, how individuals will behave is based on their pre-existing attitudes and behavioural intentions. The Theory of Planned Behaviour (Ajzen, 1985, 1991) was developed from the earlier Theory of Reasoned Action (Fishbein & Ajzen, 1975). Both theories assume intentions are the immediate antecedents of behaviour (Clough and Casey,2011). In other words, the stronger the desire to perform a behaviour, the more likely the behaviour will be carried out (Doll & Ajzen, 1992). The Theory of Planned Behaviour was created to predict and explain human behaviour in

specific situations (Ajzen, 1991). This theory can illustrate how consumers' intention to buy products inside Virtual Worlds (Bleize and Antheunis, 2019).

***Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT)***

The Technology Acceptance Model (Davies, 1989) was adapted from the Theory of Reasoned Action and describes how users utilise and accept technology. Although Technology Acceptance Model has its origins in information systems, the theory is also applied in the field of marketing communications to explain Consumer Behaviour (Bleize and Antheunis, 2019).

Meanwhile, the Unified Theory of Acceptance and Use of Technology was adapted and improved from Technology Acceptance Model by Venkatesh et al. (2003). Three factors were identified by Venkatesh et al. (2003): performance expectancy, effort expectancy, and social influence. Like perceived usefulness in the Technology Acceptance Model, performance expectancy in Virtual Worlds refers to the extent to which users believe purchasing virtual products will help them perform better in the game. On the other hand, effort expectancy and the ease-of-use construct describe how easy individuals perceive purchasing virtual products in the Virtual World. Finally, social influence refers to users' perceptions of whether others think they should buy virtual goods.

***S-O-R model***

Mehrabian and Russell (1974) proposed the S-O-R model, in which an environmental Stimulus (S) causes an emotional response in the organism (O), which consequently fosters a behavioural response (R). Several authors have applied this model to understand and predict Consumer Behaviour on the Internet (Kim and Lennon (2013); Demangeot and Broderick (2016); Manganari et al. (2009); Zhu et al. (2019), etc.). In all reviewed articles, Dad et al. (2016) adapted the S-O-R model to their 3D Servicescape model (see the following epigraph), and Munir et al. (2019) applied it for their study regarding music effects on shopper behaviour inside a virtual environment.

***Servicescape and 3D Servicescape model***

The Servicescape model was developed by Booms and Bitner (1981) based on the concept of Servicescape, which was defined as the physical factors of stores that retailers control to enhance or constrain customers' and employees' emotions and behaviours (Bitner,1992). In other words, businesses configure their Servicescape to create an environment that aims to improve the customer's experience and, as a result, influence their behaviour. The 3D Servicescape model was adapted from the Servicescape model and S-O-R model and consisted of 21 dimensions of environmental cues intending to explore the potential effect of the 3D Virtual Reality retail environment on shoppers' behaviour (Dad et al., 2016).

**Table 6. Theories discussed in reviewed articles and conference papers**

| Theory | Appearance(s) | n |
|---|---|---|
| Flow Theory | Papagiannidis et al. (2013); Cheon (2013); Barnes and Pressey (2016); Papagiannidis et al. (2017); Cowan and Ketron(2019a); Bleize and Antheunis (2019); | 6 |
| Media Richness Theory (MRT) | Cheon (2013); Peng and Ke (2015); Chesney et al. (2017); | 3 |
| Technology Acceptance Model (TAM) | Zhang and Dholakia (2018); Bleize and Antheunis (2019); Baker et al. (2019); | 3 |
| Media Naturalness Theory (MNT) | Pookulangara et al. (2014); Chesney et al. (2017); | 2 |
| Social Presence Theory | Peng and Ke (2015); Baker et al. (2019); | 2 |
| S-O-R Model | Dad et al. (2016); Munir et al. (2018); | 2 |
| Theory of Planned Behaviour (TPB) | Bleize and Antheunis (2019); Baker et al. (2019); | 2 |
| Unified Theory of Acceptance and Use of Technology (UTAUT) | Bleize and Antheunis (2019); Baker et al. (2019); | 2 |
| Symbolic Interactionism | Hansen (2013) | 1 |
| Theory of Self-Presentation | Hansen (2013) | 1 |
| Expectancy - Disconfirmation Theory | Gadalla (2013) | 1 |
| Electronic Service Quality (e-SQ) Model | Gadalla (2013) | 1 |
| Psychometric Theory | Cheon (2013) | 1 |
| Axiological Theory | Barnes et al. (2015) | 1 |
| Cannon-Bard Theory of Emotions | Barnes et al. (2015) | 1 |
| Schachter Singer's Theory of Emotions | Barnes et al. (2015) | 1 |
| Servicescape Model | Dad et al. (2016) | 1 |

| Theory | Appearance(s) | n |
|---|---|---|
| Cognition Theory of Emotion | Dad et al. (2016) | 1 |
| Commitment-Trust Theory | Chesney et al. (2017) | 1 |
| 3D Servicescape Model | Munir et al. (2018) | 1 |
| Reactance Theory | Berki (2018) | 1 |
| Social Construction of Technology (SCOT) | Zhang and Dholakia (2018) | 1 |
| Dual Capacity of Communication Codel | Zhang and Dholakia (2018) | 1 |
| Theory of Consumption Values | Bleize and Antheunis (2019) | 1 |
| Theory of Reasoned Action (TRA) | Baker et al. (2019) | 1 |
| Theory of Mind | Park and Kim (2022) | 1 |

## 5.3 Methodologies of Virtual World and Metaverse retailing

In terms of the methods used in the body of literature on Metaverse retailing (see Table 7), experiments were most frequently used in reviewed studies. This is understandable due to the nature of the Metaverse. It involves mainly social interactions that require more psychological, and Consumer Behaviour focus of experiments to learn the key factors altering consumers' purchase behaviour. Followed by survey methods (n=7) which is also an appropriate method to get data from users inside Metaverse owing to its lower cost and higher recollection speed characteristics that allow researchers to have more time to analyse data. Interviews were also relevant (n=4). As a more profound method, more data quality is obtainable, and it could also complement surveys to get more accuracy, as Krasonikolakis et al. (2014) did in their work. From a theoretical perspective, a literature review was the most used method (n=7), which is suitable for knowledge harvesting and summarising findings.

**Table 7. Summary of research methods.**

| Method type | Appearance(s) | n |
|---|---|---|
| Experiment | Papagiannidis et al. (2013); Peng and Ke (2015); Chesney et al. (2017); Papagiannidis et al. (2017); Munir et al. (2018); Berki (2018); Siegrist et al. (2019); Baker et al. (2019); | 8 |
| Survey | Cheon (2013); Krishen (2013); Krasonikolakis et al. (2014); Pookulangara (2014); Barnes et al. (2015); Barnes and Pressey (2016); Lee (2020); | 7 |

| | | |
|---|---|---|
| Interview | Hansen (2013); Krasonikolakis et al. (2014)-predesign; Dad et al. (2016); Hota and Derbaix (2016); | 4 |
| Focus group | Gadalla et al. (2013)-Study 1; Hota and Derbaix (2016); | 2 |
| Critical incident technique | Gadalla et al. (2013)-Study 2; | 1 |
| Deductive content analysis | Hassouneh and Brengman (2015); | 1 |
| Literature review | Harwood and Ward (2013); Ramanathan and Purani (2014); Cowan and Ketron (2019a); Cowan and Ketron (2019b); Bleize and Antheunis (2019); Lee et al. (2021); Park and Kim (2022); | 7 |
| Conceptual framing | Zhang and Dholakia (2018); | 1 |

## 5.4 Findings of Virtual World and Metaverse retailing

The most relevant findings are shown in Tables 8 and 9, categorised by their contribution type (theoretical or empirical). Most studies have focused on Consumer Behaviour inside a Virtual Retail Environment.

Works such as Papagiannidis (2013); Cheon (2013); Peng and Ke (2013); Papagiannidis (2017); Munir et al. (2018); Bleize and Antheunis (2019) explored how different dimensions of virtual stores could affect directly or indirectly to consumer's purchase intention. Furthermore, studies like Hota and Derbaix (2016); Barnes and Pressey (2016) studied a specific social group's consumption behaviour inside Virtual World.

The 3D store design theme also was discussed frequently, where articles like Krasonikolakis et al. (2014) and Pookulangara et al. (2014); investigated distinct aspects of virtual store layout and control and how they affect consumer responses. Hassouneh and Brengman (2015) and Dad et al. (2016) attempted to create new typologies and models for 3D stores. They set a foundation for future studies regarding 3D stores atmospherics and Servicescape from characteristics such as atmospherics, space, or symbols.

Also, some conceptual frameworks are created regarding different aspects of customer experience, such as Virtual World Experiential Promotion, Metaverse Retailing Service Quality and a 3P proposition (Place, Process and Practice). (Krishen et al., 2013; Gadalla et al., 2013; Zhang and Dholakia, 2018).

Harwood and Ward (2013) discussed the importance of research in Virtual Worlds and enumerated several challenges within this research field. Virtual Reality applications are likewise discussed by Cowan and Ketron (2019a) and Siegrist et al. (2019), where the importance and potential of Virtual Reality applied to research in the virtual environment are discussed. Telepresence has been frequently

discussed, and findings from Papagiannidis et al. (2019) and Baker et al. (2019) confirmed the importance of this construct related to virtual environments.

Lastly, other fields are suggested too, with the works of Hansen (2013), Ramathan and Purani (2014) and Barnes et al. (2015), brand-related topics are argued (e.g., brand extension and brand equity).

**Table 8. Relevant key theoretical findings**

| Source | Fields | Key findings |
|---|---|---|
| Harwood and Ward (2013) | Conceptual framework | Virtual World research is distinct because avatars are used to represent people. The fundamental principles of research remain relevant, but the nature of virtual worlds and their interpretation based on the natural (physical) world poses a challenge in research design. |
| Krishen et al. (2013) | Conceptual framework | Introduces VWEP (Virtual world experiential promotion) to support the advantages of retail and e-retail. VWEP provides better hedonic attributes like atmosphere, social experience, and personalised/adaptive selling. |
| Gadalla et al. (2013) | Conceptual framework | Created a framework. MR-SQ (Metaverse Retailing Service Quality) is formed by four dimensions: Customer Service, Product Dimension, Store Dimension, and 3D Platform Dimension. |
| Hassouneh and Brengman (2015) | Typology setting / 3D store design | Set a typology for virtual store atmospheric.<br>Virtual 3D stores appear to be more like traditional stores than 2D web stores. 3D store size seemed to impact the use of specific atmospheric cues. |
| Hota and Derbaix (2016) | Consumer Behaviour | Children conform to online peers and feel a part of the community by acquiring objects, just as they do in the real world. |
| Dad et al. (2016) | Model proposition / 3D store design | Proposes a 3D Servicescape model that explores the potential effect of 3D virtual reality retail stores' environment on shoppers' behaviour. |

| Source | Fields | Key findings |
|---|---|---|
| Zhang and Dholakia (2018) | Conceptual framework | Developed a 3P view of the virtual consumption conceptual frame, which is made up of three elements: (1) The first P refers to two places: Reality and virtuality, (2) the second P refers to virtual consumption practices and (3) the third P refers to the marketing process |
| Cowan and Ketron (2019a) | VR application in virtual environments | VR applications in research have yet to be fully utilised by marketers applicated in VWs can produce flow. |
| Bleize and Antheunis (2019) | Consumer Behaviour | Identified four factors that affect purchase intention in VWs, enjoyment, social influence, customisation, and ease of use. |
| Cowan and Ketron (2019b) | Consumer Behaviour / Telepresence | High-product involvement strategies directly influence consumer responses through imagination, co-creation, and telepresence. Low-involvement strategies indirectly increase brand engagement and influence consumer responses through the less cognitively taxing process of interactivity. |

**Table 9. Relevant key empirical findings**

| Source | Fields | Key findings |
|---|---|---|
| Hansen (2013) | Brand/ Marketing interactions | Positive brand orientations help sociability, status, and achievement. Users viewed marketing interactions as a natural part of the virtual culture with neutral to positive attitudes. |
| Papagiannidis et al. (2013) | Consumer Behaviour | Engagement and enjoyment affect user satisfaction in a positive way when buying clothes in a virtual environment. User satisfaction influences positively purchase intention. |
| Cheon (2013) | 3D store design/ Consumer Behaviour | Platform context (Interactivity, vividness, and involvement) affects the virtual experience (Flow), in turn leading to consumer purchasing behaviour. Product value impacts consumers' willingness to purchase virtual products. |

| Source | Fields | Key findings |
|---|---|---|
| Ramanathan and Purani (2014) | Consumer attitude / Brand extension | The effects of consumers' attitude toward the parent brand, number of products in brand portfolio, quality variance across brand portfolio, product category fit, and brand image fit are more substantial for within the world extensions and weaker for across the world extensions. |
| Krasonikolakis et al. (2014) | 3D Store design | Identified four factors influencing store selection: Core Store Features, Peripheral Store Features, Security and Privacy, and Social and Promotional Impulsion. The amount of money spent in virtual environments is directly proportional to the frequency of visits to VWs and the average time spent in a store. |
| Pookulangara et al. (2014) | 3D Store design | Second Life shops support two-way communication (real-time interaction) and thus increase interactivity if the virtual store requires more control from the user, then their intention to purchase decreases. |
| Peng and Ke (2015) | 3D Promotion, service quality / Consumer Behaviour | Users of 3D virtual worlds can have a pleasant online experience. Using the 3D platform for new product promotion and online services can increase their willingness to purchase real-world objects by allowing them to interact with virtual prototypes in an immersive virtual environment. |
| Barnes et al. (2015) | Brand equity | In Second Life, it is difficult to create emotional brand value, which has severe implications for the long-term viability of current real-world brands in virtual worlds. |
| Barnes and Pressey (2016) | Consumer Behaviour | Market experts can extend their knowledge across digital channels, but their ability to do so is limited when working on digital platforms. Cyber-mavens may not use virtual worlds to test new products or services to satisfy an external motivation to impress others or a desire for uniqueness (at least in comparison to other consumer groups), but rather for internal hedonistic purposes based on their personal interest in new products and the stimulation they provide. |

| Source | Fields | Key findings |
|---|---|---|
| Chesney et al. (2017) | Consumer Behaviour | Traders trust anonymous others, and that trust is bi-directional. V-commerce has the potential to boost trust in computer-mediated transactions to levels comparable to those found in physical stores.<br>Using a virtual world element as part of the online interface, where customers experience information richness in the form of employees' avatars and other customers' avatars, may help increase trust. |
| Papagiannidis et al. (2017) | 3D store design / Telepresence | Satisfaction influences purchase intention, which is influenced by enjoyment and engagement. Control, 3D authenticity, colour, and graphics vividness influence engagement, which is influenced by utilitarian and hedonic value, as well as the experience of product simulation or telepresence. Experience is more associated with engagement and enjoyment in the immersive environment, leading to a more significant purchase intention. |
| Munir et al. (2018) | Consumer Behaviour | Music significantly impacts shoppers' purchase behaviour, which is linked to their emotions. Music is an essential environmental cue in 3D VRR stores that positively impacts shoppers' emotions and behaviour. Music has been found to increase shoppers' arousal levels, increasing their pleasure levels, and then their approach behaviour. |
| Berki (2018) | 3D Promotion | When a 2D advertisement is embedded directly in a 3D virtual space, users are more likely to remember the advertisement and the advertised product than when the advertisement is integrated into a website.<br>The feeling of presence influences how the ad format (2D or 3D) affects campaign effectiveness, and a high level of presence increases advertisement recall. |
| Siegrist et al. (2019) | VR application in virtual environments | In both studies, we found that the VR condition exhibited very similar behaviours to those observed in the real world. Findings suggest that Virtual Reality could be a helpful research tool for simulating a supermarket. |

| Source | Fields | Key findings |
|---|---|---|
| Baker et al. (2019) | Consumer Behaviour / Telepresence | The nomological networks that apply to web-based e-commerce and virtual world e-commerce are equivalent. The primary difference is that in the virtual world's environment, the construct of telepresence has an impact, whereas, in the web-based environment, the shopper is not aware of it. |
| Lee (2020) | Consumer Behaviour / VR | **First,** this study emphasises the potential importance of Virtual Reality (VR) marketing research as an emerging research field. **Second,** this study discovered that the primary function of VR is information access and flow experience using the dual-path model. **Third,** there was no discernible effect of information accessibility on VR satisfaction. **Fourth**, the empirical finding that VR satisfaction can increase both the desire to use VR and the desire to visit a real mall answers the question of VR's practicality that previous researchers have raised. |

These theoretical and empirical findings could be used as foundations for future Metaverse related research topics, specifically in the retail sector. First, Consumer Behaviour in Virtual Worlds findings is possibly replicated in Metaverse retail environments. As we discussed before, several articles considered Metaverse, including Virtual World. Thus, similar behaviours will be predicted in this new environment. However, further studies are needed to obtain empirical evidence of this assumption. Besides, 3D store atmospheric and Servicescape findings and typology settings conceivably are the handbook for future Metaverse stores design and help academics and managers to have accurate data results for either academic or managerial proposes.

Virtual World research importance is raised, which is a promising and high potential research field, and its challenges are mentioned too. Virtual Reality, as resulted in the bibliometric analysis, was the most critical field within ten years of research in Metaverse related topics. Hence, finding related to Virtual Reality applications are more valuable due to their high relevance. Lastly, brand-related findings could have a relevant impact on future brands extension to Metaverse and other considerations regarding brand values when a brand enters a Metaverse.

# 6. RESEARCH AGENDA

A research agenda composed of four sub-agendas have been identified based on the analysis of the extant corpus, which is a conceptual, thematic, methodological, and technological agenda. This agenda aims to answer the RQ10 regarding future research directions.

## 6.1 Conceptual agenda

### 6.1.1 Defining Metaverse

The concept itself is not stable or, in other words, lacks clarity and generates confusion. Thus, continual conceptualisation and literature review regarding the Metaverse definition is necessary and vital to obtain a better generally accepted explanation. Academics and managers must keep up to date with what is happening in the Metaverse to describe it better and clarify what is, and what is not a Metaverse component. Because new technologies are emerging every day, a Metaverse definition should not be a container where inside fit every technology up to date. Hence classification criteria need to be created to sort out everything.

## 6.2 Thematic agenda

### 6.2.1 Metaverse retail environment

Retail activities in virtual environments have been widely studied during these years (Krasonikolakis et al., 2014; Pookulangara et al., 2014; Papagiannidis et al., 2017). Academics put their attention mainly on 3D store designs and comparisons between real, immersive, and virtual environments. Metaverse is a potential retail channel. The need for research related to Metaverse store settings design and its retail effect is crucial for brands to exploit this new medium correctly. Meanwhile, theoretical, conceptual contributions related to store designs like the 3D Servicescape model (Dad et al., 2016) and store atmospherics typology (Hassouneh and Brengman, 2015) require more empirical results in the new Metaverse environment to testify to its effectiveness and validity.

### 6.2.2 Adoption of immersive technologies in Metaverse retailing

In the previous bibliometric analysis and literature review, immersive technologies played an important role. Many reviewed studies have raised the relevance of Virtual Reality applications in virtual environments (Siegrist et al., 2019; Cowan and Ketron, 2019a; Lee, 2020), although its adoption and user attitude toward immersive technologies shall be objectives in future studies. It remains to be discussed to what extent consumers accept an immersive Metaverse and to what extent they would shop in an immersive Metaverse store.

### 6.2.3 Consumer research in Metaverse

Three important aspects of consumer research should develop in further research. First, remain unknown if exist different levels of user acceptance among diverse demographic groups inside Metaverse (e.g., Generation Z, Millennials, Generation X, etc.). Further experimentations are required to determine this information. Second, Consumer Behaviour theories, e.g., theories mentioned before in the literature review section, need to be tested in the Metaverse to prove they are applicable, adaptable, or incompatible with this new environment. Third, consumer-related research questions such as information searching, product evaluation, consumer decisions making, and post-evaluation are still uncertain in the Metaverse. Further studies need to be carried out.

### 6.2.4 Avatars

Avatar is an important characteristic of the Metaverse. Thus, avatar issues, like some mentioned by Harwood and Ward (2013), are worth further study in this new environment. For instance, different choices of avatars by the researcher inside Metaverse during experimentations could influence the results. The relation between Virtual and Real-World identities is not always abreast, which means users may behave differently in real life and in the Metaverse. Supplantation of identity is also a concern, the lack of validated personal information could make personal identity falsification more easily.

## 6.3 Methodological agenda

### 6.3.1 Comparing Metaverse retail environment with other environments

Comparisons between Metaverse retail environment and other environments such as real-world stores or web stores should be carried out to understand better the experience that Metaverse provides compared to other retail environments. Experiments, surveys, interviews, case studies, and other methods could be used throughout studies to get decent results.

### 6.3.2 Products usage

Research using virtual representations of products to buy real-world merchandise could be taken into consideration due to its potential in the future Metaverse.

## 6.4 Technological agenda

Although Metaverse from a technological perspective is beyond the objectives of this thesis, it is relevant to mention some aspects of the actual state of technology to have a better start point for future studies.

### 6.4.1 Platform

Nowadays, Metaverse platforms are still in the development phase (e.g., Meta with Horizon). Hence conducting research inside a Metaverse environment is unpractical for now. However, alternative Virtual World platforms such as Second Life could still be used as one way to experiment with Consumer Behaviours and store designs. Even though further research must be done in the future to testify those results obtained in the Virtual World work in the same way as in the Metaverse environment.

### 6.4.2 Virtual Reality

Further research and hardware development should carry out to avoid the cybersickness experienced by consumers in the Virtual World (Xi and Hamari, 2021). Also, research to democratize this technology is needed since the cost is still relatively high. If consumers want to have a better shopping experience, high-end Virtual Reality devices must be purchased a priori. Despite the effort made by PlayStation VR, the cheapest device one could get now, at the cost of 299$ (Chu, 2022), the price is still unaffordable for many consumer groups.

# 7. DISCUSSION

The objectives of this master thesis were to explore the current state of Metaverse and to find insights for the retailing sector. To achieve those objectives, ten research questions were asked and answered using bibliometric analysis and a systematic literature review.

From the results obtained in the bibliometric analysis, three relevant aspects were found:

First, immersive technologies play a significant role in research related to the Virtual World and Metaverse retailing, where Virtual Reality grows faster than other immersive technologies. Second, the most prolific Journal was the Journal of Retailing and Consumer Services, with an Impact Factor of 7,135, which is considered reasonable in the business field. This means that academics could have more interest in this Journal to publicise their works related to Virtual World and Metaverse retailing. It is relevant and has a better chance to contribute to the subject. Third, the most relevant author was Jarvonik, with the most citations, which means she has more relevance in our research field, specifically in Augmented Reality-related topics.

Next, in the Literature Review section, four key aspects were discussed.

Firstly, the conceptualisation for Virtual Worlds and Metaverse were further reviewed. In a few words, Virtual World could be considered one part of the Metaverse, according to many authors (Lee et al., 2021; Jeon, 2021; Park and Kim, 2022; Kun, 2022). Early research was focused on Virtual World, its 3D environment, and its social aspects. Next, immersiveness was added to the studies. Later, the Metaverse conception suffered distortion and expanded in the last two years. Many authors gave different versions of the definition, trying to conceptualise and classify it. For instance, Jeon (2021) categorised Metaverse into four components, Virtual World, Mirror World, Augmented Reality and Lifelogging.

Secondly, three main vital aspects were discussed theoretically in our reviewed articles and conference papers, The User's inner experiences, Communication and Consumer Behaviour. Although Flow, Presence and Immersion are more frequently discussed within the videogames field (Michailidis et al.,2018; Otzen, 2015), more relevance are given inside the retail sector regarding virtual stores. Papagiannidis (2017) pointed out the importance of consumers' flow state, which will significantly affect their purchase intention (Animesh et al., 2011). The presence, specifically telepresence and social presence, played an essential role in reviewed works in the relevant findings section will be better explained. In Communication aspects, theoretical models of media richness and naturalness defined the effectiveness of different communication mediums, where face-to-face is the most effective way to communicate. Lastly, regarding Consumer Behaviour, several critical theories were discussed. Both Theory of Reasoned Action and the Theory of Planned Behaviour have been used as the theoretical foundation for reviewed studies (Bleize and Antheunis, 2018; Baker et al., 2019). Acceptance models

(Technology Acceptance Model and Unified Theory of Acceptance and Use of Technology) were also mentioned referring to Virtual Worlds (e.g., Zhang and Dholakia, 2018; Baker et al., 2019). Therefore, existing research frequently describes Consumer Behaviour using the S-O-R model, which can be supplemented with TAM model dimensions (Laroche, 2010). Thus, the S-O-R model is relevant and should take into consideration when topics regarding Consumer Behaviour in the Virtual World are discussed.

Thirdly, the most used methodologies were also reviewed. The experiment was the most used method to get empirical results, followed by a survey. Those two methods are appropriate to apply to research related to Metaverse. The reasons are explained below. Other methods such as interviews and focus groups could be good data recollection technics as well as act as a complement to experiments and surveys.

Lastly, the most relevant findings were made into a table and discussed further. Many consumers behaviour-related findings were collected, and most of them are studies that prove how different store dimensions affect Consumer Behaviour, specifically purchase decisions. Useful findings in relation to 3D store design, in general, were found. Respect to store atmospheric and Servicescape design could help future researchers and managers configure store features to get better research aims or consumer responses. Regarding Virtual Reality applications, findings are highly practical too, where exciting results such as similar behavioural responses between the real world and Virtual Reality Worlds are perceived, which means that future studies in a Virtual Reality world environment will be highly useful to simulate real-life experiments. Discovery related to brands is likewise found, and questions about how consumers treated brand extension in the Virtual World are somehow answered in Ramanathan and Purani's research (2014).

# 8. CONCLUSION

Throughout the thesis, ten research questions were answered to cover all the objectives proposed. From RQ1 to RQ5, external aspects were discussed and answered using bibliometric analysis. About RQ1, two main evolutions were found, an evolution of the conception of the Metaverse and the technology used in different time periods. Then in RQ2, the Journal of Retailing and Consumer Services were the most prolific Journal on our research topic. Regarding RQ3 and RQ4, Javornik (2016), Bogicevic et al. (2019), Visinescu et al. (2015), and Cowan and Ketron (2019b) were the most relevant authors and articles by cites. Moreover, the answer to the RQ5, we could appreciate in the Graphic 10 and Graphic 11, themes are mainly Virtual Reality, Augmented Reality, Online Shopping and Virtual World.
From RQ6 to RQ10, internal aspects were argued using a systematic literature review. To answer RQ6, an evolution of conception was analysed. Two types of conceptualisations of Metaverse were found, a traditional Metaverse definition oriented to Virtual World and a novel Metaverse being an inclusive concept. Respect RQ7, a summary table was created (Table 6), and theories were categorised into three main types, User inner experiences, Communication and Consumer Behaviour. The same has been done to answer the RQ8, a table that recaps all the methodologies used in the reviewed articles (Table 7). With RQ9, equal structured tables were built to categorise findings (Tables 8 and 9). Regarding the last RQ10, an extensive research agenda was created to identify needs and gaps for future studies.

Contributions to this master thesis were two. First, by reviewing existing literature related to Metaverse, identify the evolution in the conceptualisation of the Metaverse and categorisation. This will allow academics and managers to have a clearer vision of Metaverse and a posteriori to better develop its definition in a more specific way. Second, a research agenda has been created to help researchers and managers aim their effort to build up a more sophisticated Metaverse retail environment in the future.
Additionally, innumerable challenges await us to be taken. However, research in this novel field is risky but necessary. For academics exploring a new channel is a potentially rewarding contribution to science. Furthermore, for managers to understand how consumers behave in a Metaverse retail environment is critical to developing the company's strategies and bringing better experiences to clients.

Moreover, some thesis limitations need to be addressed. First, WoS and Scopus were the two selected databases. Although these two databases cover the majority of studies, a few articles will surely be missed. Further studies could consider adding other databases such as Google Scholar, JSTOR, EBSCO, etc. Second, data used in the bibliometric analysis were collected without any depuration. Due to the innovativeness of the topic, fewer articles were found. It may have a different perspective than the literature review section, but it still gave us broader ideas related to the topic. Third, the time was set from 2013 to 2022, which means several older studies regarding this topic have been excluded. Future

works may consider amplifying the time range. And four, this thesis started from a social science perspective. Considering Metaverse as a multidisciplinary field, different points of view might add new insights to the topic.

Lastly, giving an opinion, Metaverse has all the conditions to thrive in our future society. New generations, such as Generation Z, are focused on the experience instead of keeping an old-fashioned lifestyle (e.g., acquiring physical products like houses, cars, etc.). Thus, Metaverse could open a door for a new digital world where one could get experiences that in real life would be impossible to have. Technological companies should move faster than anybody, start investing in technologies which enable Metaverse from different angles and contribute to the development of the Metaverse ecosystem. Other retail companies might initiate to figure out what role will their brands play and how customers in what way will behave in the Metaverse. In fact, Goldman Sachs predicted that the opportunity of Metaverse is valued between 8 to 12 trillion dollars, which is a high number.

Regarding the regulation aspect, the primary challenge is to figure out how the rules work inside Metaverse, while decentralization is a double-edged blade, which on the bright side, allows users to have more freedom and a more fluent Metaverse experience. Nevertheless, on the dark side, not having a central government to regulate all the users' behaviours, economic structures, or property regulations will make this new digital environment more chaotic and problematic. I believe one possible solution is to apply a Proof of Work of Blockchain validation system, similar to a republic government, where all users are the validators of all rules. Many other aspects of the Metaverse are still remained to be discussed. The fact is that Metaverse will arrive sooner or later, maybe in a different form, but companies must take steps forward and anticipate the whole trend. Because once Metaverse becomes a reality, it will be too late to take part in it.

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# APPENDIX I

## SEARCH FIELD

**Scopus:** TITLE-ABS-KEY((RETAIL* OR SUPERMARKET OR STORE OR SHOP*) AND ( "VIRTUAL WORLD" OR "METAVERSE ")) AND ( LIMIT-TO ( DOCTYPE,"ar" ) ) AND ( LIMIT-TO (SUBJAREA,"BUSI") OR LIMIT-TO (SUBJAREA,"SOCI")) AND (LIMIT-TO (PUBYEAR,2022) OR LIMIT-TO (PUBYEAR,2021) OR LIMIT-TO (PUBYEAR,2020) OR LIMIT-TO (PUBYEAR,2019) OR LIMIT-TO ( PUBYEAR,2018) OR LIMIT-TO ( PUBYEAR,2017) OR LIMIT-TO (PUBYEAR,2016) OR LIMIT-TO (PUBYEAR,2015) OR LIMIT-TO (PUBYEAR,2014) OR LIMIT-TO ( PUBYEAR,2013) )

**Web of Science:** TS= (RETAIL* OR STORE OR SUPERMARKET OR SHOP*) AND ("VIRTUAL WORLD" OR "METAVERSE")
Articles and Conference papers, English, 2022-2013, Social sciences and business economics.