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THESIS FOR THE DEGREE BACHELOR OF ARTS (B.A.)

THE CURRENT RESEARCH STATUS OF VIRTUAL INFLUENCERS ON SOCIAL MEDIA- A SYSTEMATIC LITERATURE REVIEW.

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Abstract

Virtual influencers, who appear as computer-generated characters in influencer marketing on social media, are becoming increasingly important due to the rapid development of artificial intelligence. To date, many studies have been conducted on this topic and various results have been published, so that a clear overview is required. The aim of this thesis is to provide this overview by summarizing and synthesizing the main findings of selected studies within a systematic literature review. Nine articles were selected and evaluated based on a structured selection of literature using defined criteria. From this, five main topics were identified that provide clarity on their perception and engagement, the reasons why consumers follow them on Instagram and which factors make them appear credible and authentic. In addition, key factors for their efficient use in social media marketing, which is equivalent to the term influencer marketing in this thesis, are given and their benefits and risks are revealed. Following this, the platform *VirtualHumans* is used as a practical example to compare literature and practical findings to identify differences and research gaps. The results show that virtual influencers are an attractive alternative to traditional influencers by taking certain conditions into account. It is also recognized that the diversity of virtual characters studied is still insufficient and that research to date has focused on Instagram, while other social media platforms are gaining in importance for virtual influencers. As a result, this thesis contributes to a comprehensive understanding of the topic and provides important insights for their strategic use in influencer marketing.

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AI	artificial intelligence
APA	American Psychological Association
BSP	Business Source Premier
CGI	computer-generated influencer
CNN	Cable News Network
e.g.	for example
etc.	and so forth
i.e.	that is
SLR(s)	systematic literature review(s)
US	United States
USA	United States of America

1 Introduction

1.1 The Rise of Virtual Influencers on Social Media

The technology of artificial intelligence (AI) has grown rapidly in recent years and is increasingly integrated into everyday life. According to forecasts, the global market of AI is estimated to grow from 6.28 million US Dollars in 2023 to 24 million US Dollars by 2030 (Next Move Strategy Consulting, 2023). As a result, AI will be used to a greater extent in the future and effect significant changes in various fields. In the economic sector, one of the greatest impacts of AI is expected to be in the field of marketing (McKinsey, 2023). In a survey from 2023, more than 80 percent (%) of companies stated to integrate influencer marketing to their marketing strategy while 63% use AI or machine learning for their influencer marketing (Geyser, 2023). This development has contributed to the rise of virtual influencers on social media. By today, 60% of companies report to have cooperated with a virtual characters in the past (Geyser, 2023) and 58% of American social media users follow at least one virtual avatar (The Influencer Marketing Factory, 2022).

Virtual influencers are defined as computer-generated or AI-supported individuals with human-like characteristics and a social media presence (Moustakas *et al.*, 2020; Park *et al.*, 2021; Thomas and Fowler, 2021). Their mainly human-like appearance makes it difficult to distinguish them from human influencers (Choudhry *et al.*, 2022). Most of these individuals have a reach of millions of followers, which they influence and entertain in various ways (Lou *et al.*, 2023). Their main contents cover fashion & beauty, lifestyle, and fitness but also gaming or music, which are the most popular sectors for influencer marketing (Geyser, 2023). Companies increasingly use virtual characters as brand ambassadors in social media and replace human influencers by the more cost-efficient avatars (Choudhry *et al.*, 2022), which are primarily aimed at Generation Z and millennials (Gerlich, 2023). These include fashion brands such as Prada and Calvin Klein but also international streaming services like Netflix, gaming companies and news channels as CNN (Baklanov, 2020).

"Pundits have claimed that virtual influencers are the future of ads, fashion and commerce […]." (Robinson, 2020, p. 3) This statement by Robinson is strengthened by the fact that the number of virtual influencers has risen from nine in 2015 to more than two-hundred by today (Hiort, 2022b). They are mainly present on the social media platform Instagram (Conti, Gathani and Tricomi, 2022) which is described as "[…] the fastest growing social network site globally." (Sheldon and Bryant, 2016, p. 89)

1.2 Relevance of this Topic in Research

The topic of virtual influencers in research continues to grow significantly since their first appearance on social media. Given that the first virtual human-like character Miquela Sousa, named Lil Miquela, appeared in 2016, (Robinson, 2020) this research field can be considered recent. Various scientists have studied this subject, and many scientific articles can be found in databases, trade journals or online platforms (Arsenyan and Mirowska, 2021; Thomas and Fowler, 2021; virtualhumans.org, 2023).

Their focus topics are wide-ranging: for example, studies have been made on the actual acceptance of virtual influencers (Arsenyan and Mirowska, 2021) and their effectiveness in social media marketing as brand ambassadors (Thomas and Fowler, 2021). In addition, their advantages and disadvantages compared to human influencers (Park *et al.*, 2021) as well as the moral and ethical justifiability of non-existing personalities (Robinson, 2020) has been questioned. Lastly, online platforms explain the creation of virtual endorsers and describe their individual characteristics and types (virtualhumans.org, 2023).

1.3 Derivation of the Research Question

In this paragraph, the research question is derived. The initial situation has highlighted the fact that there are many research results, however, it is difficult to gain an overview of the studies. For this reason, there is a need for a general overview on the current research status of the topic. This overview is intended to provide key information of the field of research and create a foundation for future research and the development of strategies and recommendations for virtual influencers on social networks.

In consideration of the aspects mentioned, the following research question can be formulated: "What are the current research findings of virtual influencers on social media and what conclusions can be drawn for future developments?".

1.4 Objective and Purpose of this Study

The aim of this work is to conduct a systematic literature review to develop a structured overview of the current research status of virtual influencers on social media.

For this purpose, different studies will be selected, and their theories, research findings and implications for the use of virtual influencers are examined and compared. In the first step, a general overview of the selected articles, their research methods, and objectives, is given.

The results presented in the studies are structured thematically so that the most frequently discussed topics can be identified. Subsequently, these results are compared to recognize trends or discrepancies in the individual topics. These discrepancies may be explained by differences in the methodology applied within the studies, the test group or the virtual influencers selected. In a next step, the researched benefits and risks of virtual characters are analyzed so that opportunities and threats can be demonstrated transparently. Additionally, research findings of the literature are expanded and compared with current data from existing virtual influencers using a practical example. Thus, deviations or confirmations of the scientific findings can be identified, and indications provided for their future development. The practical example is presented using a cluster analysis based on data from the platform *VirtualHumans*, which was collected in January 2023 and January 2024.

After conducting the systematic literature review, a structured overview of the current state of research is created and the previously formulated research question can be answered.

2   Methodology

2.1   Research Method: A Systematic Literature Review

In order to create a general overview of the current research status of virtual influencers on social media, the selected research method of this thesis is a systematic literature review (SLR). A SLR is described as structured approach to identify and analyze key findings of a specific research field with the aim to answer a certain research question, using a selection process to review all relevant literature (Liberati *et al.*, 2009). The selection process includes the definition of keywords as search criteria and the selection of databases together with the setting of inclusion and exclusion criteria to limit the search to the selected topic (Snyder, 2019). To ensure the transparency in the selection process, the PRISMA flowchart is used. This is a tool of the PRISMA 2020 statement, a guideline for systematic reviews, to provide an overview of the selected databases and the number of search results (Page *et al.*, 2021). Apart from predefined criteria, the studies will be chosen based on their quality and availability. The quality assessment of the studies is included in the search process following the specifications of the evaluation form by Hawker *et al.* (2002). After conducting the SLR, the available results and key findings are summarized transparently and comprehensibly, correlations and discrepancies in the study results are identified and gaps in the research field are established (Davis *et al.*, 2014). Lastly, in addition to answering the research question, research fields can be identified which need to be investigated in the future through further studies.

2.2 Selection Process of the Literature

2.2.1 Definition of Virtual Influencers

The literature defines the term "virtual influencer" in diverse ways. The following table provides an overview of eight definitions that describe "virtual influencers" characteristics. Based on these definitions, the most frequently used terms are identified to determine the key words. The latter are selected to limit the search results to all available relevant literature.

Table 1: An Overview of Definitions of a "virtual influencer"

AUTHOR(S)	DEFINITION
Choudhry *et al.* (2022, p. 1)	"Virtual Influencers (VIs) are computer-generated characters, many of which are often visually indistinguishable from humans and interact with the world in the first-person perspective as social media influencers."
Conti, Gathani and Tricomi (2022, p. 86)	"We can describe a virtual influencer as a person or thing created by software that can influence others, primarily through marketing collaborations or participation in social campaigns, and is solely created and consumed via digital mediums. They resemble human characteristics, behavior, and actions but do not correspond to any human in the real world."
Lou *et al.* (2023, p. 1)	"Artificially created characters – virtual influencers – amass millions of followers on social media and affect digital natives' engagement and decisionmaking in remarkable ways."
Moustakas *et al.* (2020, p. 1)	"Virtual influencers are computer-generated influencers (CGI) or artificial intelligence influencers (AII) with a social media presence."
Park *et al.* (2021, p. 1)	"Virtual influencers are fictive computer-generated images (CGIs), which are generated by artificial models with computer vision-oriented graphic technologies. After social media and network services are one of the main streams in our society (e.g. Instagram), a large number of new accounts for virtual influencers have been created for sharing their images and contents to other users in social media and network services."
Sookkaew and Saephoo (2021, p. 326)	"Digital identities, also known as virtual influencers, are created by humans through the creation of digital tools that mimic human behavior through the use of creative design."

Arsenyan and Mirowska (2021, p. 2)	"[..] we have witnessed the emergence of "virtual influencers": agents augmented with digital avatars, designed to look human."
Gerlich (2023, p. 1)	"Virtual influencers, also known as AI-generated influencers or digital avatars, have been on the rise in the marketing industry. These computer-generated characters or digital models are designed to look and act like real people and have their social media profiles and post content that marketers, agencies, or studios create."

2.2.2 Keywords and Databases

In this section, the keywords for the search process are specified. Firstly, it can be determined that the term "virtual influencer" forms the basis of the research framework and was included in all definitions. For this reason, it is identified as the first keyword. In addition, four out of eight definitions, virtual influencers are also referred to as "artificially generated", "AI-generated" or "artificial intelligence influencers". Therefore, another word is "artificial intelligence/AI". Likewise, four out of eight authors refer to them as "computer-generated (CG)" and five out of eight definitions describe them as "human". To ensure that the term "human" does not lead to incorrect results, the terms are combined to "computer-generated human" and added to the search string. Finally, the connection with "social media" forms a relevant term for the literature research. Six of the eight authors associate virtual influencers with social media presence.

In the search for all relevant literature, the focus is intended to be entirely on the use of virtual influencers in an economic context. Therefore, in addition to the keywords already defined, "influencer marketing" is also included in the search string. Within the databases, the determined keywords are converted according to the following combinations for the advanced search using the Boolean operator:

(("virtual influencer") OR ("AI influencer") OR ("computer-generated human")) AND (("social media") OR ("influencer marketing"))

The literature selection process is conducted sequentially in December 2023. The included databases are Business Source Premier, APA PsycInfo, Web of Science and ScienceDirect. They cover a wide range of highly rated scientific literature in the fields of economics and business. Business Source Premier (BSP) is one of the most frequently used databases in the business sector (Business Source Complete, 2023). The database offers an extensive range of specialist literature and further publications. These are specifically selected for business-related topics and a considerable number are peer-reviewed. APA PsycInfo expands the literature through psychological content in an economic context. This applies particularly to marketing and the use of innovative technologies (e.g. AI) in this field. Web of Science comprises a multidisciplinary database that provides comprehensive coverage for academic research (Clarivate, 2023). Lastly, ScienceDirect database includes a variety of business-related journals, books, handbooks, and reference works. Each of the selected databases offer a broad selection of high-ranking economic content for literature research and allow advanced search and filters to apply the inclusion and exclusion criteria defined in the next paragraph.

The search engine Google Scholar is excluded from the database selection since the search process is not adjustable for all defined inclusion and exclusion criteria. This makes the search procedure less systematic and comprehensible and is consequently not suitable.

2.2.3 Inclusion and Exclusion Criteria

For the literature search, specific inclusion and exclusion criteria are defined in advance to limit the research. The predefined keywords need to be present in the title of the publications to ensure that they specifically address the topic. This filter can be specified in the databases when entering the search string. The search is limited to English-language literature, as the research topic is of international relevance and English is the standard language for scientific work. In addition, it forms the basis for knowledge exchange among researchers, so that most recent results are first documented and published in English. A further inclusion criterion comprises the publication period of the studies. The search includes studies that were published in the period from 2016 to 2023. This time limit is justified by the emergence of virtual individuals. Lil Miquela, one of the ten most famous virtual characters on social media, was created in 2016 (Lil Miquela, 2023). Regarding the study focus of the articles, only studies that consider the development or effects of virtual influencers in the context of influencer marketing on social media and focus on influencer marketing or brand awareness and consumer responses towards AI-generated humans on social media were included in this work. The type of publications

selected for the SLR are peer-reviewed academic journals or articles. They offer professional quality and validity of the study results as well as a specific focus on concrete research fields. Finally, the last inclusion criterion includes the study design of academic journals. Only primary studies such as statistical and qualitative analyses are included in the selection.

After the inclusion criteria have been defined in detail and their selection has been justified, the resulting exclusion criteria are listed. They narrow the selection of studies and complete the inclusion criteria. The first exclusion criterion indicates that studies that do not focus on AI influencers in a business or marketing context or provide findings on their perception and development in social media are not considered. The type of publication for this work is academic journals or articles with peer-reviewed status. Therefore, bachelor's or master's theses and dissertations are excluded as well as conference papers, books, and specialist magazines. In addition to the lack of peer review of this literature type, new topics are researched with greater actuality and explicitly in an academic journal or article. In order to answer the research question within an appropriate framework, purely secondary studies like SLRs are excluded in the literature selection, as this study design does not provide any new findings independently. It should be noted that one included study involves a two-study design consisting of a SLR and an interview. The inclusion of this study is justified because it is not exclusively a secondary source, as the interview provides new research findings.

2.2.4 Qualitative Criteria for the Study Selection

The selected studies are critically examined according to their quality. The study quality is determined by the evaluation form by Hawker *et al.* (2002), which compromises nine criteria, each rated with 1 to 4 points (good = 4; fair = 3; poor = 2; very poor = 1):

(1) Abstract & Title
(2) Introduction & Aims
(3) Method & Data
(4) Sampling
(5) Data Analysis

(6) Ethics & Bias
(7) Results
(8) Transferability or Generalizability
(9) Implications & Usefulness

After the assessment of the studies, a total of 36 points can be achieved (Hawker *et al.*, 2002). Each selected study will be evaluated critically, and an overview is listed in paragraph 3.1.2.

3   Results

3.1   Results of the Literature Review

3.1.1 The Study Selection Process

The studies were selected according to the PRISMA 2020 guidelines. The following figure represents this process graphically. Initially, all studies found in the four databases were identified. After all duplicates were removed, the number of studies was reduced from 127 to 111. In a next step, the records were screened for relevance based on their title and the abstract. Records were excluded if it was recognizable from the first screening that the content of the journals did not refer to virtual influencers/AI influencers or computer-generated humans in a social media or marketing context. This way, the total number of records was reduced by 75 in this step. A total of 36 studies were selected for the literature review and checked for accessibility in full text. The number of studies not available in full text reached 17. Subsequently, the remaining 19 studies were checked for suitability and excluded based on two reasons: (R1) the study design (e.g., SLRs were excluded) and (R2) the research focus. Due to R1, four studies were excluded, while another six studies were deducted due to R2. In the last step of the PRISMA flowchart, the final number of included studies is stated. A total of nine studies were selected to be included for the SLR of this thesis.

Figure 1: The PRISMA Flowchart (own illustration based on (Page *et al.*, 2021))
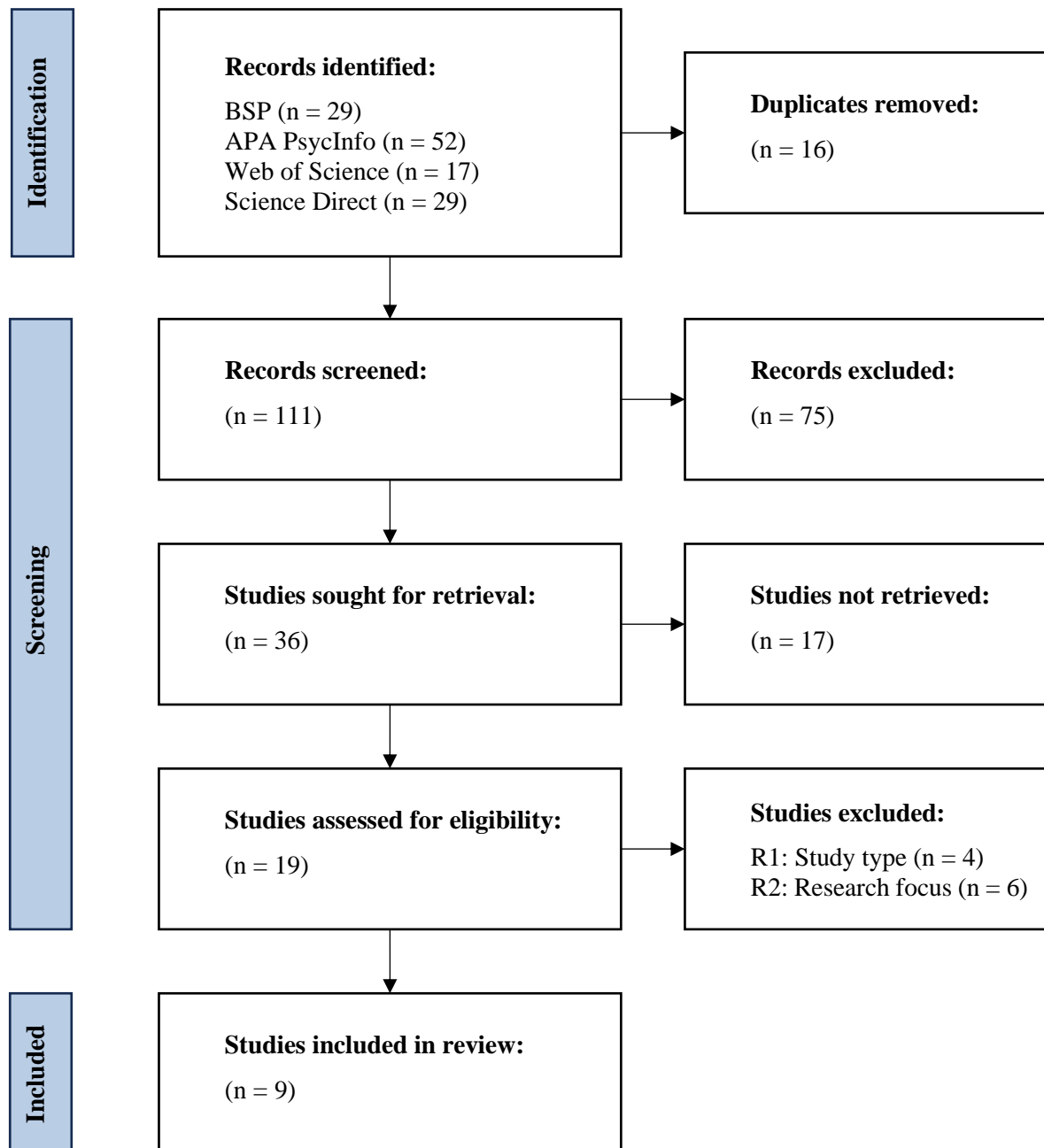
3.1.2 Literature Quality Assessments

In this paragraph, the selected nine studies from the literature review are assessed according to their quality using the evaluation form by Hawker *et al.* (2002). This qualitative evaluation is intended to critically examine and justify the appropriate selection of literature for the following content analysis. The detailed justifications for scoring are listed in Appendix A.

The evaluation according to the nine available criteria led to the following results: one study was rated with full points (36 points) and four with 35 points. The remaining four studies scored between 33 and 34 points. This high score level of all journals reviewed indicates a high quality of content, which has a positive effect on the results of the systemic literature search.

Table 2: Evaluation of the selected Titles 1-5 according to Hawker *et al.* (2002)

Authors of selected Studies / Assessment Criteria	Arsenyan and Mirowska, 2021	Batista da Silva Oliveira, Antonio and Chimenti, 2021	Brito Silva *et al.*, 2022	Franke, Groeppel-Klein and Müller, 2023	Gerlich, 2023
Abstract & Title	4	4	4	4	4
Introduction & Aims	4	4	4	4	4
Method & Data	4	4	4	4	4
Sampling	4	4	4	4	4
Data Analysis	4	3	4	4	4
Ethics & Bias	4	3	3	4	3
Results	4	4	4	4	4
Transferability or Generalizability	3	4	4	3	4
Implications & Usefulness	4	4	4	4	4
Total Points	**35**	**34**	**35**	**35**	**35**

Table 3: Evaluation of the selected Titles 6-9 according to Hawker *et al.* (2002)

Authors of selected Studies / Assessment Criteria	Lou *et al.*, 2023	Sands *et al.*, 2022	Thomas and Fowler, 2021	Xie-Carson, Benckendorff and Hughes, 2023
Abstract & Title	4	4	3	4
Introduction & Aims	4	4	4	3
Method & Data	4	4	4	4
Sampling	4	4	3	4
Data Analysis	4	4	4	4
Ethics & Bias	4	3	3	3
Results	4	4	4	4
Transferability or Generalizability	4	3	4	3
Implications & Usefulness	4	4	4	4
Total Points	**36**	**34**	**33**	**33**

3.2 Research Findings

This chapter presents the results of the selected studies for the SLR. First, the literature details and research characteristics are described to provide a general overview of the publications. These characteristics include the publication year, study design, sampling size or research objective. In the next step, the study results are clustered by research fields and the findings of the assessed articles are synthesized to identify the current state of research on virtual influencers. Finally, a cluster analysis is carried out using data from the platform *VirtualHumans*. Based on the information of this platform, a comparison with the current state of research in the literature follows.

3.2.1 Characteristics of the Studies

To begin with the characterization of the studies, it can be noted that the publication period of the studies is between 2021 and 2023: three journals were published in 2021, four in 2022 and two in 2023. The study designs include an interview (Lou *et al.*, 2023), three mixed method approaches as comparative case studies (Arsenyan and Mirowska, 2021; Batista da Silva Oliveira, Antonio and Chimenti, 2021; Brito Silva *et al.*, 2022), two online surveys (Gerlich, 2023; Sands *et al.*, 2022), a twofold study design with questionnaires with 7-point scales (Franke, Groeppel-Klein and Müller, 2023), an experimental design (Thomas and Fowler, 2021) and a qualitative netnographic analysis (Xie-Carson, Benckendorff and Hughes, 2023). As part of a comparative case study published in the *'International Journal of Human - Computer Studies'*, **Arsenyan and Mirowska (2021)** analyzed the posting behavior of Instagram users based on written comments and emojis. The observation period lasted eleven months and the sample comprises a total of almost 49,000 comments (Arsenyan and Mirowska, 2021, p. 5). The posting behavior towards a human influencer, a virtual influencer and an anime-like influencer was compared in this study to determine emotions towards these three different influencer types. Differences in positive and negative emotions measured by the comments were used to find out how differently Instagram users perceive human, virtual or anime-like influencers on Instagram.

Batista da Silva Oliveira, Antonio and Chimenti (2021) conducted a SLR in combination with a netnography, and in-depth interviews with the aim to find out what impact virtual influencers have on online marketing which was published in the *'Australasian Journal of Information Systems'*. For the SLR, 32 articles from four databases were included in the review and eight influencer experts from Brazil were invited for the interviews. Three of the interviewees (in total five male and three female) were assigned to Generation X, five to Generation Y and the average duration of a single interview was 61.25 minutes (Batista da Silva Oliveira, Antonio and Chimenti, 2021, p. 8). Finally, a netnography was applied on the five most popular virtual influencers according to *HypeAuditor* on Instagram. The period covered ten months and the entire appearance and behavior of the AI-generated influencers was evaluated with the aim of gaining new insights into the use of virtual individuals in marketing.

The third selected journal released in *'Social Network Analysis and Mining'* also includes a comparative case study. **Brito Silva *et al.* (2022)** analyzed five virtual influencers on Instagram, initially with the support of *HypeAuditor* and through own research using the technique of non-participant online observation. *HypeAuditor* metrics were statistically analyzed and comments under the posts of virtual individuals were evaluated. Data from the influencer profiles was collected within a period of 180 days and a total of 55 postings were included in the study (Brito Silva *et al.*, 2022, p. 4). The results were compiled and findings on the authenticity and effectiveness of influencer marketing were collected. Based on this knowledge, advantages, disadvantages, and risks of virtual influencers in influencer marketing on the social media platform Instagram were identified.

In a twofold study published in the *'Journal of Advertising'*, **Franke, Groeppel-Klein and Müller (2023)** assessed the attractiveness of virtual influencers compared to human influencers and the recognizability of non-human individuals using questionnaires with 7-point scales. Only female participants (N= 352) with an average age of 28.83 ± 10.40 years were selected for the study (Franke, Groeppel-Klein and Müller, 2023, p. 527). The findings provided conclusions about the effectiveness of virtual influencer marketing for different product groups and the connection between influencer types and brand images was highlighted.

As part of an online questionnaire-based survey, **Gerlich (2023)** investigated consumers' preferences for human or virtual influencers and their effectiveness in marketing which are available in the journal *'administrative sciences'*. The sample comprised 357 participants from 18 different countries (Gerlich, 2023, p. 11) who became aware of the study through Instagram, Facebook, and LinkedIn. Men were surveyed in almost equal numbers to women and the age distribution was 50% over and 50% under 45 years (Gerlich, 2023, p. 11). Parameters such as trust, expertise, and relevance were included in the study. By comparing human and virtual influencers in relation to these parameters, the appearance of these influencers and the resulting consumer behavior was evaluated using a statistical approach.

Lou *et al.* (2023) studied the motivation of consumers to interact with or follow virtual influencers through in-depth interviews conducted in Singapore. A total of 26 interviews lasting around 45 minutes were conducted and the interviewees had an average age of 22.54 years (Lou *et al.*, 2023, p. 6). More women than men were interviewed. As part of the interviews, questions were asked to examine the background to the success of virtual influencers. For this purpose, reasons for following virtual influencers were uncovered and codes were formed for different motivations. These include entertainment, integration, self-justification, brand image, novelty,

and further factors (Lou *et al.*, 2023, p. 2). The results are mainly aimed at creators and brands, to optimize the use of virtual influencers based on the insights gained and presented in the *'Journal of Advertising'*.

In two studies via online surveys, which are published in the *'European Journal of Marketing'*, **Sands *et al.* (2022)** examined the relationship between virtual vs. human influencers and their management approach (independently or externally managed) in terms of personal connection of consumers. The first study included 325 female participants with an average age of 33.26 years (Sands *et al.*, 2022, p. 1729). Respondents were surveyed to identify the influencers (human or virtual) and their management style. The second study included 347 participants, 42.2% of whom were female with an average age of 36 years (Sands *et al.*, 2022, p. 1733). Similar questions were included as in study one. Overall, the results show how perceptions of virtual vs. human influencers can be affected by certain characteristics such as uniqueness.

The eighth selected article from the *'Journal of Advertising'* by **Thomas and Fowler (2021)** includes a 2 x 2 between subjects design through online surveys. Participants were recruited via *MTurk (*Amazon Mechanical Turk) and a total of 157 (minus twelve removed participants), 58% of whom were male, were included in the study (Thomas and Fowler, 2021, p. 8). Study one assessed the perception of a virtual influencer compared to a human influencer and the effect of a misstep on the purchase intention. Within the second study, the effects of this misstep were examined in more detail to determine how consumers perceive the brand after an incident and what effect an exchange with a human influencer has on the brand image.

In a qualitative netnography, **Xie-Carson, Benckendorff and Hughes (2023)** analyzed social media comments on Instagram posts of six non-human influencers. The sample size comprised 52 Instagram posts with a total of 1,112 comments (Xie-Carson, Benckendorff and Hughes, 2023, p. 5). The evaluation was carried out with the help of coding and clustering of the results according to content and source factors (Xie-Carson, Benckendorff and Hughes, 2023, p. 6). Different reasons for interacting with virtual influencers were investigated with the aim to achieve a deeper understanding of the use of these characters in influencer marketing and the improvement of their effective use in marketing campaigns which were published in the *'Journal of Business Research'*.

3.2.2 Categorization of the Study Contents

Following the presentation of the study characteristics and research results, a categorization of the study contents was conducted. This categorization is intended to allow a structured comparison and synthesis of different findings. A total of 22 subject fields were listed, which were grouped into five main topics that form the next chapters of this work. The following table represents the basis of the categorization process.

Table 4: A Visualization of the Study Contents to form the main Topics

Author(s) (Year)	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14	F15	F16	F17	F18	F19	F20	F21	F22	F23
Arsenyan and Misowska (2021)	×	×	×	×									×										×
Batista da Silva Oliveira (2021)	×	×	×	×	×								×			×							×
de Brito Silva et al. (2022)	×		×	×						×		×	×				×		×				×
Franke et al. (2023)	×																		×			×	×
Gerlich (2023)			×	×	×								×	×	×	×	×	×					×
Lou et al. (2022)	×		×			×	×	×	×	×	×		×				×	×	×				×
Sands et al. (2022)	×	×						×								×				×			×
Thomas and Fowler (2021)	×																×			×			×
Xie-Carson et al. (2023)				×	×	×				×	×		×	×		×						×	×
Register:	F1- Perception of VIs; F2- Consumer reactions; F3- Interactions with VIs; F4- Engagement; F5- Attractiveness; F6- Entertainment; F7- Interest in technology; F8- Novelty; F9- Social Integration; F10- Emotional Connection; F11- VIs as experts; F12- Segments of Interest; F13- Authenticity; F14- Creditability; F15- Reliability; F16- Trust; F17- Purchase Intentions; F18- Brand awareness; F19- Brand/ad novelty; F20- Brand image; F21- Word-of-mouth/referral marketing; F22- Product/Segment dependency; F23- Opportunties/threats through VIs																						

After conducting this categorization, the following topics were derived based on the results from Table 4: F1-5 is summarized as "Perception and Engagement of Virtual Influencers on Social Media" while F6-12 include different findings on consumer motivation and areas of interests of virtual influencers. The subtopics of F13-16 compare the study results on authenticity and credibility of virtual humans and F17-22 include the impact of virtual influencers on companies, which was titled as their effectiveness in social media marketing. Finally, a last main topic was outlined, which includes recommendations and indications on benefits and risks of avatars providing a concluding classification (F23).

3.2.3 Perception and Engagement of Virtual Influencers on Social Media

This section focuses on analyzing the selected articles on how consumers perceive and engage with virtual influencers by synthesizing different research findings.

To begin with, study results reveal that people engage similarly with virtual and human influencers (Lou *et al.*, 2023) as their mainly human-like appearance makes it difficult to distinguish them from humans (Batista da Silva Oliveira, Antonio and Chimenti, 2021). However, differences in how people recognize them and the abilities and characteristics they associate with them were established in the studies. Originally, it was found that virtual humans are perceived as less individual characters which are more easily replaceable (Thomas and Fowler, 2021) and controllable (Batista da Silva Oliveira, Antonio and Chimenti, 2021). Furthermore, they are considered to be more business or advertising-oriented than human influencers (Sands *et al.*, 2022) and represent an "unattainable perfection" (Batista da Silva Oliveira, Antonio and Chimenti, 2021, p. 10). Moreover, Sands *et al.* (2022) emphasized that virtual influencers are less trusted and perceived being more socially distanced in comparison to human influencers. This social distance has proven to be a factor that negatively influences both trust levels and the exchange of information and experiences about virtual characters (Sands *et al.*, 2022). Likewise, Franke, Groeppel-Klein and Müller (2023) found that consumers engage less intensively with virtual than with human influencers. One of the reasons for this is that people observe AI influencers as frightening and foreign beings, however, they had a different attitude towards them when they were informed about their background and creators (Franke, Groeppel-Klein and Müller, 2023). Beyond that, the *Uncanny Valley Theory* by Mori was determined for the acceptance of human-like endorsers (Arsenyan and Mirowska, 2021; Lou *et al.*, 2023). Within this theory, it is described that a realistic human-like appearance of robots makes people skeptical and afraid of them (Mori, MacDorman and Kageki, 2012). This effect was identified within the studies of Arsenyan and Mirowska (2021) and Lou *et al.* (2023), as Arsenyan and Mirowska (2021) showed that anime-like virtual influencers are perceived more positively and friendly and get more likes on Instagram than human-like virtual influencers. Nevertheless, these responses can be diminished by focusing on two factors: imperfection, allowing for small mistakes and weaknesses of their appearance (Arsenyan and Mirowska, 2021; Lou *et al.*, 2023), and self-justification (Lou *et al.*, 2023). This makes virtual influencers appear less perfect and more authentic to their audience, which increases their overall acceptance (Arsenyan and Mirowska, 2021; Lou *et al.*, 2023). Likewise, self-justification contributes to them being more

accepted if followers assume that a human team is managing the account, creating a more authentic interaction experience (Lou *et al.*, 2023).

An initially different attitude towards avatars was studied by Thomas and Fowler (2021). Their research results indicate that virtual influencers are perceived by consumers in the same way as human influencers. Additionally, Gerlich (2023) researched that consumers interact with them in a comparable way to human influencers, both on an emotional and rational level, building relationships with them which are addressed and described in a different study as "[...] crucial in obtaining long-term engagement." (Xie-Carson, Benckendorff and Hughes, 2023, p. 11) These findings are supported by Arsenyan and Mirowska (2021) and Batista da Silva Oliveira, Antonio and Chimenti (2021), who revealed that virtual endorsers achieve greater engagement than human influencers, which could be due to their innovative nature. Moreover, Batista da Silva Oliveira, Antonio and Chimenti (2021) concluded that the attraction of virtual influencers can be connected to several factors including their appearance or special interest in their technology. A further factor was identified by Arsenyan and Mirowska (2021) indicating that in particular the type of communication, including the choice of emojis, and a positive attitude result in the attractiveness of virtual endorsers. The authors justify this with the assumption that they "[…] create an escapist fantasy for her audience." (Arsenyan and Mirowska, 2021, p. 10) The fact that a positive and humorous attitude has a positive influence on the attractiveness of individuals was also proven by Xie-Carson, Benckendorff and Hughes (2023). Regarding their presentation on the social media platform Instagram, engagement is especially high when virtual characters share posts which reflect their personality or daily life experiences (Brito Silva *et al.*, 2022). This includes postings showing them to "[…] be present in the human world […]" like a walk in the park (Brito Silva *et al.*, 2022, p. 9). This human-like lifestyle is identified as an important factor that makes AI influencers interesting and attractive to consumers (Xie-Carson, Benckendorff and Hughes, 2023). Furthermore, the engagement level is positively affected and strengthened when they present their human personality by addressing social problems and advocating certain views on a political or societal topic (Xie-Carson, Benckendorff and Hughes, 2023). Regarding the perceived trust level, Gerlich (2023) further stated that they are considered more reliable and are observed as more dependable by consumers than human endorsers, which has a positive impact on purchasing decisions. Ultimately, findings presented that Lil Miquela, as an independent, human-like influencer, achieves the highest engagement rate compared to

other virtual influencers, e.g. Lu from Malagu or Dai, who as brand mascots are always associated with a specific brand, even though they have a similar number of followers and fields of interest (Arsenyan and Mirowska, 2021; Brito Silva *et al.*, 2022).

As the results of the studies presented show inconsistencies in the perception of virtual influencers, it is necessary to critically examine the reasons for this. First, perception and engagement with virtual influencers was predominantly rated as high (Arsenyan and Mirowska, 2021; Batista da Silva Oliveira, Antonio and Chimenti, 2021; Brito Silva *et al.*, 2022; Gerlich, 2023; Xie-Carson, Benckendorff and Hughes, 2023). There were only two studies that clearly indicated that avatars have a lower perception compared to human influencers (Franke, Groeppel-Klein and Müller, 2023; Sands *et al.*, 2022). These contradictory results in research could possibly be since Arsenyan and Mirowska (2021), Batista da Silva Oliveira, Antonio and Chimenti (2021), Brito Silva *et al.* (2022) and Xie-Carson, Benckendorff and Hughes (2023) conducted their research results either exclusively or as an addition based on observations of consumer reactions and comments on the social media platform Instagram. In comparison, the contrary study results by Franke, Groeppel-Klein and Müller (2023) and Sands *et al.* (2022) were based on surveys only. This could indicate that the estimated and actual perception differs, and respondents are more likely to expect negative responses which they imply in surveys or interviews, but the actual use and interaction proved the opposite. Future research should take this into account and examine whether the results of Franke, Groeppel-Klein and Müller (2023) and Sands *et al.* (2022), persist when observing customer reactions and comments on Instagram. The different findings could also be explained by the fact that Franke, Groeppel-Klein and Müller (2023) and Sands *et al.* (2022) only included female participants in their study. Thus, future research should examine whether the results of the two studies remain consistent when both women and men are surveyed.

Second, apart from conflicting results on the perception of avatars, there is an agreement among the findings on the *Uncanny Valley Effect* in human-like individuals (Arsenyan and Mirowska, 2021; Lou *et al.*, 2023). Despite different study designs, the explanations are similar, and the discovery of this theory is of no relevance to the origin of the users. In both studies, however, Lil Miquela was selected as the human-like avatar. It is therefore necessary to prospectively investigate whether this theory is applicable when other human-like influencers are used. With regard to consumer engagement, it is found to be high when studies include different virtual influencers in their studies, representing both human, human-like and animated characters (Arsenyan and Mirowska, 2021; Batista da Silva Oliveira, Antonio and Chimenti, 2021; Brito Silva

et al., 2022; Lou *et al.*, 2023; Xie-Carson, Benckendorff and Hughes, 2023). However, contradictory outcomes were found in studies that conducted a direct comparison between a human and a human-like virtual influencer, with Lil Miquela chosen as avatar (Franke, Groeppel-Klein and Müller, 2023; Sands *et al.*, 2022). Therefore, the conflicting results may be attributable to the selection of virtual characters. Prospective research should examine whether the outcomes of Franke, Groeppel-Klein and Müller (2023) and Sands *et al.* (2022) remain stable when human-like characters or influencer types other than Lil Miquela are compared to human endorsers. Following on from this, the most popular AI-generated influencer types are included in the practical example in section 3.3.

3.2.4 Consumer Motivations to follow Virtual Influencers

This paragraph provides an overview of consumer motivations to follow virtual influencers on social media. Within the studies, various motivations were stated that explain both the reach of the characters and their general success on social media in recent years.

A first decisive factor recognized by Brito Silva *et al.* (2022) is the avatars' interest and subject field, as findings show that consumers follow them particularly when they address topics such as fashion, accessories and jewelry, beauty, lifestyle, music and sports in their profiles (Brito Silva *et al.*, 2022). These contents correspond to those that users prefer from human influencers since they belong to the most popular segments for influencer marketing, as mentioned in the introduction part (Geyser, 2023). However, the literature review identified more specific consumer motivations. According to Lou *et al.* (2023), six motivations can be described to follow a virtual human on social media. First, it was studied that consumers are "[…] intrigued by this new technology and its mechanism […]" (Lou *et al.*, 2023, p. 8) and follow them because of their innovation nature that differs from existing influencers. This motivation was also found in another study, which emphasized that the distinctiveness of the individual distinguishes them from the mass of endorsers on social media and plays a decisive role in the decision to follow (Sands *et al.*, 2022). Apart from that, another factor of following a virtual influencer is an entertainment aspect of discovering their daily journeys and experiences (Lou *et al.*, 2023). This aspect was also identified by Xie-Carson, Benckendorff and Hughes (2023), concluding that entertainment can be considered as one of the most important impulses to follow avatars and strengthens the connection between humans and non-humans. The third motivating factor is the interest in the technological development and the opportunities that can be realized by virtual characters (Lou *et al.*, 2023). Moreover, it was found that users are interested in the activities

of a robot in the human world, explaining […]*"I want to see what she [Lil Miquela] gets to like …"*[…] (Lou *et al.*, 2023, p. 8) so the surveillance factor is a motivation to follow. In addition, two studies mentioned that another incentive to follow them is the emotional connection, indicating that social media users can identify with them, especially when it comes to current problems in society (Lou *et al.*, 2023; Xie-Carson, Benckendorff and Hughes, 2023). Beyond that, consumers see them as an inspiration and admire their style and design, as described by an interviewee […] *"I only follow her because I feel like her aesthetics/her face, resonates with me most."* […] (Lou *et al.*, 2023, p. 9). A final motivation indicator highlighted by Xie-Carson, Benckendorff and Hughes (2023) is their professional knowledge and that their content is perceived as informative, which, as outlined in the study, increases credibility and trust, an important factor for interest in a virtual character.

The study results on consumer motivations to follow a virtual influencer identified similar or complementary factors (Brito Silva *et al.*, 2022; Lou *et al.*, 2023; Sands *et al.*, 2022; Xie-Carson, Benckendorff and Hughes, 2023). Initially, fields of interest were identified as a relevant factor for motivation and interest in a virtual human (Brito Silva *et al.*, 2022; Lou *et al.*, 2023; Xie-Carson, Benckendorff and Hughes, 2023). These results were recognized in different study designs: a case study (Brito Silva *et al.*, 2022), interviews (Lou *et al.*, 2023), and a netnography (Xie-Carson, Benckendorff and Hughes, 2023) were applied. A similar independence is found in studies in which entertainment is mentioned as a motivating factor, as this was noted both by the interviewees and in the netnography (Lou *et al.*, 2023; Xie-Carson, Benckendorff and Hughes, 2023). Furthermore, the consistency of the results is given by the variation in other aspects. For example, findings were not influenced by the origin of the study participants, as Lou *et al.* (2023) included Chinese and Malaysian respondents while Sands *et al.* (2022) enrolled American participants in the studies. Results were further not affected by the age group surveyed, as an average age between 22 and 36 years was considered (Lou *et al.*, 2023; Xie-Carson, Benckendorff and Hughes, 2023). Finally, conclusions remain constant when reflecting on the virtual endorsers included, as the studies included different types of characters, i.e. human-like, anime-like influencers or non-humans (Brito Silva *et al.*, 2022; Lou *et al.*, 2023; Sands *et al.*, 2022; Xie-Carson, Benckendorff and Hughes, 2023). However, the complementary findings may be due to the fact that all studies that provided evidence on the reasons to follow a virtual character focused on the platform Instagram (Brito Silva *et al.*, 2022; Lou *et al.*, 2023; Sands *et al.*, 2022; Xie-Carson, Benckendorff and Hughes, 2023). Therefore, future research

should specifically examine consumer motivations on different social media platforms to determine if these results indicate similar factors for users to follow AI influencers.

3.2.5 Authenticity and Creditability towards Virtual Influencers

This section focuses on the degree of authenticity and credibility attributed to virtual influencers. As part of the SLR, six journals addressed this topic and concluded study results, which will be compared in the following.

Initially, authenticity in this context is associated with characteristics such as trust, reliability and transparency (Batista da Silva Oliveira, Antonio and Chimenti, 2021; Gerlich, 2023; Xie-Carson, Benckendorff and Hughes, 2023). However, within the studies, different research findings were established regarding the degree of authenticity of virtual endorsers.

Gerlich (2023) argues that virtual influencers are described as very authentic, while it is added that authenticity is especially present when avatars address everyday human situations "[…] with 'real' elements such as people, pets, household items […]" (Xie-Carson, Benckendorff and Hughes, 2023, p. 10) to their audience. Furthermore, it was noted that some users explain that a professional knowledge is not decisive but a general competence of virtual humans is more important to appear credible (Xie-Carson, Benckendorff and Hughes, 2023). According to Brito Silva *et al.* (2022), apart from their perceived competence, interacting with virtual humans strengthens their authenticity, although the actual perception differs for each individual follower. It was further found that individuals' provenance information is important for their credibility and that the compatibility between brand image and personality of virtual influencers affects their level of credibility (Arsenyan and Mirowska, 2021; Xie-Carson, Benckendorff and Hughes, 2023).

In contrast to the positive effects that improve credibility and trust in virtual endorsers, it is stated that they cannot be authentic and are not perceived as such because of their non-humanity (Batista da Silva Oliveira, Antonio and Chimenti, 2021; Lou *et al.*, 2023). One reason for this is that they represent an unnatural and therefore unattainable image of human beings while another argument points to the fact that their non-humanity is the main reason why they cannot be experienced with the same credibility as a human being (Batista da Silva Oliveira, Antonio and Chimenti, 2021). When considering their credibility with regard to advertising campaigns, people describe their advertising as less convincing and inauthentic because virtual characters "[…] were unable to use the promoted products themselves and did not have real experiences to share […]" (Lou *et al.*, 2023, p. 11). Nevertheless, it was studied that authenticity can also

be misinterpreted with a need for control, causing people to feel that authenticity is more significant than it actually is and it seems that "[…] the virtual influencer is a type of influence that starts to have an expectation for authenticity a little higher than the human influence." (Batista da Silva Oliveira, Antonio and Chimenti, 2021, p. 14)

These research findings are analyzed in more detail to clarify explanations for the conflicting conclusions. Studies that examine the authenticity of virtual influencers predominantly show that consumers perceive them as authentic and credible (Brito Silva *et al.*, 2022; Gerlich, 2023; Xie-Carson, Benckendorff and Hughes, 2023). Only one study indicates that consumers consider them as inauthentic (Lou *et al.*, 2023). These contradictory results could be caused by the fact that Lou *et al.* (2023) mainly included an AI Influencer in the interviews, representing the sectors lifestyle, fashion and music (Brito Silva *et al.*, 2022). In the future, research should therefore investigate whether the findings of Lou *et al.* (2023) also apply when characters of other sectors are analyzed. Different conclusions could further be caused by the study design applied, as Brito Silva *et al.* (2022), Gerlich (2023) and Xie-Carson, Benckendorff and Hughes (2023) collected the data using indirect or mixed research methods. Likewise, another factor that could explain the contradictory results are the virtual characters included, as Lou *et al.* (2023) primarily included Lil Miquela as a virtual endorser. Consequently, it is useful to examine whether the findings Brito Silva *et al.* (2022), Gerlich (2023) and Xie-Carson, Benckendorff and Hughes (2023) indicate a similar tendency if the selection of virtual influencers is mainly on the human-like character Lil Miquela.

Besides the apparent discrepancies in the results, similarities were also found. Research into the credibility of virtual humans stated that this is strengthened by transparent disclosure of the background and provenance of AI influencers (Arsenyan and Mirowska, 2021; Xie-Carson, Benckendorff and Hughes, 2023). This was obtained in both studies by evaluating comments and posts from mainly female virtual influencers on Instagram. Future research should be expanded to examine whether this factor is recognized on other social media platforms and by other genders of characters. Ultimately, non-humanity as an indicator of the lack of credibility of virtual characters was recognized by two studies conducting interviews, regardless of the country of origin of the study participants, as both Chinese and Malaysian (Lou *et al.*, 2023) and exclusively Brazilian citizens (Brito Silva *et al.*, 2022) were involved. Nevertheless, future studies should examine whether this indicator persists when more indirect methodologies are applied.

3.2.6 Effectiveness in Social Media Marketing

After demonstrating the effect of virtual influencers in the previous sections, this paragraph deals with the actual effectiveness of their use in social media marketing. This is examined with regard to the generated purchase intention, resulting brand image and factors to be considered for a successful implementation.

First of all, researchers describe virtual influencers as an effective marketing tool that has numerous positive effects on the brand involved (Brito Silva *et al.*, 2022; Franke, Groeppel-Klein and Müller, 2023; Gerlich, 2023; Sands *et al.*, 2022). These effects include increased brand awareness, which arises through greater referral marketing as opposed to human influencers, and attention through their exclusivity and novelty (Gerlich, 2023; Lou *et al.*, 2023; Sands *et al.*, 2022). At the same time, brands are perceived as more innovative when promoting their products with virtual influencers (Franke, Groeppel-Klein and Müller, 2023). Lou *et al.* (2023) also revealed that the brand image is simultaneously perceived as more advanced and "keeping with the technological progress" and can therefore stand out from other brands. As a result, the purchase intention is positively influenced and increased by the use of virtual endorsers, which can ultimately lead to a positive sales quota (Gerlich, 2023; Thomas and Fowler, 2021). Additionally, Thomas and Fowler (2021) found that failures committed by virtual avatars have a negative impact on purchasing decisions, as is the situation with human influencers. In this case, consumers stated that a virtual influencer should be replaced by a human and not another AI-supported character to increase marketing effectiveness in the future (Thomas and Fowler, 2021).

In comparison, Lou *et al.* (2023) identified a generally negative attitude towards AI influencers: consumers are often not affected by them in their purchasing decisions because they consider them to be inauthentic. Likewise, Franke, Groeppel-Klein and Müller (2023) investigated that traditional, human influencers create more effective brand loyalty. However, as perception and engagement of virtual humans is linked to their success in marketing (Gerlich, 2023), some authors provide recommendations for the efficient use of them in social media marketing. A relevant factor, which has already been mentioned in the context of credibility, is the interaction between the virtual endorser and a brand (Brito Silva *et al.*, 2022; Xie-Carson, Benckendorff and Hughes, 2023). Accordingly, Xie-Carson, Benckendorff and Hughes (2023) emphasizes the importance of matching non-humans and brands in terms of identity and competence. In addition, the avatar should be adapted to the interests and attitudes of the target group in order

to effectively attract their interests (Brito Silva *et al.*, 2022) and similarly, as with human influencers, a high reach is crucial for overall success of advertising (Lou *et al.*, 2023). Another factor that affects their advertising success is related to the product group to be promoted, as studies suggest that advertising for products from the technology segment lead to a more harmonious combination than with other segments such as cosmetics (Franke, Groeppel-Klein and Müller, 2023). Lastly, it was studied that the management type of virtual characters is a factor influencing their effectiveness, with independent virtual influencers achieving greater results as they are rated more favorably and more likely to follow them than those managed by third parties (Sands *et al.*, 2022). This means that, in addition to content-related aspects such as the consistency between brand and influencer (Xie-Carson, Benckendorff and Hughes, 2023) or product segment (Franke, Groeppel-Klein and Müller, 2023), studies also refer to characteristics of virtual individuals that influence their effectiveness in marketing.

These research findings are again critically analyzed and arguments for discrepancies are presented. Studies that have examined the effectiveness of AI influencers predominantly describe them as effective and efficient at affecting purchasing decisions (Brito Silva *et al.*, 2022; Franke, Groeppel-Klein and Müller, 2023; Gerlich, 2023; Sands *et al.*, 2022; Thomas and Fowler, 2021). There was only one study found that virtual endorsers negatively influence purchase decisions (Lou *et al.*, 2023). Similar to the results on authenticity, these contradictory results could possibly be caused by the fact that Lou *et al.* (2023) concentrated on Asian participants in the selection process. The contradictory results might also be due to the age distribution, as Brito Silva *et al.* (2022), Franke, Groeppel-Klein and Müller (2023), Gerlich (2023), Sands *et al.* (2022) and Thomas and Fowler (2021) mainly included participants with an average age of 30-40 years. Future research should therefore investigate whether the outcomes of the above five studies change when younger participants, from Generation Z, are selected. Furthermore, complementary and confirming results were identified as most studies mentioned that brand awareness and innovation is achieved through the implementation of virtual influencers (Franke, Groeppel-Klein and Müller, 2023; Gerlich, 2023; Lou *et al.*, 2023; Sands *et al.*, 2022; Thomas and Fowler, 2021). Thus, this effect is discovered independent of the study design, participant gender and participant origin. Nonetheless, all five studies focused their analysis primarily on female, human-like AI influencers. It is therefore relevant to investigate whether their findings persist when diverse or male human-like avatars are included. In addition, research should examine a generalization of brand awareness through virtual influencers if the same outcomes of the five studies apply to other types of influencers such as animated or non-

human characters. Complementary results were also found suggesting that the compatibility between brand or product and virtual endorser influences the marketing effectiveness (Franke, Groeppel-Klein and Müller, 2023; Xie-Carson, Benckendorff and Hughes, 2023). Despite different methods of data collection and AI characters, these results remain unchanging. However, both studies included Lil Miquela as an example of a human-like character. Future work should therefore investigate whether the two studies by Franke, Groeppel-Klein and Müller (2023) and Xie-Carson, Benckendorff and Hughes (2023) provide similar observations for the selection of other human-like personalities.

3.2.7 Benefits and Risks

This chapter summarizes the benefits and risks of virtual influencers presented in the selected literature. First, the benefits are demonstrated followed by the risks that exist for companies in using virtual characters in social media marketing.

One of the most frequently mentioned positive effects of virtual influencers is the customizability of the characters, i.e. they can be adapted precisely and almost indefinitely to the brand's target group, image, and advertiser's preferences (Batista da Silva Oliveira, Antonio and Chimenti, 2021; Brito Silva *et al.*, 2022; Gerlich, 2023; Sands *et al.*, 2022). This is why they are seen as a useful alternative to traditional influencers and bring new opportunities to the field of marketing (Arsenyan and Mirowska, 2021; Batista da Silva Oliveira, Antonio and Chimenti, 2021). Brito Silva *et al.* (2022) argue that they are a more cost-effective alternative to human influencers as, for example, they eliminate the need for trips and save on the associated expenses. Therefore, Thomas and Fowler (2021) consider them to be a viable alternative to hiring human influencers, especially for younger companies with limited financial opportunities. Regarding their content production, avatars are considered more reliable as they cannot fail due to illness (Brito Silva *et al.*, 2022) and arouse a high level of interest (Batista da Silva Oliveira, Antonio and Chimenti, 2021), while at the same time being able to build long-term relationships with users (Gerlich, 2023). It is also examined by Franke, Groeppel-Klein and Müller (2023), that they enable a company to be perceived as more innovative and future-oriented and thus standing out from competitors. Virtual characters are also beneficial as brands can determine their postings and performance (Brito Silva *et al.*, 2022) so that Batista da Silva Oliveira, Antonio and Chimenti (2021) concluded that they are less likely to get involved in a controversy. In this context, Sands *et al.* (2022) highlighted that the risk of misinformation and misrepresentation of the brand to the audience can be mitigated. Additionally, controversial issues related

to politics or society can be addressed more freely and in greater depth, as no one can be judged or criticized for a particular opinion or stance on a topic (Arsenyan and Mirowska, 2021; Xie-Carson, Benckendorff and Hughes, 2023). Another advantage of AI influencers is the greater efficiency of content creation through artificial intelligence in terms of time, regularity, or punctuality of posts (Batista da Silva Oliveira, Antonio and Chimenti, 2021; Brito Silva *et al.*, 2022). Finally, this technology enables them to adapt more quickly to new trends and requirements on social media platforms, which can change rapidly (Sands *et al.*, 2022). Due to numerous advantages towards human influencers and their benefits identified, the literature predicts that "[…] a further rise of their popularity is expected in the coming years." (Franke, Groeppel-Klein and Müller, 2023, p. 535)

After the benefits have been outlined, the risks associated with the use of virtual influencers are discussed within the next paragraph.

One of the most frequently cited risks associated with the use of virtual influencers is the inconsistency and incompatibility between the company image or product being advertised and the virtual endorser (Brito Silva *et al.*, 2022; Franke, Groeppel-Klein and Müller, 2023; Lou *et al.*, 2023). According to researchers, this leads to confusion resulting in inefficient advertising (Brito Silva *et al.*, 2022). Consequently, virtual humans cannot be used across the board without taking into account whether, for example, real experiences are important for convincing advertising, which are inauthentically conveyed to consumers by virtual influencers (Lou *et al.*, 2023). A further risk arises if the company is not transparent about the fact it is using an AI-supported and not a human influencer, especially in the case of human-like characters, as consumers could react to this with rejection and irritation (Franke, Groeppel-Klein and Müller, 2023; Xie-Carson, Benckendorff and Hughes, 2023). Xie-Carson, Benckendorff and Hughes (2023) therefore suggest providing background information about the individuals and their creators to prevent misunderstandings that could lead to a loss of trust in the brand. In this context, Brito Silva *et al.* (2022) emphasized that these factors should not be neglected, as the follower reach of avatars is not the only decisive factor for successful marketing. Following on from consumer perceptions, the use of virtual influencers can lead to doubts about the accuracy of information provided which can result in the company being classified as unreliable and untrustworthy (Thomas and Fowler, 2021). In addition, consumers criticize advertising with perfect identities, as this may trigger self-doubt and misperceptions in followers, affecting their mental well-being (Batista da Silva Oliveira, Antonio and Chimenti, 2021). One interviewee explained this by highlighting that virtual characters are "[…] more perfect and idealized, it

will always be something that is so distant and perhaps the frustration is greater and can even bring more anguish and anxiety." (Batista da Silva Oliveira, Antonio and Chimenti, 2021, p. 17) Based on these user attitudes, the risk of using AI influencers was emphasized, indicating the importance of selecting carefully, as the opposite can reflect poorly on the company. In addition, the studies also raised risks in relation to the necessary resources. These include the high costs of a virtual endorser as well as the technical requirements and tools needed for the implementation process, which may represent a financial risk and effort depending on the avatars reach and popularity (Batista da Silva Oliveira, Antonio and Chimenti, 2021; Thomas and Fowler, 2021). Lastly, it was stated by Franke, Groeppel-Klein and Müller (2023), that apart from risks arising from the implementation and non-consideration of elementary factors, brands should be prepared that legal changes may occur in the future which can impose new risks and restrictions when using AI in marketing.

A closer examination of the benefits and risks of virtual influencers has revealed inconsistencies in the research findings. Some studies that addressed the benefits of avatars emphasize that they represent a more cost-effective and sustainable alternative to traditional endorsers (Arsenyan and Mirowska, 2021; Brito Silva *et al.*, 2022). Other studies, in contrast, highlight the costs and use of resources required by brands (Batista da Silva Oliveira, Antonio and Chimenti, 2021; Thomas and Fowler, 2021). These conflicting results could possibly be due to the fact that Arsenyan and Mirowska (2021) and Brito Silva *et al.* (2022) mainly covered industries such as fashion and beauty. Accordingly, it should be investigated whether the financial commitment is dependent on industries or requirements of a target group and whether the findings of Arsenyan and Mirowska (2021) and Brito Silva *et al.* (2022) remain consistent when other industries are examined. A further discrepancy was identified in the information disseminated by AI influencers as studies emphasize that virtual influencers allow to prevent negative attention as the brands can determine the posting content (Batista da Silva Oliveira, Antonio and Chimenti, 2021; Brito Silva *et al.*, 2022). Other studies found that their contributions cause confusion more quickly (Franke, Groeppel-Klein and Müller, 2023; Thomas and Fowler, 2021). These inconsistent results could be attributable to their data source, as Batista da Silva Oliveira, Antonio and Chimenti (2021) and Brito Silva *et al.* (2022) worked with data from *HypeAuditor*. Likewise, the contradictory results could be explained because Franke, Groeppel-Klein and Müller (2023) and Thomas and Fowler (2021) conducted surveys. Similar to research on authenticity, this could lead to this methodology finding different results than observations of user reactions in social media. In the future, research should examine whether the findings of Batista

da Silva Oliveira, Antonio and Chimenti (2021) and Brito Silva *et al.* (2022) appear persistent when research is conducted independently of *HypeAuditor* data. In addition, four studies identified that the customization and design opportunities of virtual avatars represent a significant advantage for brands (Batista da Silva Oliveira, Antonio and Chimenti, 2021; Brito Silva *et al.*, 2022; Gerlich, 2023; Sands *et al.*, 2022). Two other studies emphasize the risk of incongruence between brand/product and virtual influencer (Franke, Groeppel-Klein and Müller, 2023; Lou *et al.*, 2023). These contrasting findings could be explained by the fact that Batista da Silva Oliveira, Antonio and Chimenti, 2021, Gerlich, 2023 and Sands *et al.*, 2022 focus on the effective use of avatars from a corporate perspective. Similarly, the contrasting results could be explained as Franke, Groeppel-Klein and Müller, 2023 and Lou *et al.*, 2023 researched attitudes and perceptions towards AI influencers from a consumer point of view. Therefore, future research should investigate the extent to which the customization of characters occurs from the consumer perspective and whether perceptions of consistency between virtual influencers and brands differ between companies and consumers.

In summary, it can be noted that other benefits and risks included in the SLR are partly complementary or provide different results through other fields of investigation or perspectives. As the reasons for these conflicting or confirming findings overlap with those in the previous sections which would result in repetition, the critical discussion of them is completed here.

3.3 Practical Example: A Cluster Analysis

3.3.1 Current Numbers and Facts from the Platform 'VirtualHumans'

As part of my work at the Institute of Economics at the Ruhr West University of Applied Sciences in Mülheim, I worked on a project on virtual influencers last year. The facts and figures collected from this project are based on data from the platform *VirtualHumans* (virtualhumans.org, 2023), which was gathered at the beginning of January 2023 and January 2024. In addition, the follower numbers of the virtual characters refer to the same period, which were taken from their individual Instagram accounts (Instagram, 2024). Following on from the study results presented as part of the SLR, this practical example is intended to complement the literature findings by providing current figures and trends. For this purpose, 200 virtual characters are analyzed regarding their segments of interest, influencer type, gender, year of appearance and origin. Moreover, collaborating brands are listed as well as their social media presence on different platforms. A comparison of the overall results with the current top ten characters is

created and correlations are examined with the attributes that explain the success of AI influencers on Instagram. Tables and diagrams illustrating the outcomes of the cluster analysis are attached in Appendix B.

Initially, 14 different segments were identified as part of the cluster analysis, into which virtual characters were categorized based on their areas of interest. These are as follows: fashion, food, lifestyle, programming, comedy/entertainment, music, dancing, gaming, insurance/ financial savings, children, digital creator (precisely stated on Instagram), brand ambassador/ content creator, sports and 'not given/identifiable'. An individual avatar could be assigned to several areas of interest if these were recognizable from the posting content, descriptions in the Instagram biography or from the profile on *VirtualHumans*. The allocation of 200 avatars to the segments revealed that fashion and brand ambassador/ content creator were the most popular with 21%, followed by lifestyle with 18% and music with 14%. Looking at the top ten most successful influencers in January 2024 (measured by the number of followers), there is a similar distribution with 25% for digital creator (precisely stated on Instagram) and lifestyle, followed by in 21% fashion content. This indicates that fashion, lifestyle, brand ambassador/content creator, digital creator and music are segments most covered by AI influencers and that there is a correlation between the segments and their success.

Next, the avatar types are identified to get an overall picture of the most common types, and then compared with the top ten in 2024. The classification into three defined types was based on their appearance and characteristics described in their Instagram biography. Human-like characters are the most common, accounting for 54.5% of all individuals analyzed, followed by 24.5% anime-like and 21% non-humans. However, a different trend emerges in the top ten, where five non-humans, three human-like and two animate-like influencers are represented. To summarize, although the human-like avatars are the most common in overall numbers, non-humans achieve a greater reach and are more successful. This is why no clear correlation between the influencer type and popularity could be identified.

In terms of the most represented gender, it was found that 67% of avatars identified as female, while 16.5% identified as male or diverse. The top ten results are also made up of 50% female, 40% diverse and 10% male people, so it can be concluded that female avatars are the most common and a strong relationship exists between gender and success.

Following on from the types and genders, a comparison between the success in January 2023 and January 2024 is appropriate to determine whether a trend towards a particular AI influencer (type) has changed within a year. Overall, the most successful virtual character Lu of Malagu

in 2023 was replaced by @nobodysausage with a follower difference of over 1.1 million. The top three (@nobodysausage, Lu of Malagu and CB of Casas Bahia) have only changed their order while Barbie is in fourth place, followed by Miquela Sousa (Lil Miquela). Miquela's followers have decreased by around 300,000 while Barbie has gained over 1.3 million followers. Finally, PuffPuff and Minnie Mouse grew by 300,000 and 50,000 new followers respectively. Therefore, the development of them reveals that within a year, two diverse non-humans have been replaced by a female human-like and a diverse non-human character and the most successful AI influencer is not a female human-like but a non-human, diverse avatar.

An analysis of their appearances over the last few years identified that most AI influencers were created in 2020. Only a few new characters have been added since 2022, but the exact current number is unclear. The oldest character of the 200 selected is Barbie, who was created in 1959. As she first became known through films, the starting point of virtual influencers is set at 2007 with the appearance of GEICO Gecko, a brand mascot of *The Martin Agency*. However, by taking into consideration the 20 most successful avatars, no connection could be identified between a long social media presence and a high number of followers.

A total of 41 countries were counted for the origins of virtual influencers. Most of them are from the United States of America (USA), Japan, South Korea, and the United Kingdom. Around 28 of them did not indicate a place of origin, while five stated several countries or designations such as "from space/another universe". Within Europe, the highest number comes from France, with a total of seven. Two virtual influencers were created in Germany, named Noonouri, an animated girl and Ivan & Peter, two disco balls. Regarding a correlation between the country of origin and the level of awareness on Instagram, a relation could be recognized that the most successful AI influencers come from the USA or Brazil. Similarly, 60% of the top ten originate from the USA.

In terms of brand collaborations, it could be found that 66 companies have worked with virtual endorsers in the past years. These mainly involve international brands from various sectors, such as Amazon, Samsung, Puma, IKEA, Gucci, and McDonalds. Magazines such as Vogue, Cosmopolitan and Forbes also include them. Furthermore, three stars were found to have either created their own avatar, such as tennis player Serena Williams, or to advertise with them, like Lady Gaga and Paris Hilton. A clear tendency can be noticed for the top ten characters, as international companies in the fashion and lifestyle sector in particular use them to promote their products. Thus, brands appear to pay attention to the compatibility of the AI influencer segments as they are active in these fields. Nevertheless, it cannot be generalized that brand

collaborations influence the success of avatars as many of them do not collaborate with brands and generate their profits through music streaming or merchandise sales, for example (Hiort, 2022a).

Ultimately, the practical example is intended to give insights into the development of virtual humans in their social media presence. The analysis showed that a total of 98.5% is active on Instagram, while 67.5% have their own email address, 49% a website and 42.5% a TikTok account. Since this year, Twitch has been added, which was indicated by 38.5% existing characters. Other platforms include Twitter/X with 38.5% and YouTube with 34%. In the top ten, all of them have an Instagram account, 80% an email address and 70% each have a Facebook or TikTok account or their own website. From this it can be concluded that Instagram forms the focus platform for virtual influencers.

3.3.2 A Comparison of Research and Practice Findings

After the cluster analysis has provided an impression of the current situation of virtual influencers, the findings from research and practice are compared. The aim is to establish in which fields the studies are supported by the data from *VirtualHumans* and where practical fields exist that are not covered by the selected research. First, a detailed discussion is given of the aspects that are supported by the results of the cluster analysis. Subsequently, deviating findings and further elements of the practical example are presented.

The findings from practice initially confirm the most popular and most frequently represented segments of interest. While researchers identified fashion, accessories and jewelry, beauty, lifestyle, music, and sports as the most popular segments (Brito Silva *et al.*, 2022), the own analysis revealed a similar result with fashion, lifestyle, brand ambassador/content creator, digital creator, and music. It should be noted here that the segments in the literature and practice are not identical. Nevertheless, there are clear indications that research in this field is already well represented. Furthermore, the focus is on human-like avatars both in the literature and on the platform *VirtualHumans*. While most researchers chose Lil Miquela as an example of a virtual influencer (Arsenyan and Mirowska, 2021; Brito Silva *et al.*, 2022; Franke, Groeppel-Klein and Müller, 2023; Lou *et al.*, 2023; Xie-Carson, Benckendorff and Hughes, 2023), a clear tendency towards human-like influencers can also be confirmed by the 200 avatars, which are represented with around 55%. The same applies to the most frequently represented gender: while research primarily uses Lil Miquela to represent a female character, the cluster analysis shows that 67% of the individuals identify as female or represent the female gender. This demonstrates that the

group of AI influencers, which is represented the most on social media, is also the group that is considered most likely in research. In the literature, two studies have confirmed the *Uncanny Valley Effect* in connection with human-like influencers (Arsenyan and Mirowska, 2021; Lou *et al.*, 2023). Based on the results of the cluster analysis, it has been determined that half of the top ten characters from 2024 are non-humans. This indicates that although human-like avatars are the most popular influencer type, the *Uncanny Valley Effect* may prevent them from being the most popular among the top ten and generating the most followers. However, this is only a conclusion and further concrete research is required. Finally, another confirmation was found between theoretical and practical results. In both cases, it was established that Instagram is the platform most likely to be used by virtual influencers. The focus in all selected journal articles is on characters on Instagram, and almost 99% of the 200 avatars are present on this social media platform. This suggests that intensive research has already been carried out in this topic and that this finding is already frequently reflected in studies.

Apart from the identified similarities, differences between the research findings and the practical example were recognized.

While the research focuses on the most frequently represented segments of interest, the cluster analysis allowed the identification of several other segments that are not considered in the research. These include categories such as dancing, gaming, and children content. Likewise, it has already been determined that Lil Miquela is the preferred character for AI influencers in research. Nevertheless, the cluster analysis showed that she is in fifth place among the top ten avatars and that there are four virtual characters that are significantly more successful than her. In addition, apart from Lil Miquela, only two of the nine studies included another character from the top ten by taking Lu of Malagu or Barbie (Brito Silva *et al.*, 2022; Xie-Carson, Benckendorff and Hughes, 2023). The currently most popular character, @nobodysausage, was not represented in any of the studies included in the SLR. Furthermore, the origin of the AI influencers was not addressed and examined in any of the studies reviewed, while a clear tendency was found in the practical example showing that virtual influencers from the USA are the most successful. The platform also provides insights into the brand cooperations and companies that use avatars in influencer marketing, so that numerous companies can be identified and mentioned. Although some studies stated that brand collaboration is a widespread practice, they do not investigate exactly which and how many brands are involved to date. A final aspect recognized by *VirtualHumans* is the range of social media platforms on which the AI influencers are

represented. Beyond the research findings, it was revealed that other platforms such as TikTok, Twitter/X and Twitch are becoming increasingly popular and attractive for virtual characters.

4   Discussion

4.1   Interpretation of the Results and Response to the Research Question

In this section, the research findings on the current state of research on virtual influencers and their implications for future developments are summarized and interpreted. The SLR provides a comprehensive overview of the topic so that the research question stated in the introduction can be answered.

Starting with the current state of research, the studies indicate that virtual influencers represent an efficient and advanced marketing tool for influencer marketing on social media (Batista da Silva Oliveira, Antonio and Chimenti, 2021; Brito Silva *et al.*, 2022; Franke, Groeppel-Klein and Müller, 2023; Gerlich, 2023; Lou *et al.*, 2023; Sands *et al.*, 2022; Thomas and Fowler, 2021). In general, research tends to reflect an optimistic attitude towards AI influencers and the results point to a number of positive effects and potentials. These include the fact that users perceive them as innovative and interesting individuals who they follow because of their originality and interest in the technology (Lou *et al.*, 2023; Sands *et al.*, 2022; Xie-Carson, Benckendorff and Hughes, 2023). Furthermore, the studies revealed that their use in marketing strengthens brand awareness in particular and encourages more intensive word-of-mouth (Gerlich, 2023; Lou *et al.*, 2023; Sands *et al.*, 2022). However, the importance of brand and virtual character consistency is emphasized, as their impact on marketing effectiveness has already been examined in detail (Brito Silva *et al.*, 2022; Franke, Groeppel-Klein and Müller, 2023; Thomas and Fowler, 2021; Xie-Carson, Benckendorff and Hughes, 2023). In terms of the customization and design options of avatars, studies described them as a more flexible and controllable alternative that can easily adapt to fast-moving trends on social networks (Batista da Silva Oliveira, Antonio and Chimenti, 2021; Brito Silva *et al.*, 2022; Gerlich, 2023; Sands *et al.*, 2022). In addition, the ongoing costs of using AI influencers were found to be lower than those of human influencers, but the initial costs as well as the technical skills and resources required must be taken into account (Batista da Silva Oliveira, Antonio and Chimenti, 2021; Brito Silva *et al.*, 2022; Thomas and Fowler, 2021). Regarding their presence and the exchange and interactions with virtual influencers, all findings refer to the social media platform Instagram, which is described as their preferred platform (Arsenyan and Mirowska, 2021; Batista da Silva Oliveira, Antonio and Chimenti, 2021; Brito Silva *et al.*, 2022; Lou *et al.*, 2023; Sands *et*

al., 2022; Xie-Carson, Benckendorff and Hughes, 2023). Moreover, the most popular and successful areas of interest were identified, which are very similar to those of traditional human endorsers (Brito Silva *et al.*, 2022). When researching the multitude of different characters and types, human-like, female influencers are the majority. Other types and genders have barely been included in the literature to date. The study findings on the current research status also indicate that the human-like appearance, characteristics, and lifestyle have a positive influence on their authenticity so that they are perceived as credible (Arsenyan and Mirowska, 2021; Batista da Silva Oliveira, Antonio and Chimenti, 2021; Gerlich, 2023; Xie-Carson, Benckendorff and Hughes, 2023). Nevertheless, communication and transparency in the use of AI for the audience emerged as an important factor for user acceptance which also affects their overall success (Batista da Silva Oliveira, Antonio and Chimenti, 2021; Gerlich, 2023; Xie-Carson, Benckendorff and Hughes, 2023).

In order to answer the second part of the research question and thus the conclusions for future developments, the variety and diversity of the characters indicates an increasing use by brands. This signifies that they will become more central to marketing strategies in the future and have an important function in brand communication. Considering their appearance and performance, it can be deduced that female AI influencers are more likely to be created and brands will focus increasingly on the individual design of avatars to optimize a character that is tailored to the target group. Linked to their integration in social media marketing, the research findings imply that companies will have to take a deeper interest in the cost structures and resources required, as these have not yet been analyzed in detail. Moreover, the *Uncanny Valley Effect* was highlighted as a reason to address certain aspects in the future development of virtual characters to optimize the credibility and positive perception of users (Arsenyan and Mirowska, 2021; Lou *et al.*, 2023). This could lead to other characters and types (non-humans and anime-like influencers) growing and gaining popularity. Additionally, the transparency in the use of AI in marketing, which is important for consumers, indicates that communication with their followers about their creators and backgrounds should gain greater attention in the future development of virtual endorsers. However, the overall perception and attractiveness of them depends on age groups and individual interests and perceptions (Batista da Silva Oliveira, Antonio and Chimenti, 2021; Lou *et al.*, 2023; Xie-Carson, Benckendorff and Hughes, 2023), so their effects cannot be determined homogeneously. This finding suggests that the design and impacts of avatars in different contexts as well as user interests must be considered in a differentiated

approach for further development. It can therefore be concluded that the current state of research on the topic of virtual influencers already provides a broad range of insights and knowledge, but that additional in-depth studies are required to investigate existing research deficits which will be described in detail in chapter 4.3.

4.2 Limitations of this Study

The results of this work must be interpreted by taking into account certain limitations resulting from the time constraints of a bachelor's thesis. Firstly, the SLR was compiled by only one author and a cross-check of the selection and findings of the literature search was not carried out. This might have resulted in some relevant studies not being identified, so that the outcomes of the SLR should be classified as subjective. In addition, the decision of inclusion was based on an initial and rough screening of the articles, so it cannot be ruled out that relevant studies were neglected in this step. The search was limited to four databases (BSP, APA PsycInfo, Science Direct and Web of Science) and within these four databases, the selection of studies was restricted by the defined inclusion and exclusion criteria. Additionally, the literature search was limited to English-language literature, so it cannot be excluded that important studies in other languages may have been unnoticed. Furthermore, a time frame for the publications was set for 2016 to 2023, so that previously published studies were not included. Next, only journal articles were considered, which implies that other types of publications with potentially significant results were disregarded. The selection was also restricted to peer-reviewed articles, meaning that potentially significant gray literature was omitted. Finally, the inclusion of the study design (qualitative and statistical methods) within the literature search represents a limiting factor, resulting in the selection being restricted to nine articles.

Limitations were also identified apart from the methodology applied.

In addition to similar analysis parameters in the included studies, which impair the generalizability of the research results, the field of virtual influencers is a very topical issue that may change quickly. In particular, the development of the number of followers on Instagram was reduced to a period of one year and only two months were considered (January 2023 and January 2024), so that changes within the year or monthly fluctuations were not considered. As a result, the conclusions on the future development of avatars must be classified taking these limitations into account.

4.3 Future Research and Outlook

This section finally presents the research gaps and insufficiently researched fields of virtual influencers identified by the SLR and the practical example. Additionally, an outlook is given that describes the topic in the future.

Primarily, the under-researched fields can be divided into three main areas, which include the characteristics of the participants enrolled in the studies, the characteristics of virtual influencers included as well as the effectiveness of AI influencers and their collaboration with brands. Starting from the characteristics of participants, it was found that the studies did not conduct their results for different age groups and generations, which are characterized by different expectations and needs. This means that the perception and corresponding preferences, for example in relation to the influencer type (human-like, anime-like, non-human), are still unclear and further research is necessary. Future research should also investigate more specifically the impact of origin and cultural backgrounds on attitudes towards AI influencers. The same applies to the gender and potentially conflicting conclusions, which have not yet been adequately considered to date. As for the virtual humans involved, there is a need for future research to focus on characters besides Lil Miquela, as other species and genders have received little attention in the studies. Moreover, it should be examined more closely if virtual influencers from different countries have varying effects on consumers and whether the language and communication of avatars is decisive. Following on from this, there is a research deficit in the analysis of the top ten virtual influencers on Instagram. So far, only three of them have been studied in research, the consideration of the other characters is still outstanding. This should include a closer examination of the reasons leading to @nobodysausage, for example, being the most successful AI influencer. In particular, the fact that @nonodysausage is a non-human influencer indicates the need for further work on what factors distinguish it and to what extent this type of influencer, which is less represented in studies, generates attraction or interest among its followers. In addition, segments such as gaming, dancing, and children's content, which have hardly been considered to date, should be included in the studies in the future to create a comprehensive analysis of all the segments represented by AI influencers. In terms of the final area around collaboration with virtual influencers and their effectiveness in marketing, more in-depth studies are required to determine which companies and industries are most strongly represented among virtual influencers. In addition, researchers should examine more closely whether brand collaborations change the overall impression of avatars and whether it differentiates them from characters

known through the sale of merchandise or music streaming. Furthermore, there are gaps existing in research findings on the factors that strengthen brand awareness. This is because little research has been conducted into the type of influencer and gender that attracts the most attention and if the represented segments of interest are a contributing factor. In this way, brands could derive from these results which AI influencer is most profitable to implement in their marketing concept. Research is also insufficiently covered concerning the actual costs and resources required for virtual influencers. In this regard, it needs to be assessed whether the costs are sector-dependent and for which companies the use is most effective. Subsequently, avatars on other social media platforms such as TikTok, YouTube, Twitter/X, Twitch etc. should be analyzed to find out whether users have different expectations of the individuals on different platforms. To end this, future studies should aim to investigate different perspectives and uncover whether the design and presentation of virtual influencers between brands and creators are congruent with those of consumers. This could provide valuable insights for their future development and optimization. As technology continues to develop, it can be predicted that the topic of virtual influencers will grow further in order to constantly adapt to the needs and expectations of the target group and users. In the next few years, they will go beyond Instagram and social media and offer opportunities for an interactive presence on other platforms by using different communication channels to cover a wide range of perspectives and interests. Through algorithms and the continuous improvement of AI, increasingly personalized content could be created that can lead to a deep connection between robots and humans. This will require more intensive consideration of research and the issue of moral and ethical concerns in the future. Nevertheless, they will gain popularity and enthusiasm because of their infinite possibilities and potentials. All in all, virtual influencers will become a major player in the online world, expanding and redefining marketing and digital communication beyond its current boundaries.

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Appendix A

Appendix A provides further information on the literature research including the search results in the selected databases and a detailed evaluation of the selected titles according to Hawker *et al.* (2002).

Search Process in the Databases

Figure 2: Overview of the Literature Results in Databases for the selected Search String

Overview of Searchstring & Results in the Databases

searchstring	(("virtual influencer") OR ("AI influencer") OR ("computer-generated influencer") OR ("human-like influencer") AND (("social media") OR ("influencer marketing")))
	("virtual influencer") (Title) OR ("AI influencer") (Title) OR ("computer-generated influencer") (Title) OR ("human-like influencer") (Title) AND (("social media") (Title) AND ("social media") (Title) AND
	virtual influencer (Title) OR AI influencer (Title) OR computer-generated influencer (Title) OR human-like influencer (Title) AND social media (Title) AND influencer mark
	TI virtual influencer OR TI ai influencer OR TI computer-generated influencer OR TI human-like influencer AND TI social media AND TI influencer marketing
	(("virtual influencer") OR ("AI influencer") OR ("computer-generated human") AND (("social media") OR ("influencer marketing")))
language	english
period	2016-2023
document type	academic journals, articles
key words included in	title
total sum of journals	111

Database	EBSCO APA					EBSCO BSP					Web of Science						Science Direct			
results	0	404	493	20	73	0	3635	1025	66	33	2	9	65	21	85	91	0	1450	147273	91
language (non-english)		23	23		0			3	3	3			2	0		0				0
no economic/marketing focus													27		17	60		870		60
no academic journal/article			89	2	2			14	31	1				4	15	2				2
other methodology (SLR/interview)					19															
no academic journal/ article																				
total results	0	381	381	18	52	0	3635	1011	32	29	2	9	36	17	53	29	0	580	147273	29
doublets					5					0				7		4				4
new sum					47					29				10		25				25

Note: separate entry for Web of Science as follows, as the entry via "title" did not lead to sufficient results:

((TI=(virtual influencer)) OR (TI=(AI influencer)) OR (TI=(computer-generated human)))

AND ((TI=(social media)) OR (TI=(influencer marketing)))

Figure 3: Results within the Databases APA, BSP, Web of Science and ScienceDirect

Search Results of the selected Databases

BSP

author	title	access
Ameen	Risk, Trust, and the Roles of Hur	yes
Byun	A Systematic Review of Virtual I	no
Chan	Color effects on AI influencers'	no
Conti	Virtual Influencers in Online So	yes
da Silva Oliveira	"Humanized Robots": A Proposi	yes
de Boissieu	The perceived credibility of hun	no
Deng	Effects of human versus virtual	no
El Hedhli	Stereotyping human-like virtual	no
Franke	Consumers' Responses to Virtu	yes
Gerlich	The Power of Virtual Influencer	yes
Haikel-Elsabeh	Virtual Influencers versus Real	no
Jhawar	The emergence of virtual influer	yes
Kim	Are Virtual Influencers Friends	no
Laszkiewicz	Virtual influencers as an emerg	no
Li	Virtual Influencers in Advertise	no
Li, Huajun	Can you sense without being hu	no
Lou	Authentically Fake? How Consu	no
Mahn	Social Media Influencers in Virl	no
Muniz	Are they humans or are they rot	no
Na	Investigating the Effect of Self-C	no
Park	Revisiting the elaboration likeli	no
Robinson	Towards an Ontology and Ethic	yes
Sands	False idols: Unpacking the oppc	no
Sands	Unreal influence: leveraging AI	yes
Thomas	Close Encounters of the AI Kind	no
Vila-López	A bibliometric analysis of virtu	yes
Wan	Can Virtual Influencers Replace	no
Yang	Anthropomorphism in CSR Endo	no
Yang	Human versus Virtual Influence	no
	access	**12**
	no access	**17**
total of journals with access		**70**
	doublets (total)	16
	doublets (with access)	8
	total without doublets	62
doublets		

ScienceDirect

author	title	access
Alboqami	Trust me, I'm an influen	no
Bag	Big data analytics and a	no
Conde	Micro, macro and mega	yes
Coombs	What is it about human	yes
Deng	Effects of human versus	no
El Hedhli	Stereotyping human-like	no
Ferraro	Embracing diversity, eq	no
Ford	AI advertising: An overv	no
Jarrahi	Artificial intelligence ar	no
Kiwoong	The merchants of meta	no
Kushwaha	What impacts customer	yes
Lefkeli	Sharing information wit	yes
Li, Huajun	Can you sense without t	no
Ma	Machine learning and A	yes
Meena	Extrinsic and intrinsic r	no
Mustak	Deepfakes: Deceptions,	no
Pan	Artificial intelligence fo	no
Papagiannidis	Uncovering the dark sid	yes
Park	Editorial introduction: F	yes
Paschen	Artificial intelligence: B	yes
Paschen	Collaborative intelligen	yes
Pereira	A systematic literature r	no
Petrescu	AI-based innovation in I	yes
Prentice	Engaging and retaining	yes
Sands	False idols: Unpacking t	yes
Shin	Algorithm awareness: W	yes
Sowa	Cobots in knowledge wc	yes
Wong	Persuasive cues and rec	no
Xie-Carson	Not so different after al	yes
	access	**16**
	no access	**13**

APA

author	title	access
Abhishek	Mapping the influenc	yes
Argyris	The effects of visual c	yes
Arsenyan	Almost human? A con	yes
Belanche	Understanding influe	yes
Boermann	Disclosing influencer	yes
Bu	Influencer marketing:	no
Cartwright	Influencer marketing	yes
Caruana	Learner satisfaction I	yes
Coates	The effect of influenc	yes
Coates	Social media influenc	no
De Jans	Digital food marketin	yes
De Veirman	Marketing through in	yes
Feng	An expert with whom	yes
Gross	Influencer marketing	yes
Jin	Instafamous and soci	yes
Jung	The mechanism of so	yes
Karagür	How, why, and when c	no
Kemp	The matchmaking act	yes
Kim	Influencer marketing	no
Kim	Trust me, trust me no	yes
Le	Impact of the pander	no
Lee	I'm not a puppet, i'm i	no
Lee	AI versus human: Retl	no
Lee	The sway of influence	yes
Leung	Attractive females ve	yes
Leung	Online influencer ma	yes
Li	Virtual influencers in	no
Li	Influencer marketing:	no
Lim	'You are a virtual infl	no
Lou	Influencer marketing:	no
Mallipeddi	A framework for anal	no
Mero	B2B influencer marke	yes
Mirowska	Sweet escape: The rol	yes
Miyake	I am a virtual girl fro	no
Muniz	Are they humans or a	no
Park	The interplay betwee	no
Piehler	Traditional or 'instaf	no
Rohde	'It's selling like hotca	yes
Sands	Unreal influence: Lev	yes
Sharma	Femleuncing: Integra	no
Stubb	Influencer marketing:	yes
Sundermann	Hope you're not total	no
Thomas	Close encounters of tl	yes
Tsen	Who to find to endor:	yes
van der Bend	Can I @handle it? Th	yes
van Reijmersdal	Effects of disclosing i	no
von Mettenheim	The complex triad of i	yes
Xiao	Engaging in dialogue	no
Xie	How to strategically c	no
Xie-Carson	All hype or the real d	yes
Yang	Human versus virtual	yes
Zhou	How social media inf	yes
	access	**31**
	no access	**21**

WoS

author	title	access
Arsenyan	Almost human? /	yes
Barari	Unveiling the dar	no
Chiu	Impact of Celebri	yes
Conti	Virtual Influence	yes
de Brito Silva	Avatar marketing	yes
Deng	Effects of human	no
Jhawar	The emergence of	yes
Kadekova, Holien	Influencer marke	yes
Kim	Are Virtual Influe	yes
Kim, Eunjin	The next hype in	yes
Mirowska	Sweet escape: Th	yes
Mouritzen	Virtual influence	no
Rutter	Social media infl	yes
Sands	Unreal influence	yes
Simay	The e-WOM inter	no
Suprawan	WHAT CAUSES SC	yes
Yap, Yoong Ruey	Factors of virtua	no
	access	**11**
	no access	**6**

Figure 4: Total Number of Records studied as part of the PRISMA Flowchart

Records Screening

author	title	access	Inclusion	Exclusion	Maybe	comments
Abhishek	Mapping the influence of influencer marketing: A bibliometric analysis.	yes		x		
Alboqami	Trust me, I'm an influencer! - Causal recipes for customer trust in artificial intelligence influencers in th	no		x		retail industry
Ameen	Risk, Trust, and the Roles of Human Versus Virtual Influencers.	yes		x		tourist decision making
Argyris	The effects of visual congruence on increasing consumers' brand engagement: An empirical investigati	yes		x		
Arsenyan	Almost human? A comparative case study on the social media presence of virtual influencers.	yes	x			
Bag	Big data analytics and artificial intelligence technologies based collaborative platform empowering ab	no		x		
Barari	Unveiling the dark side of influencer marketing: how social media influencers (human vs virtual) dimini	no	x			
Belanche	Understanding influencer marketing: The role of congruence between influencers, products and consu	yes		x		
Boermann	Disclosing influencer marketing on YouTube to children: The moderating role of para-social relationshi	yes		x		
Bu	Influencer marketing: Sponsorship disclosure and value co-creation behaviour.	no		x		
Byun	A Systematic Review of Virtual Influencers: Similarities and Differences between Human and Virtual Inf	no			x	systematic literature review
Cartwright	Influencer marketing within business-to-business organisations.	yes		x		
Caruana	Learner satisfaction in marketing simulation games: Antecedents and influencers.	yes		x		
Chan	Color effects on AI influencers' product recommendations.	no		x		color effects
Chiu	Impact of Celebrity, Micro-Celebrity, and Virtual Influencers on Chinese Gen Z's Purchase Intention Thr	yes	x			
Coates	The effect of influencer marketing of food and a 'protective' advertising disclosure on children's food int	yes		x		
Coates	Social media influencer marketing and children's food intake: A randomized trial.	no		x		
Conde	Micro, macro and mega-influencers on instagram: The power of persuasionvia the parasocial relations	yes		x		
Conti	Virtual Influencers in Online Social Media	yes	x			
Coombs	What is it about humanity that we can't give away to intelligent machines? A European perspective	yes		x		
da Silva Oliveira	"Humanized Robots": A Proposition of Categories to Understand Virtual Influencers.	yes	x			
de Boissieu	The perceived credibility of human-like social robots: virtual influencers in a luxury and multicultural co	no		x		multicultural context/luxury
de Brito Silva	Avatar marketing: a study on the engagement and authenticity of virtual influencers on Instagram	yes	x			
De Jans	Digital food marketing to children: How an influencer's lifestyle can stimulate healthy food choices am	yes		x		
De Veirman	Marketing through instagram influencers: The impact of number of followers and product divergence o	yes		x		
Deng	Effects of human versus virtual human influencers on the appearance anxiety of social media users.	no	x			
El Hedhli	Stereotyping human-like virtual influencers in retailing: Does warmth prevail over competence?	no		x		
Feng	An expert with whom I can identify: The role of narratives in influencer marketing.	yes		x		
Ferraro	Embracing diversity, equity, and inclusion (DEI): Considerations and opportunities for brand managers	no		x		
Ford	AI advertising: An overview and guidelines	no		x		
Franke	Consumers' Responses to Virtual Influencers as Advertising Endorsers: Novel and Effective or Uncanny	yes	x			
Gerlich	The Power of Virtual Influencers: Impact on Consumer Behaviour and Attitudes in the Age of AI.	yes	x			
Gross	Influencer marketing on Instagram: Empirical research on social media engagement with sponsored po	yes		x		
Haikel-Elsabeh	Virtual Influencers versus Real Influencers Advertising in the Metaverse, Understanding the Perceptio	no	x			
Jarrahi	Artificial intelligence and the future of work: Human-AI symbiosis in organizational decision making	no		x		
Jhawar	The emergence of virtual influencers: a shift in the influencer marketing paradigm	yes	x			
Jin	Instafamous and social media influencer marketing.	yes		x		

Author	Title					
Jung	The mechanism of social media marketing: Influencer characteristics, consumer empathy, immersion,	yes		x		
Kadekova, Holienc	Influencer marketing as a modern phenomenon creating a new frontier of virtual opportunities	yes	x			
Karagür	How, why, and when disclosure type matters for influencer marketing.	no		x		
Kemp	The matchmaking activity: An experiential learning exercise on influencer marketing for the digital mar	yes		x		
Kim	Are Virtual Influencers Friends or Foes? Uncovering the Perceived Creepiness and Authenticity of Virtua	no	x			
Kim	Influencer marketing and social commerce: Exploring the role of influencer communities in predicting u	no		x		
Kim	Trust me, trust me not: A nuanced view of influencer marketing on social media.	no	x			
Kim, Eunjin	The next hype in social media advertising: Examining virtual influencers' brand endorsement effectiver	yes		x		
Kiwoong	The merchants of meta: A research agenda to understand the future of retailing in the metaverse	no		x		
Kushwaha	What impacts customer experience for B2B enterprises on using AI-enabled chatbots? Insights from Bij	yes			x	systematic literature
Laszkiewicz	Virtual influencers as an emerging marketing theory: A systematic literature review.	no		x		
Le	Impact of the pandemic on social media influencer marketing in fashion: A qualitative study.	no	x			
Lee	I'm not a puppet, i'm a real boy! Gender presentations by virtual influencers and how they are received	no	x			
Lee	AI versus human: Rethinking the role of agent knowledge in consumers' coping mechanism related to ir	no		x		
Lee	The sway of influencer marketing: Evidence from a restaurant group.	no		x		
Lefkeli	Sharing information with AI (versus a human) impairs brand trust: The role of audience size inferences a	yes		x		
Leung	Attractive females versus trustworthy males: Explore gender effects in social media influencer marketi	yes		x		
Leung	Online influencer marketing.	yes	x			
Li	Virtual Influencers in Advertisements: Examining the Role of Authenticity and Identification.	no	x			
Li	Influencer marketing: Purchase intention and its antecedents.	yes	x			
Li, Huajun	Can you sense without being human? Comparing virtual and human influencers endorsement effective	no	x			
Lim	'You are a virtual influencer!': Understanding the impact of origin disclosure and emotional narratives (	no	x			
Lou	Authentically Fake? How Consumers Respond to the Influence of Virtual Influencers.	yes		x		
Lou	Influencer marketing: How message value and credibility affect consumer trust of branded content on s	no		x		
Ma	Machine learning and AI in marketing – Connecting computing power to human insights	yes		x		
Mahn	Social Media Influencers in Virtual Selling Tools.	no		x		
Mallipeddi	A framework for analyzing influencer marketing in social networks: Selection and scheduling of influenc	no		x		
Meena	Extrinsic and intrinsic motivators for usage continuance of hedonic mobile apps	no		x		
Mero	B2B influencer marketing: Conceptualization and four managerial strategies	yes	x			
Mirowska	Sweet escape: The role of empathy in social media engagement with human versus virtual influencers.	yes	x			
Miyake	I am a virtual girl from Tokyo: Virtual influencers, digital-orientalism and the (Im)materiality of race and	no	x			
Mouritzen	Virtual influencer marketing: the good, the bad and the unreal	no	x			
Muniz	Are they humans or are they robots? The effect of virtual influencer disclosure on brand trust.	no		x		
Mustak	Deepfakes: Deceptions, mitigations, and opportunities	no	x			
Na	Investigating the Effect of Self-Congruity on Attitudes toward Virtual Influencers: Mediating the Effect o	no		x		
Pan	Artificial intelligence for digital sustainability: An insight into domain-specific research and future dire	no		x		
Papagiannidis	Uncovering the dark side of AI-based decision-making: A case study in a B2B context	yes		x		not found
Park	Revisiting the elaboration likelihood model in the context of a virtual influencer: A comparison betwee	no		x		
Park	Editorial introduction: Retail innovation in the 4th industrial revolution	yes		x		
Park	The interplay between human likeness and agency on virtual influencer credibility.	no		x		
Paschen	Artificial intelligence: Building blocks and an innovation typology	yes		x		
Paschen	Collaborative intelligence: How human and artificial intelligence create value along the B2B sales funn	yes		x		
Pereira	A systematic literature review on the impact of artificial intelligence on workplace outcomes: A multi-p	no		x		
Petrescu	AI-based innovation in B2B marketing: An interdisciplinary framework incorporating academic and prac	yes		x		
Piehler	Traditional or 'instafamous' celebrity? Role of origin of fame in social media influencer marketing.	no		x		
Prentice	Engaging and retaining customers with AI and employee service	yes	x			
Robinson	Towards an Ontology and Ethics of Virtual Influencers.	yes		x		
Rohde	'It's selling like hotcakes': Deconstructing social media influencer marketing in long-form video content	yes		x		
Rutter, Richard	Social media influencers, product placement and network engagement: using AI image analysis to emp	yes	x			
Sands	False idols: Unpacking the opportunities and challenges of falsity in the context of virtual influencers	yes	x			
Sands	Unreal influence: leveraging AI in influencer marketing.	yes		x		
Sharma	Femluencing: Integration of femvertising and influencer marketing on social media.	no		x		
Shin	Algorithm awareness: Why user awareness is critical for personal privacy in the adoption of algorithmi	yes		x		
Simay	The e-WOM intention of artificial intelligence (AI) color cosmetics among Chinese social media influenc	no		x		
Sowa	Cobots in knowledge work: Human – AI collaboration in managerial professions	yes		x		
Stubb	Influencer marketing: The impact of disclosing sponsorship compensation justification on sponsored co	yes		x		
Sundermann	Hope you're not totally commercial! Toward a better understanding of advertising recognition's impac	no	x			
Suprawan	What causes social media users to engage and mimic virtual influencers? The role of self-congruity	yes	x			
Thomas	Close Encounters of the AI Kind: Use of AI Influencers As Brand Endorsers.	yes		x		
Tsen	Who to find to endorse? Evaluation of online influencers among young consumers and its implications f	yes		x		
van der Bend	Can I @handle it? The effects of sponsorship disclosure in TikTok influencer marketing videos with diffe	yes		x		
van Reijmersdal	Effects of disclosing influencer marketing in videos: An eye tracking study among children in early adole	no	x			
Vila-López	A bibliometric analysis of virtual influencers in the Web of Science.	yes		x		
von Mettenheim	The complex triad of congruence issues in influencer marketing	yes	x			
Wan	Can Virtual Influencers Replace Human Influencers in Live-Streaming E-Commerce? An Exploratory Stud	no		x		
Wong	Persuasive cues and reciprocal behaviors in influencer-follower relationships: The mediating role of in	no		x		
Xiao	Engaging in dialogues: The impact of comment valence and influencer-viewer interaction on the effecti	no		x		
Xie	How to strategically disclose sponsored content on Instagram? The synergy effects of two types of spor	no		x		tourism focus
Xie-Carson	Not so different after all? A netnographic exploration of user engagement with non-human influencers	yes		x		
Xie-Carson	All hype or the real deal? Investigating user engagement with virtual influencers in tourism.	yes		x		
Yang	Anthropomorphism in CSR Endorsement: A Comparative Study on Humanlike vs. Cartoonlike Virtual Infl	no		x		no marketing foucs
Yang	Human versus Virtual Influencer: The Effect of Humanness and Interactivity on Persuasive CSR Messagi	no			x	in Malaysia?
Yap, Yoong Ruey	Factors of virtual influencer marketing influencing Generation Y consumers' purchase intention in Mala	no		x		
Zhou	How social media influencers' narrative strategies benefit cultivating influencer marketing: Tackling is	yes				
Total no. journals		**111**	**33**	**74**	**3**	

Figure 5: Reports sought for Retrieval within the PRISMA Flowchart

Reports sought for retrieval

author	title	access	Inclusion	Maybe not	comments	Study design
Arsenyan	Almost human? A comparative case study on the social media presence of virtual influencers.	yes	x			comparative case study
Barari	Unveiling the dark side of influencer marketing: how social media influencers (human vs virtual) diminish followers	no		x	focus	
Byun	A Systematic Review of Virtual Influencers: Similarities and Differences between Human and Virtual Influencers	no		x	SLR	review
Chiu	Impact of Celebrity, Micro-Celebrity, and Virtual Influencers on Chinese Gen Z's Purchase Intention Through Social	yes		x	in China?	statistical approach
Conti	Virtual Influencers in Online Social Media	yes	x			extensive study of the literature, press articles, social platforms data, blogs, and interviews,
da Silva Oliveira	"Humanized Robots": A Proposition of Categories to Understand Virtual Influencers.	yes		x	University F	SLR & interviews
de Brito Silva	Avatar marketing: a study on the engagement and authenticity of virtual influencers on Instagram	yes	x			descriptive statistics and semiotic analysis
Deng	Effects of human versus virtual human influencers on the appearance anxiety of social media users.	no		x	appearnace a	
Franke	Consumers' Responses to Virtual Influencers as Advertising Endorsers: Novel and Effective or Uncanny and Dec	yes	x			
Gerlich	The Power of Virtual Influencers: Impact on Consumer Behaviour and Attitudes in the Age of AI.	yes	x			questionnaire-based survey method
Haikel-Elsabeh	Virtual Influencers versus Real Influencers Advertising in the Metaverse, Understanding the Perceptions, and Inte	no		x		qualitative approach
Jhawar	The emergence of virtual influencers: a shift in the influencer marketing paradigm	yes		x		SLR & case study approach
Kadekova, Holiencin	Influencer marketing as a modern phenomenon creating a new frontier of virtual opportunities	yes	x		inquiry	
Kim	Are Virtual Influencers Friends or Foes? Uncovering the Perceived Creepiness and Authenticity of Virtual Influen	no	x			survey approach
Kim, Eunjin	The next hype in social media advertising: Examining virtual influencers' brand endorsement effectiveness	yes	x			statistical approach
Laszkiewicz	Virtual influencers as an emerging marketing theory: A systematic literature review.	no		x	SLR	review
Lee	I'm not a puppet, I'm a real boy! Gender presentations by virtual influencers and how they are received	no	x			content analysis
Lee	AI versus human: Rethinking the role of agent knowledge in consumers' coping mechanism related to influencer	no		x	focus on consumer coping mechanism	
Li	Virtual Influencers in Advertisements: Examining the Role of Authenticity and Identification.	no	x			statistical approach
Li, Huajun	Can you sense without being human? Comparing virtual and human influencers endorsement effectiveness.	no	x			secondary data analysis and three scenario-based experiments spanning
Lim	'You are a virtual influencer!': Understanding the impact of origin disclosure and emotional narratives on parasoc	no	x			two experiments
Lou	Authentically Fake? How Consumers Respond to the Influence of Virtual Influencers.	yes	x			Uses and Gratification (U&G) approach and the Uncanny Valley Theory
Mirowska	Sweet escape: The role of empathy in social media engagement with human versus virtual influencers.	yes	x			randomised experimental design
Miyake	I am a virtual girl from Tokyo: Virtual influencers, digital-orientalism and the (im)materiality of race and gender.	no		x	cultural context	
Mouritzen	Virtual influencer marketing: the good, the bad and the unreal	no	x			
Muniz	Are they humans or are they robots? The effect of virtual influencer disclosure on brand trust.	no	x			statistical approach
Na	Investigating the Effect of Self-Congruity on Attitudes toward Virtual Influencers: Mediating the Effect of Emotion	no	x			survey
Robinson	Towards an Ontology and Ethics of Virtual Influencers.	yes		x	Sydney University	
Sands	False idols: Unpacking the opportunities and challenges of falsity in the context of virtual influencers	yes		x	literature review	
Sands	Unreal influence: leveraging AI in influencer marketing.	yes	x			two empirical studies
Suprawan	What causes social media users to engage and mimic virtual influencers? The role of self-congruity	yes	x			questionnaire
Thomas	Close Encounters of the AI Kind: Use of AI Influencers As Brand Endorsers.	yes	x			statistical approach
Vila-López	A bibliometric analysis of virtual influencers in the Web of Science.	yes		x	no focus on	bibliometric approach
Wan	Can Virtual Influencers Replace Human Influencers in Live-Streaming E-Commerce? An Exploratory Study from	no	x			expert interviews and a consumer experiment
Xie-Carson	Not so different after all? A netnographic exploration of user engagement with non-human influencers on social	yes	x			study analyses on user comments from Instagram posts
Yap, Yoong Ruey	Factors of virtual influencer marketing influencing Generation Y consumers' purchase intention in Malaysia	no		x	in Malaysia?	
total no. journals		**36**	**24**	**12**		

Figure 6: Final Selection of Studies included in the SLR

Final overview of included studies

Author	Title	Study design	Pub. year	Publisher	Database(s)
Arsenyan	Almost human? A comparative case study on the social	comparative case study	2021	International Journal of Human - Computer	APA; WoS
da Silva Oliveir	"Humanized Robots": A Proposition of Categories to Und	SLR & in-depth interviews	2021	Australasian Journal of Information Syste	BSP
de Brito Silva	Avatar marketing: a study on the engagement and author	comparative case study	2022	Social Network Analysis and Mining	WoS
Franke	Consumers' Responses to Virtual Influencers as Adverti	online questionnaires with 7-point scales	2023	Journal of Advertising	BSP
Gerlich	The Power of Virtual Influencers: Impact on Consumer Be	questionnaire-based survey method	2023	Administrative Sciences	BSP
Lou	Authentically Fake? How Consumers Respond to the Infl	in-depth interviews	2022	Journal of Advertising	BSP
Sands	Unreal influence: leveraging AI in influencer marketing.	online surveys	2022	European Journal of Marketing	APA; BSP; WoS
Thomas	Close Encounters of the AI Kind: Use of AI Influencers As	online surveys	2021	Journal of Advertising	APA; BSP
Xie-Carson	Not so different after all? A netnographic exploration of us	qualitative netnography	2023	Journal of Business Research	ScienceDirect

Literature Quality Assessment Form
Hawker et al., 2002, pp. 1296–1297 "Appraising the Evidence: Reviewing Disparate Data Systematically"

Scale: Good = 4 ; Fair = 3 ; Poor = 2 ; Very poor = 1

1. Abstract & title:

Did they provide a clear description of the study?

Good:	Structured abstract with full information and clear title.
Fair:	Abstract with most of the information.
Poor:	Inadequate abstract.
Very Poor:	No abstract.

2. Introduction & aims:

Was there a good background and clear statement of the aims of the research?

Good:	Full but concise background to discussion/study containing up-to date literature review and highlighting gaps in knowledge. Clear statement of aim AND objectives including research questions.
Fair:	Some background and literature review. Research questions outlined.
Poor:	Some background but no aim/objectives/questions OR Aims/objectives but inadequate background.
Very Poor:	No mention of aims/objectives. No background or literature review.

3. Method & data:

Is the method appropriate and clearly explained?

Good:	Method is appropriate and described clearly (e.g., questionnaires included). Clear details of the data collection and recording.
Fair:	Method appropriate, description could be better. Data described.
Poor:	Questionable whether method is appropriate. Method described inadequately. Little description of data.
Very Poor:	No mention of method, AND/OR Method inappropriate, AND/OR No details of data.

4. Sampling:

Was the sampling strategy appropriate to address the aims?

Good:	Details (age/gender/race/context) of who was studied and how they were recruited. Why this group was targeted. The sample size was justified for the study. Response rates shown and explained.
Fair:	Sample size justified. Most information given, but some missing.
Poor:	Sampling mentioned but few descriptive details.
Very Poor:	No details of sample.

5. **Data analysis:**

Was the description of the data analysis sufficiently rigorous?

Good: Clear description of how analysis was done. Qualitative studies: Description of how themes derived/ respondent validation or triangulation. Quantitative studies: Reasons for tests selected hypothesis driven/ numbers add up/statistical significance discussed.
Fair: Qualitative: Descriptive discussion of analysis. Quantitative.
Poor: Minimal details about analysis.
Very Poor: No discussion of analysis.

6. **Ethics & bias:**

Have ethical issues been addressed, and what has necessary ethical approval gained? Has the relationship between researchers and participants been adequately considered?

Good: Ethics: Where necessary issues of confidentiality, sensitivity, and consent were addressed. Bias: Researcher was reflexive and/or aware of own bias.
Fair: Lip service was paid to above (i.e., these issues were acknowledged).
Poor: Brief mention of issues.
Very Poor: No mention of issues.

7. **Results:**

Is there a clear statement of the findings?

Good.   Findings explicit, easy to understand, and in logical progression. Tables, if present, are explained in text. Results relate directly to aims. Sufficient data are presented to support findings.
Fair: Findings mentioned but more explanation could be given. Data presented relate directly to results.
Poor: Findings presented haphazardly, not explained, and do no progress logically from results.
Very Poor: Findings not mentioned or do not relate to aims.

8. **Transferability or generalizability:**

Are the findings of this study transferable (generalizable) to a wider population?

Good: Context and setting of the study are described sufficiently to allow comparison with other contexts and settings, plus high score in Question 4 (sampling).
Fair: Some context and setting described, but more needed to replicate or compare the study with others, PLUS fair score or higher in Question 4.
Poor: Minimal description of context/setting.
Very Poor: No description of context/setting.

9. **Implications & usefulness:**

How important are these findings to policy and practice?

Good:	Contributes something new and/or different in terms of understanding/insight or perspective. Suggests ideas for further research. Suggests implications for policy and/or practice.
Fair:	Two of the above (state what is missing in comments).
Poor:	Only one of the above.
Very Poor:	None of the above.

Title 1: **Almost human? A comparative case study on the social media presence of virtual influencers**
Authors: **Jbid Arsenyan, Agata Mirowska**

1. **Abstract & title:**

Did they provide a clear description of the study?

Good:	The abstract gives a structured overview of the study design and insights into the findings. The title is clear and concise.

2. **Introduction & aims:**

Was there a good background and clear statement of the aims of the research?

Good:	The background input includes current research knowledge and the need for further research. The research gap is made clear and the aim of the study including the research questions is involved.

3. **Method & data:**

Is the method appropriate and clearly explained?

Good:	The methodology is appropriate and well chosen. The procedures for collecting the data are explained in detail.

4. **Sampling:**

Was the sampling strategy appropriate to address the aims?

Good:	The sampling strategy was explained in detail and suitable for the research objective. It was explained which participants were selected for the study and under which circumstances the study was conducted.

5. **Data analysis:**

Was the description of the data analysis sufficiently rigorous?

Good:	The execution of the data analysis was described in detail and the results were presented in tabular form for better visualization. The selected hypotheses were discussed after evaluation and the results compared.

6. **Ethics & bias:**

Have ethical issues been addressed, and what has necessary ethical approval gained? Has the relationship between researchers and participants been adequately considered?

Good:	Ethics and bias are included in the conclusion of the journal.

7. **Results:**

Is there a clear statement of the findings?

Good: The results of the study are presented in a well-structured manner and provide answers to the previously defined research questions. The data analysis was adequate to achieve the research findings.

8. **Transferability or generalizability:**

Are the findings of this study transferable (generalizable) to a wider population?

Fair: The framework conditions of the study are presented, but the selection and results of three selected influencers cannot be generalized.

9. **Implications & usefulness:**

How important are these findings to policy and practice?

Good: The results of the study provide important new insights for future research in the field of virtual influencers and the understanding of how to use them correctly. Open questions and topics for future research are presented.

Title 2: **"Humanized Robots": A Proposition of Categories to Understand Virtual Influencers**
Authors: **Antonio Batista da Silva Oliveira, Paula Chimenti**

1. **Abstract & title:**

Did they provide a clear description of the study?

Good: The title of the journal gives an idea of the content, and the abstract is structured and clearly describes the subject of the paper.

2. **Introduction & aims:**

Was there a good background and clear statement of the aims of the research?

Good: Extensive background knowledge is provided and explained in detail, which research gaps are considered, the objective is clearly formulated. The research question is presented in the introduction together with how findings are to be achieved (study design).

3. **Method & data:**

Is the method appropriate and clearly explained?

Good: The choice of methodology is appropriate to the research objective and the data collection is explained in detail.

4. **Sampling:**

Was the sampling strategy appropriate to address the aims?

Good: Good description of the sampling size and reasons for the selection of the interviewees are given. The procedure is clear and structured.

5. **Data analysis:**

   Was the description of the data analysis sufficiently rigorous?

   Fair: The results include statements from the interviewees and other literature. No statistical/hypothesis tests are carried out.

6. **Ethics & bias:**

   Have ethical issues been addressed, and what has necessary ethical approval gained? Has the relationship between researchers and participants been adequately considered?
   Fair: Brief reference to bias, ethics were not included in the final section.

7. **Results:**

   Is there a clear statement of the findings?

   Good. The results contribute to answering the research question. They are comprehensive and presented in detail.

8. **Transferability or generalizability:**

   Are the findings of this study transferable (generalizable) to a wider population?

   Good: The setting and circumstances of the study are explained in detail, so the transferability is given.

9. **Implications & usefulness:**

   How important are these findings to policy and practice?

   Good: The content of the journal contributes to new findings in research on the topic of virtual influencers in influencer marketing. Future research opportunities and links are provided as well as suggestions for practice.

Title 3: **Avatar marketing: a study on the engagement and authenticity of virtual influencers on Instagram**

Authors: **Marianny Jessica de Brito Silva, Lorena de Oliveira Ramos Delfino, Kaetana Alves Cerqueira, Patrícia de Oliveira Campos**

1. **Abstract & title:**

   Did they provide a clear description of the study?

   Good: The title is precise, and the abstract provides a clear structure of the journal and gives a first impression of the subject matter.

2. **Introduction & aims:**

   Was there a good background and clear statement of the aims of the research?

   Good: The introduction provides extensive background information on the topic and the research gap in question. The research objective is clearly described.

3. **Method & data:**

Is the method appropriate and clearly explained?

Good: The method selected for this study is appropriate and explained in detail. Concrete steps of the data collection process are included.

4. **Sampling:**

Was the sampling strategy appropriate to address the aims?

Good: The sample size is justified and the exact circumstances of the selection and the strategy are explained.

5. **Data analysis:**

Was the description of the data analysis sufficiently rigorous?

Good: The data analysis procedure is described in detail. Comprehensive data analysis using statistical calculations and illustrations of the results.

6. **Ethics & bias:**

Have ethical issues been addressed, and what has necessary ethical approval gained? Has the relationship between researchers and participants been adequately considered?
Fair: Consideration of ethics and bias could be more extensive.

7. **Results:**

Is there a clear statement of the findings?

Good. The results are listed in a well-structured manner. Tables were used and explained in detail. The results relate directly to the previously defined research objectives.

8. **Transferability or generalizability:**

Are the findings of this study transferable (generalizable) to a wider population?

Good: The framing conditions of the study are well described to allow comparison with other contexts.

9. **Implications & usefulness:**

How important are these findings to policy and practice?

Good: The results provide new insights into the field of research and are important for the future.

Title 4: **Consumers' Responses to Virtual Influencers as Advertising Endorsers: Novel and Effective or Uncanny and Deceiving?**
Authors: **Claudia Franke, Andrea Groeppel-Klein, and Katrin Müller**

1. **Abstract & title:**

Did they provide a clear description of the study?

Good: Well-structured abstract that describes the topic and approach well and a meaningful title.

2. **Introduction & aims:**

Was there a good background and clear statement of the aims of the research?

Good: Comprehensive background information and clear derivation of the research objective. The orientation of the studies is clear and comprehensible.

3. **Method & data:**

Is the method appropriate and clearly explained?

Good: The methodology used is appropriate and the approach to data collection is well described.

4. **Sampling:**

Was the sampling strategy appropriate to address the aims?

Good: Specific details of the sampling strategy are listed, and the selection is justified. The response rates are explained sequentially.

5. **Data analysis:**

Was the description of the data analysis sufficiently rigorous?

Good: Well-structured analysis of the data and presentation of results. Tables are used for a better overview and the hypothesis tests are applied/discussed.

6. **Ethics & bias:**

Have ethical issues been addressed, and what has necessary ethical approval gained? Has the relationship between researchers and participants been adequately considered?

Good: Integration of limitations and ethics/bias within the studies conducted.

7. **Results:**

Is there a clear statement of the findings?

Good.   The findings of the paper are presented and discussed in a structured way. Specific statements are given about the answers to the hypotheses.

8. **Transferability or generalizability:**

Are the findings of this study transferable (generalizable) to a wider population?

Fair: The circumstances of the study were well presented, but transferability to other similar studies is not necessarily given due to the selection of exclusively female participants in the study.

9. **Implications & usefulness:**

How important are these findings to policy and practice?

Good: The findings of the study cover new insights of the topic of virtual influencers and are therefore important for research. Future research opportunities are given.

Title 5: **The Power of Virtual Influencers: Impact on Consumer Behaviour and Attitudes in the Age of AI**
Author: **Michael Gerlich**

1. **Abstract & title:**

   Did they provide a clear description of the study?

   Good: The title is clear, and the abstract provides all the necessary information to gain an insight into the subject matter and the study content.

2. **Introduction & aims:**

   Was there a good background and clear statement of the aims of the research?

   Good: The introduction presents important background information on the current status quo of virtual influencers and the open research gaps. the research objectives are derived, and the aims of the study are clarified.

3. **Method & data:**

   Is the method appropriate and clearly explained?

   Good: The method is appropriate and the procedure steps for data collection are explained in detail.

4. **Sampling:**

   Was the sampling strategy appropriate to address the aims?

   Good: Very detailed explanation of the sampling strategy and justification of the sampling size. Inclusion of the necessary sample size (formula) and assuming population, and chi-square test for demographic segmentation of the participants.

5. **Data analysis:**

   Was the description of the data analysis sufficiently rigorous?

   Good: Clear data analysis descriptions and calculations within the statistical approach.

6. **Ethics & bias:**

   Have ethical issues been addressed, and what has necessary ethical approval gained? Has the relationship between researchers and participants been adequately considered?
   Fair: Inclusion of bias but ethics could be considered more.

7. **Results:**

   Is there a clear statement of the findings?

   Good.   The results of the study are presented in a clear and structured manner. Tables are explained in the text and the results contribute to answering the research questions.

8. **Transferability or generalizability:**

Are the findings of this study transferable (generalizable) to a wider population?

Good: Circumstances of the study are explained in detail. Transferability is therefore given for future studies with similar context.

9. **Implications & usefulness:**

How important are these findings to policy and practice?

Good: The results provide new insights for research and clear recommendations for brands and marketers on how they should deal with virtual influencers in the future. Also included in the journal is a "Future Research Roadmap", which summarizes the still open research topics.

Title 6: **Authentically Fake? How Consumers Respond to the Influence of Virtual Influencers**
Authors: **Chen Lou, Siu Ting Josie Kiew, Tao Chen, Tze Yen Michelle Lee, Jia En Celine Ong, and ZhaoXi Phua**

1. **Abstract & title:**

Did they provide a clear description of the study?

Good: The title clearly reflects the content of the journal, and the abstract is structured and informative.

2. **Introduction & aims:**

Was there a good background and clear statement of the aims of the research?

Good: The objectives of the study are meaningfully derived from previous research knowledge and the aim and objectives of the study are clearly formulated.

3. **Method & data:**

Is the method appropriate and clearly explained?

Good: The selected method is appropriate and explained in detail. The data collection process is considered and included.

4. **Sampling:**

Was the sampling strategy appropriate to address the aims?

Good: Comprehensive information about the sample size, demographics, and selection process. Justification of the chosen interviewees is included.

5. **Data analysis:**

Was the description of the data analysis sufficiently rigorous?

Good: The concrete description of the data analysis procedure is given.

6. **Ethics & bias:**

   Have ethical issues been addressed, and what has necessary ethical approval gained? Has the relationship between researchers and participants been adequately considered?
   Good: Clear inclusion of ethics and bias within the final paragraph.

7. **Results:**

   Is there a clear statement of the findings?

   Good.   Structured presentation of the findings which are of great importance to answer the research questions. Individual statements of the interviewees are presented and integrated into the argumentation.

8. **Transferability or generalizability:**

   Are the findings of this study transferable (generalizable) to a wider population?

   Good: The circumstances and settings of the study are described so that transferability is conceivable in a similar context.

9. **Implications & usefulness:**

   How important are these findings to policy and practice?

   Good: Practical implications are provided after presenting the results of the study. These contribute to new findings and are useful for future research.

Title 7: **Unreal influence: leveraging AI in influencer marketing**
Authors: **Sean Sands, Colin L. Campbell, Kirk Plangger and Carla Ferraro**

1. **Abstract & title:**

   Did they provide a clear description of the study?

   Good: The structure of the abstract is very well-organized with subheadings (Purpose, Design/Methodology/Findings etc.) and the heading is clear.

2. **Introduction & aims:**

   Was there a good background and clear statement of the aims of the research?

   Good: The introduction provides extensive background knowledge on the topic. The aim of the study is included by emphasizing the gaps in research in this context.

3. **Method & data:**

   Is the method appropriate and clearly explained?

   Good: Structured information about the data collection process is provided and the chosen method is appropriately and clearly explained.

4. **Sampling:**

   Was the sampling strategy appropriate to address the aims?

   Good: Detailed circumstances of the sampling size and strategy are included. The selected sampling size is justified transparently. Furthermore, the response rates are presented.

5. **Data analysis:**

Was the description of the data analysis sufficiently rigorous?

Good: The data analysis process is described well in detail and the study results are presented in tables to make the findings more comprehensive. The statistical significance is discussed.

6. **Ethics & bias:**

Have ethical issues been addressed, and what has necessary ethical approval gained? Has the relationship between researchers and participants been adequately considered?

Fair: Bias are considered in the statistical approach, but ethics are less included within the study (results).

7. **Results:**

Is there a clear statement of the findings?

Good. The study results (two studies) are presented in clear statements and sufficient data is available to draw conclusions.

8. **Transferability or generalizability:**

Are the findings of this study transferable (generalizable) to a wider population?

Fair: The circumstances and sample composition of the study are clearly explained, but one of the two studies only included female participants, which could distort the comparison with similar studies.

9. **Implications & usefulness:**

How important are these findings to policy and practice?

Good: The study results present new findings in the field of AI in influencer marketing and the engagement of consumers towards artificially created personas compared to human influencers. Future research as well as practical implications are included.

Title 8: **Close Encounters of the AI Kind: Use of AI Influencers As Brand Endorsers**
Authors: **Veronica L. Thomas and Kendra Fowler**

1. **Abstract & title:**

Did they provide a clear description of the study?

Fair: The abstract provides most of the information but lacks clear statements about the study selection/process to provide an overall picture.

2. **Introduction & aims:**

Was there a good background and clear statement of the aims of the research?

Good: An extensive foundation of knowledge is presented in the introduction and the research objective is derived from the current state of research. The structure of the work is outlined and after the theoretical framework has been presented, the hypotheses are formulated.

3. **Method & data:**

Is the method appropriate and clearly explained?

Good: The chosen method of this study is appropriate to the research aim and details about the process within the pilot study are given.

4. **Sampling:**

Was the sampling strategy appropriate to address the aims?

Fair: The sample size is justified and most information for the sampling s strategy are given. However, details about the sample size selection are missing.

5. **Data analysis:**

Was the description of the data analysis sufficiently rigorous?

Good: The data analysis is presented in a structured manner and the results are explained in detail. The hypotheses are integrated and discussed.

6. **Ethics & bias:**

Have ethical issues been addressed, and what has necessary ethical approval gained? Has the relationship between researchers and participants been adequately considered?

Fair: The author is aware of ethics and bias but they but could be considered more detailed.

7. **Results:**

Is there a clear statement of the findings?

Good.   The study results aim to answer the research questions. They are clearly described and evaluated. The data collected is sufficient within the context of the study design.

8. **Transferability or generalizability:**

Are the findings of this study transferable (generalizable) to a wider population?

Good: The context and environment of the study are described in detail, which enables generalizability for studies in the same context.

9. **Implications & usefulness:**

How important are these findings to policy and practice?

Good: The findings of the study present new knowledge about consumer responses towards virtual humans and their relationship. Furthermore, implications for practice and future research are included.

Title 9: **Not so different after all? A netnographic exploration of user engagement with non-human influencers on social media**
Authors: **Li Xie-Carson, Pierre Benckendorff , Karen Hughes**

1. **Abstract & title:**

   Did they provide a clear description of the study?

   Good: The abstract provides a structured overview of the journal's content, and the title is clear and precise.

2. **Introduction & aims:**

   Was there a good background and clear statement of the aims of the research?

   Fair: The introduction includes full background to understand the current research gap of non-human influencers. The resulting research aim is comprehensive and appropriate. The research question is not included in the introduction part.

3. **Method & data:**

   Is the method appropriate and clearly explained?

   Good: The method selection is appropriate and explained in detail. Additionally, the data collection procedure is presented in this section.

4. **Sampling:**

   Was the sampling strategy appropriate to address the aims?

   Good: The sampling strategy is justified, and the framework of sampling is included. The selection of the sample is explained, and the circumstances are clearly described.

5. **Data analysis:**

   Was the description of the data analysis sufficiently rigorous?

   Good: The evaluation of the collected data is well-done. The posting and comment evaluation is executed transparently, and the findings are discussed in detail.

6. **Ethics & bias:**

   Have ethical issues been addressed, and what has necessary ethical approval gained? Has the relationship between researchers and participants been adequately considered?
   Fair: Some ethical limitations are explained, but bias could be considered more specifically.

7. **Results:**

   Is there a clear statement of the findings?

   Good.   The findings of the study are explicit and presented in a structured and detailed manner. There are clear statements about the results and their relevance for the research.

8. Transferability or generalizability:

Are the findings of this study transferable (generalizable) to a wider population?

Fair: The circumstances of the study design are explained, but since Instagram postings were evaluated, transferability or generalizability to similar studies is limited. The selected postings are very individual, and the attention paid to these images and the commenting behavior depend on many factors (content/image design/segment/etc.).

9. Implications & usefulness:

How important are these findings to policy and practice?

Good: The study results provide new insights in the field of consumer engagement towards virtual influencers. This knowledge is relevant and important for future research. Implications and future research topics are included in the work.

Appendix B

Appendix B provides detailed information on the cluster analysis process based on input from the platform *VirtualHumans* and the individual Instagram accounts.

Figure 7: Top 10 Virtual Influencers in January 2024
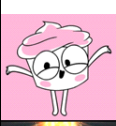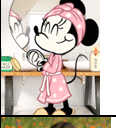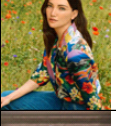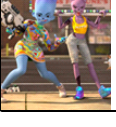
Character	Influencer Agency	Followers Instagram January 2024	Followers Instagram January 2023	Difference	Year of Appearance	Origin	Identity (m/f/d)	Type (h/a/n)	Picture
Nobody Sausage		7.800.000	4.600.000	3.200.000	2020	Portugal	d	n	
Lu of Magalu	Magalu Company	6.700.000	6.200.000	500.000	2009	Brazil	f	h	
CB of Casas Bahia	Casas Bahia	3.700.000	3.400.000	300.000	2017	Brazil	m	a	
Barbie	Mattel	3.500.000	2.200.000	1.300.000	1959	USA	f	a	
Miquela Sousa	Brud	2.600.000	2.900.000	-300.000	2016	USA	f	h	
Good Advice Cupcake		2.400.000	2.500.000	-100.000	2018	USA	d	n	
Puff Puff		1.100.000	875.000	225.000	2020	USA	d	n	
Minnie Mouse	Disney	794.000	744.000	50.000	2019	USA	f	n	
Daisy Yoox	YOOX	781.000	727.000	54.000	2018	Italy	f	h	
Dayzee and Staxx	Superplastic	715.000	727.000	-12.000	2020	USA	d	n	

Figure 8: Evolution of the Top 10 Virtual Influencers from 2023 to 2024

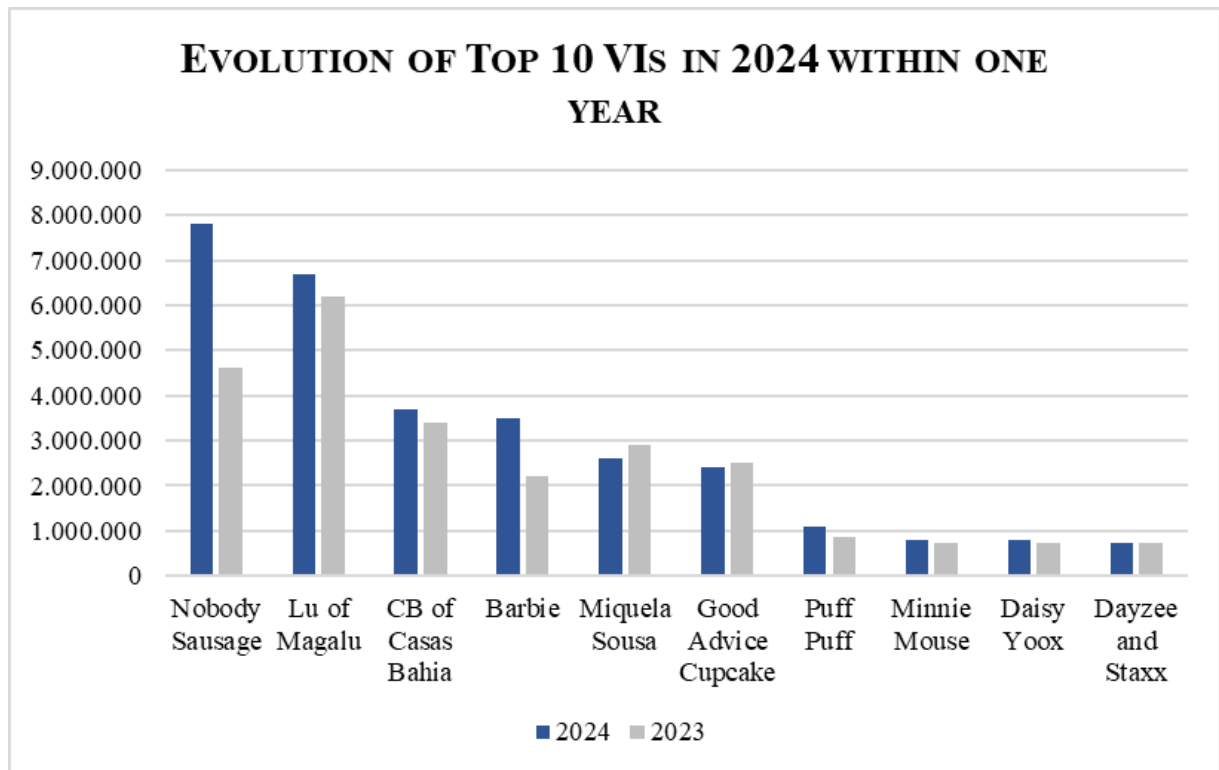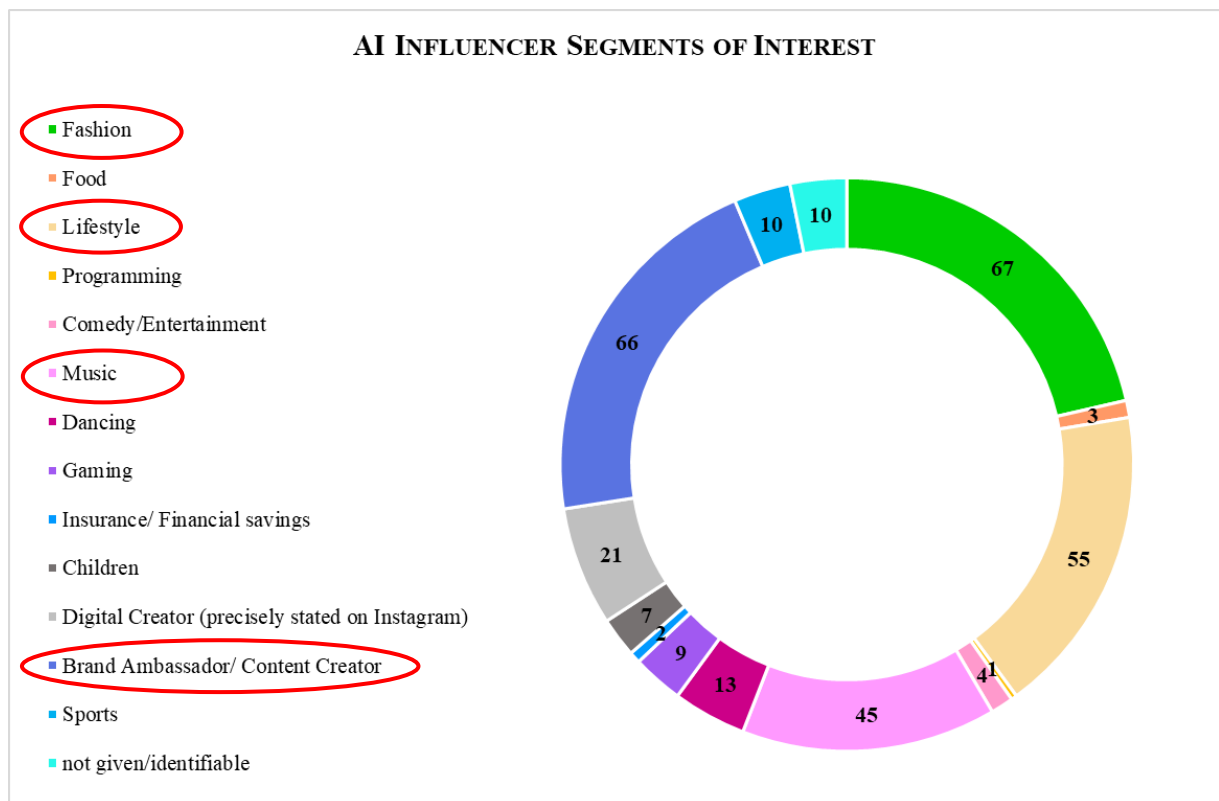**Figure 9: Segments of Interest of the selected 200 AI Influencers**
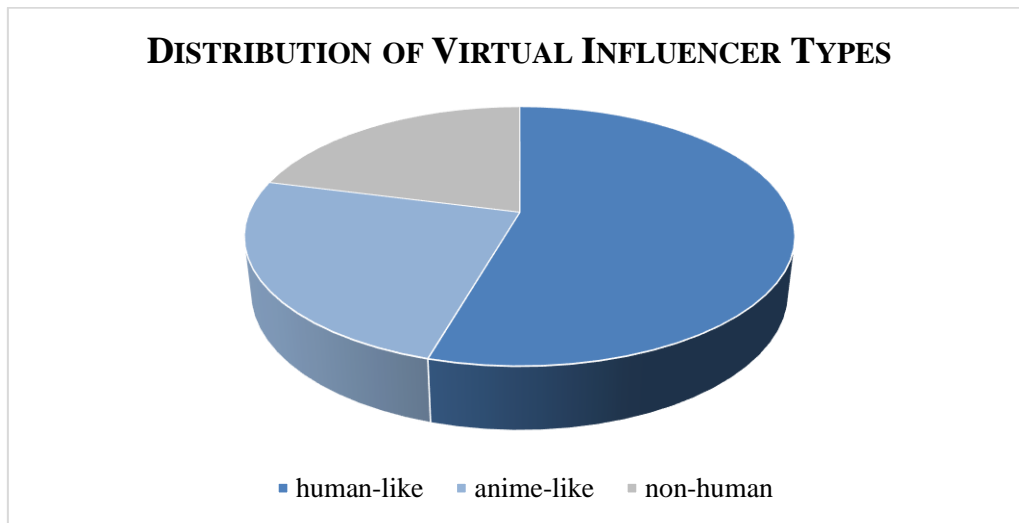
Figure 10: Distribution of Virtual Influencer Types

DISTRIBUTION OF VIRTUAL INFLUENCER TYPES

human-like　anime-like　non-human

Figure 11: Distribution of Types for total Number of Characters vs. Top 10

COMPARISON OF DISTRIBUTIONS

Total Distribution　Distribution of Top 10
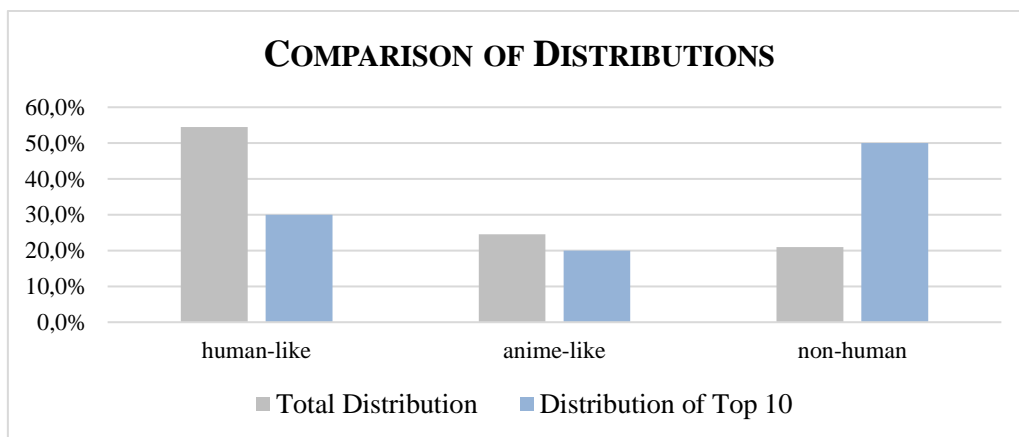
Figure 12: Gender Distribution among AI Influencers

GENDER DISTRIBUTION OF AI INFLUENCER

Total Distribution　Top 10
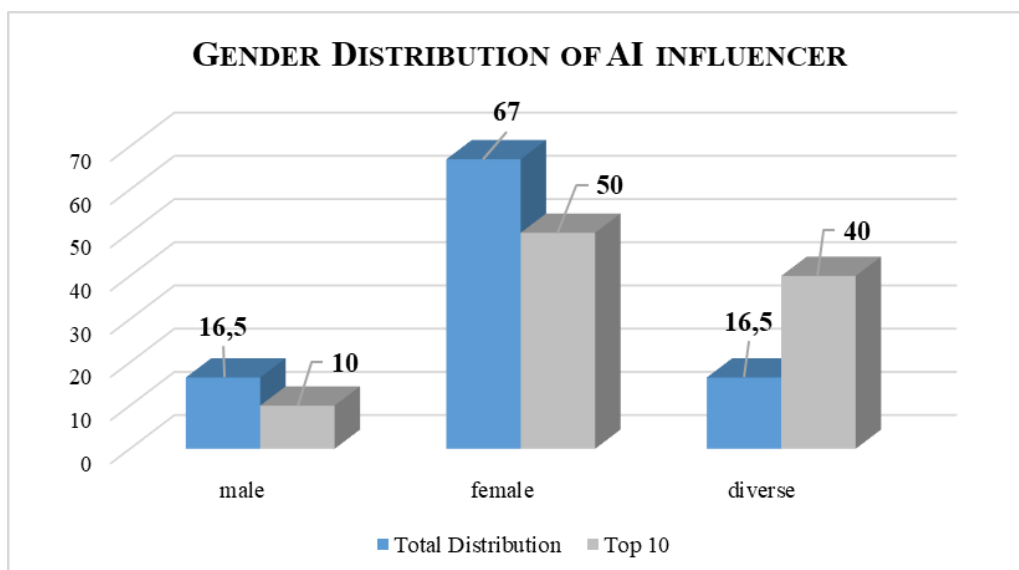
Figure 13: Years of Appearance of AI Influencers
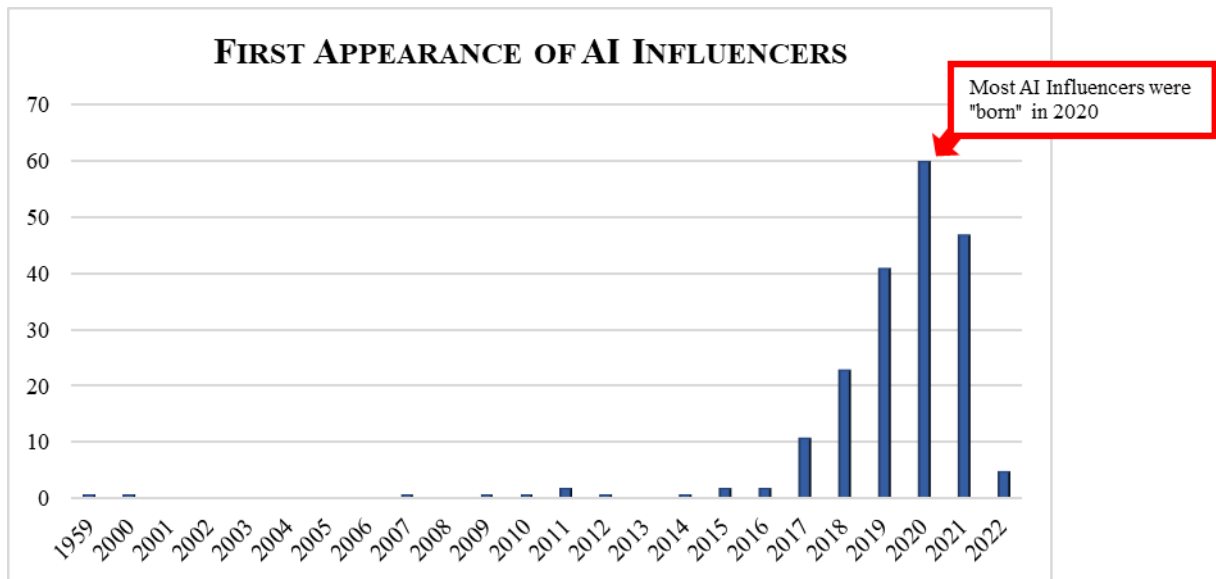
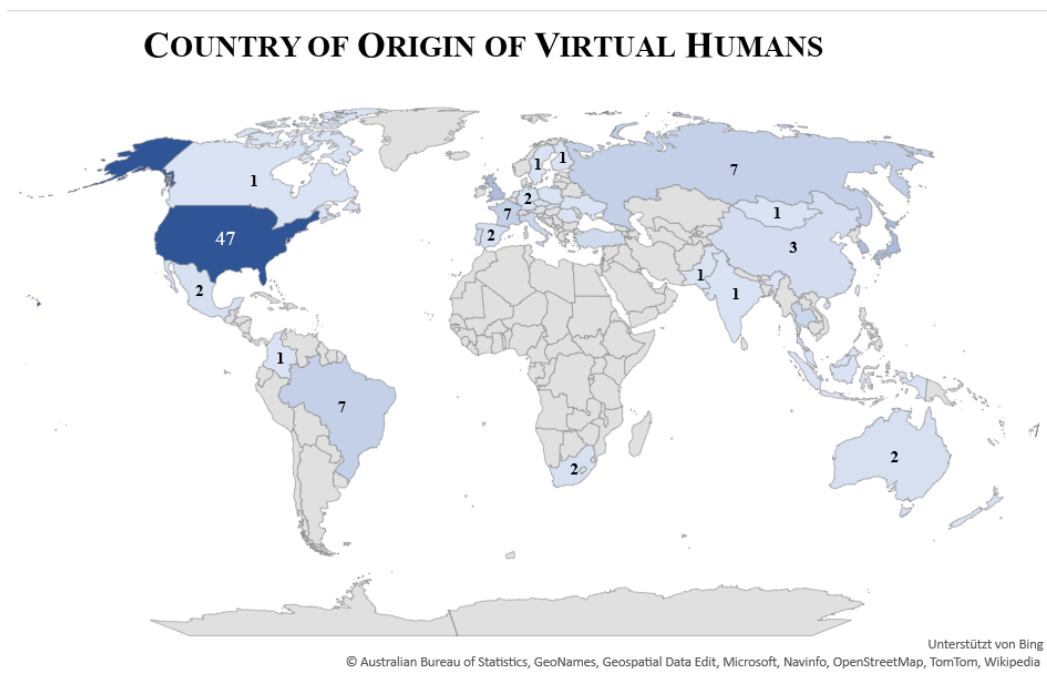**Figure 14: A World Map to illustrate the Origins of Virtual Humans**

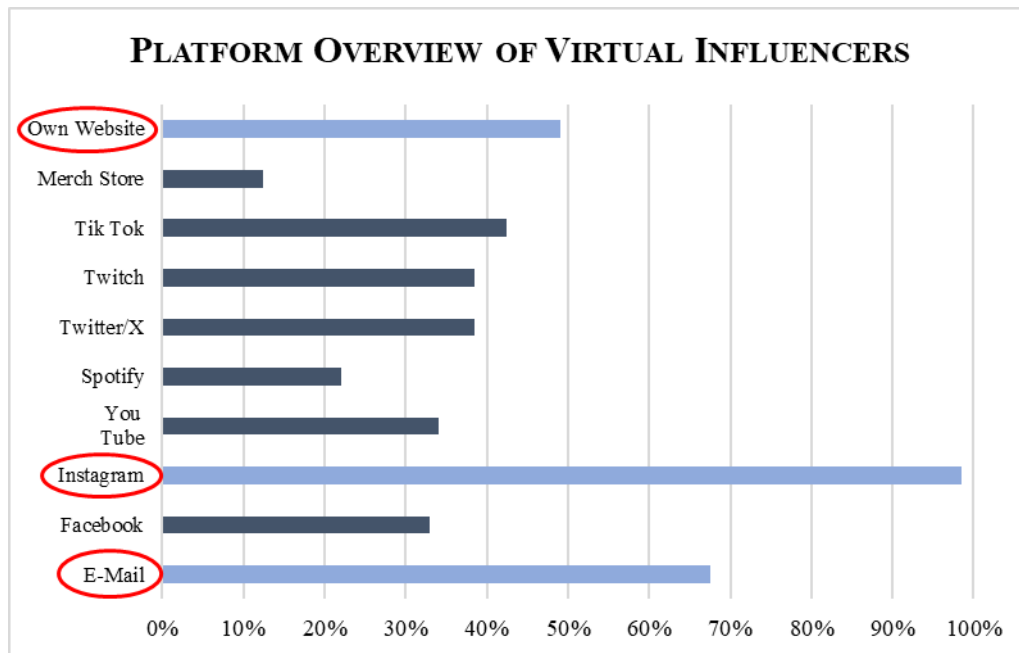**Figure 15: Representation of the Social Media Platforms used by Virtual Influencers**

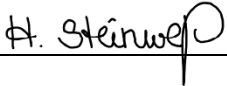PLATFORM OVERVIEW OF VIRTUAL INFLUENCERS

Official Declaration

Hereby I declare, that I have not submitted this thesis at the Hochschule Ruhr West or to any other Institution. I officially ensure, that this thesis has been written solely on my own. I herewith officially ensure, that I have not used any other sources but those stated by me. Any and every part of the text, which constitute quotes in original wording or in its essence have been explicitly referred by me by using official marking and proper quotation.

I also officially declare, that the Word-document and the PDF-document that I submit are identical. I am aware that, the thesis might be checked by a plagiarism software.

Krefeld, February 19, 2024

 Helena Steinwegs
Name/ Signature