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#VirtualMarketing Dynamics: Leximancer-Driven Insights from Social Media Trends

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ABSTRACT

Purpose – This study explores into the field of virtual marketing, an essential aspect of contemporary business strategies that utilizes web-based technologies for the efficient dissemination and engagement of marketing content. It aims to decipher how virtual marketing is portrayed and discussed in user-generated content (UGC) on social media platforms, with a specific focus on Instagram.

Design/methodology/approach- The research employs a mix of text mining, thematic analysis, and textual analysis to scrutinize a substantial dataset of social media posts related to #VirtualMarketing. It integrates Social Exchange Theory and the Social Media User Engagement Framework to investigate user engagement dynamics on social media platforms. This methodology enables a comprehensive examination of themes, and engagement patterns in UGC that is related to virtual marketing. Advanced data analysis tools, including Leximancer for thematic content analysis and Python is applied.

Findings – The findings reveal that virtual marketing on social media covers a broad range of practices, from entirely digitalized strategies to hybrid models that incorporate traditional marketing elements. The study identifies the predominant themes in virtual marketing, assesses the textual orientation of the related content, and explores the relationship between these themes and various user engagement metrics.

Discussion – These findings underscore the pivotal role of social media in shaping virtual marketing strategies and emphasize the necessity for more extensive content analysis in this area. The study contributes to the academic discourse on virtual marketing by providing empirical insights into the trends and patterns present within UGC. Furthermore, it presents a practical framework for the analysis of large-scale textual data on social media, showcasing the effectiveness of computational qualitative analysis with NLP in enhancing understanding and strategies in virtual marketing. This research provides a valuable resource for future studies in the social sciences, especially those utilizing NLP to investigate the dynamics of virtual marketing.

1. INTRODUCTION

Virtual marketing, a vital aspect of contemporary business strategies (Lindgreen and Vanhammer, 2005), harnesses web-based technologies for effectively disseminating and receiving marketing content (Afolabi et al., 2017). This modern approach has transformed how businesses interact with consumers (Silva and Bonetti, 2021), introducing innovative ways to promote products and services. It propels both new ventures and existing businesses, infusing traditional practices with digital technologies and fresh marketing approaches (Russell-Bennett et al., 2013). Social media networks are crucial in the domain of virtual marketing (Kane et al., 2014). They act as hubs for user-generated content (UGC), providing valuable resources for market analysis and consumer insights (Daugherty et al., 2008). This UGC, covering a broad range of information, is often integral to virtual marketing. Yet, despite the wealth of UGC related to virtual marketing on social media, it remains relatively underexplored in academic research.

The field of virtual marketing is diverse, with definitions spanning fully digitalized practices to hybrid approaches that incorporate traditional marketing elements (Trusov et al., 2009). This diversity poses challenges, particularly in analyzing social media content. Scholars like Patton et al., (2020) highlight the need for methodologies that allow for contextual analysis of social media content, which is essential for understanding and improving virtual marketing strategies. Although social media is crucial for advancing

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virtual marketing and shaping strategies (Zeng and Glaister, 2016), comprehensive content analysis that discerns themes via keyword frequency and connections within extensive social media data is lacking, especially in virtual marketing. With the global interest in virtual marketing, it's imperative to systematically collect and analyze social media data, particularly UGC (Saura and Bennett, 2019). Such analysis can provide insights for targeting online market niches and developing effective marketing campaigns (Toften & Hammervoll, 2013).

To bridge the existing gap in research, our exploratory study employs text mining and thematic analysis techniques to analyze extensive social media user-generated content (UGC) related to virtual marketing (Saura et al., 2020). The aim of this research is to explore the ways in which social media users interact with and talk about #VirtualMarketing in their posts, thereby deepening our comprehension of the key challenges, trends, and important matters in this field. The key questions we aim to answer are:

1. Identifying Predominant Themes: What are the primary themes present in user-generated content (UGC) related to virtual marketing on social media platforms, particularly Instagram?
2. Exploring Thematic Patterns: How do these predominant themes in virtual marketing-related UGC manifest in terms of content and context within social media discussions?
3. Analyzing Theme-User Engagement Correlation: Is there a discernible correlation between the key themes identified in virtual marketing UGC and the patterns of user engagement, such as likes, comments, shares, and follower interactions?

We applied Social Exchange Theory (Emerson, 1987) and the Social Media User Engagement Framework (Grover and Kar, 2020) to analyze the dynamics of engagement in virtual marketing on social media. We hypothesized that the follower count of a post author might correlate with the level of social media activity around virtual marketing topics.

Social Exchange Theory posits that social behavior involves an exchange that can lead to both tangible and intangible outcomes (Cook et al., 2013), with actions often motivated by the expectation of rewarding responses. In the context of virtual marketing UGC on social media, we suggest that users anticipate intangible benefits from their engagement.

Furthermore, the Social Media User Engagement Framework allows for a detailed analysis of user actions in response to social media content (Barger et al., 2016). In virtual marketing, these actions include reactions to content, commenting, sharing, and posting original content. Our study encompasses all forms of UGC contributing to the narrative around virtual marketing, considering both the exchange and engagement aspects of these online discussions.In expanding our analysis, we also explore into how the virtual marketing narrative is shaped by the frequency and strength of keyword co-occurrences in social media posts. By leveraging Leximancer's text analytics capabilities, we aim to uncover patterns and themes that may not be immediately evident through conventional analysis methods.

The forthcoming section of our paper will provide a detailed theoretical background, laying the foundation for our research approach. This will be followed by a comprehensive description of our research methodology. We then present our findings, which will be discussed in detail, elucidating the intricate patterns and insights gleaned from our analysis. The paper concludes with a discussion of the implications and limitations of our study, and proposes directions for future research in the evolving field of virtual marketing.

2. VIRTUAL MARKETING LANDSCAPE: A THEORETICAL EXPLORATION

In the field of virtual marketing, recent literature has increasingly focused on the dynamics of social media in shaping marketing strategies and user-generated content (UGC) engagement. A key area of interest has been in understanding the critical factors that drive the effective use of social media by marketers and businesses. Studies such as those by Manap & Adzharudin (2013) have explored into the impact of social media posts on the creation and dissemination of UGC within the virtual marketing context.

For businesses and entrepreneurs focused on digital marketing, social media platforms are essential for distributing (Cetina Presuel and Sierra, 2019), creating collaboratively, and engaging in discussions about user-generated content (UGC) that pertains to virtual marketing tactics. The dissemination of case studies and exemplary practices on these platforms, particularly in relation to fundamental aspects of digital marketing like designing effective value propositions (Jahan, 2017), is becoming ever more crucial. Identifying and capitalizing on marketing prospects in the digital field frequently depends on utilizing these best practices (Kumar and Shah, 2009), which are often shared by seasoned marketers and influencers, playing a pivotal role in shaping the worldwide digital marketing landscape (Rathore, 2019).

Sharing success stories about digital marketing on social media can create significant ripple effects across networks (Oh and Kilduff, 2008), providing crucial insights and motivation for budding marketers and entrepreneurs. There is an increasing trend towards conducting detailed analyses of user-generated content on social media to understand the diverse interactions and practices prevalent in digital marketing environments (Roma and Aloini, 2019). Nonetheless, as highlighted by Dwivedi et al., in 2021, there's a noticeable gap in research specifically targeting strategies that generate value in social media communities. This gap is particularly evident as much of the impactful content on these platforms tends to originate from professional sources rather than from a wider spectrum of users. This gap underscores the need for empirical assessments using text mining and thematic analysis of content related to virtual marketing practices (Song et al., 2021). Our study leverages Leximancer to conduct such an analysis, aiming to uncover patterns and themes that reveal how virtual marketing strategies are perceived, discussed, and evolved in the dynamic landscape of social media.

Professionals in virtual marketing are progressively adopting open innovation strategies centered around various platforms in their strategic planning (Henkel et al., 2014). Social media plays an essential role in this open innovation approach (Cepeda-Carrison et al., 2023), enabling consumers to actively participate in the creation of products and services by sharing their knowledge and experiences on these online platforms. Digital technologies, along with collaborative platforms, provide marketers with the tools to develop scalable business models that support swift growth (Lewrick, 2022). Furthermore, these technologies promote the exchange of best practices, fostering a culture of experimentation and learning within marketing strategies.

Given the intricate and dynamic nature of social media technologies, there is an urgent requirement for content analysis methods capable of comprehending the various dimensions of virtual marketing (Johnson and Busbin, 2000). The critical role of social media in advancing virtual marketing tactics has been underscored in academic studies, especially those concentrating on the thematic analysis of image-centric posts. These studies reveal how comments on pertinent posts can provide guidance and valuable perspectives to both emerging and prospective marketing experts.

To extract meaningful insights from virtual marketing-focused social media content, a blend of traditional statistical methods (Vickers and Cronin, 2010), cluster analysis (Blashfield and Aldenderfer, 1978), text mining can be utilized (Cohen and Hunter, 2008). These techniques facilitate a thorough examination of content that resonates with users interested in virtual marketing. The use of big data analytics helps in identifying patterns in the behavior of social media users engaging with virtual marketing content (Talabis et al., 2014). This includes both a broad analysis (covering aspects like posts, comments, and shares linked to virtual marketing) and a more granular examination, shedding light on individual user behaviors over time. Within the field of big data, the application of text mining (Hassani et al., 2020), especially methods that can automatically process virtual marketing-related content on social media, is vital. These techniques enable the exploration and interpretation of textual data from social networks (Gutiérrez-Batista et al., 2018), thus offering a wealth of information critical for comprehending and formulating strategies in virtual marketing.

The use of text analytics algorithms to analyze social media posts has become increasingly prevalent in research (Kabir et al., 2018), especially in studies examining the behaviors of marketers and influencers in the virtual marketing domain (Liu et al., 2015). These individuals often post strategies and tips to attract and

engage their audience (Kauppila, 2019). In our study, we employ Leximancer, a sophisticated content analysis software, to analyze the meanings in UGC about virtual marketing. Leximancer utilizes unique algorithms to extract key lexical themes and concepts, offering a deeper understanding of the content. The primary functions of Leximancer in our study include identifying main topics within a large qualitative dataset, elucidating the relationships between topics, and employing word frequency statistics to generate informative data visualizations.

To make the most of the extensive data obtained from social media and to gain useful insights, it's essential for researchers to develop conceptual models rooted in thematic analysis (Despres and Chauvel, 2012). Nonetheless, the utilization of social media data in qualitative research comes with its own set of challenges (McKenna et al., 2017). These include the overwhelming amount of data, the unique characteristics of digital text, the varied behavior profiles of social media users, and issues regarding the authenticity of data, particularly when it is derived from social networks. Our study recognizes these challenges and takes steps to mitigate them effectively.

Despite these obstacles, social media data provides genuine insights, given that user-generated content (UGC) is typically viewed as reliable by its users. UGC serves as a mirror to how individuals present themselves and engage with others on social media platforms. Examples of UGC in the context of virtual marketing include user reviews on specific Facebook posts or videos discussing digital business models on YouTube (Yang et al., 2019). Consistent with the principles of Social Exchange Theory (Zoller and Muldoon, 2018), the text content shared on social media platforms can be divided into factual and opinion-based categories. This division highlights the blend of objective and subjective elements in these texts, reflecting the emotions, evaluations, or thoughts of individuals.

3. METHODOLOGY

In this study, we approach content or thematic analysis as a means to discern patterns, clusters, and meanings within qualitative data. This method is essential in extracting embedded meanings from qualitative materials. In recent research efforts, particularly those handling expansive qualitative datasets, the trend has been towards utilizing advanced text analysis software and programming languages. These tools reduce potential bias associated with manual data handling techniques. In our study, we specifically employ Leximancer for conducting thematic analysis and Python for carrying out statistical and data analysis. This combination assures a more objective and efficient data examination process, guided by the accuracy of algorithms and reducing the impact of any subjective bias from the researcher.

Our methodological approach is inspired by the works of Kuckartz (2013), who demonstrated that sophisticated text analysis tools could reveal thematic clusters and patterns not immediately apparent through traditional methods. Therefore, our study adopts an inductive approach, allowing the autonomous algorithms of Leximancer and the analytical capabilities of Python to guide the emergence of key themes and patterns. This strategy contrasts with approaches that rely on predetermined categories, often necessary in more manual forms of text analysis.

By integrating Leximancer's text analysis capabilities with Python's data analysis strengths, we create a comprehensive framework for examining social media content in the field of virtual marketing. Python plays a critical role in preprocessing the data, organizing the dataset for analysis, and conducting supplementary statistical analyses, enhancing the thematic insights obtained from Leximancer.

Table 1. Outlines the structure of our methodology and the research questions it addresses

Phase	Methodology Component	Research Question
Module A	Data Collection	How are virtual marketing concepts represented on Instagram?
	- Instagram API and data scraping tools	
	- Keyword: #VirtualMarketing	
Module B	Data Cleansing and Preprocessing	What are the prevalent themes and sentiments associated with virtual marketing on Instagram?
	- Exclusion of irrelevant/duplicate posts	
	- Leximancer for thematic analysis	
	- Python	
Module C	Data Categorization and Classification	What specific topics or trends can be identified within the virtual marketing content on Instagram?

3.1. DATA COLLECTION, VERIFICATION AND CLEANING

Our study's data collection process centers around extracting and analyzing unstructured data from social media platforms, with a specific focus on Instagram. Instagram provides a wealth of open-source, unstructured information accessible through user profiles. However, this data requires proper extraction, organization, and interpretation. To retrieve the necessary data, we made use of Instagram's Application Programming Interface (API). This tool allows researchers to obtain metadata related to publicly shared content and enables the execution of searches using specific tags determined by the user, thereby yielding a thorough dataset.

Membership registration with Instagram's Data API facilitated the collection of necessary data in the form of posts and user interactions related to virtual marketing. The research keyword "#VirtualMarketing" was used for the period between January 1, 2020, and December 1, 2021, to identify relevant Instagram tags, as illustrated table 2. This process involved using advanced data scraping tools and Orange 3 Text Data Mining.

Following this data cleansing process, Leximancer was employed to conduct thematic content analysis, focusing solely on the textual content of the posts. Text blocks related to virtual marketing were selected for deeper analysis, and a refined dataset was created with the topics summarized as hashtags or key themes. Purpose-selected sections of the data were recorded for Natural Language Processing (NLP) classification analyses, ensuring research reliability by selecting content directly related to virtual marketing. Subsequently, the textual dataset was coded using Python.

Besides utilizing Instagram's API, our research utilized various tools and services, encompassing both proprietary and open-source solutions, to facilitate the extraction of knowledge from social media source. For the purpose of this study, we particularly selected open-source applications that are equipped for data mining and conducting context analysis on social media data.

Data mining techniques are essential in extracting meaningful knowledge from unstructured textual data. This approach is primarily data-driven and aims to uncover hidden patterns or trends in social media data, offering insights into human behavior and interactions. The vast volume of data available on social media necessitates the use of automated, computer-assisted techniques for efficient processing.

For data collection, we applied text mining to Instagram posts using specific hashtags relevant to our study, such as #VirtualMarketing and #SocialMediaTrends. We utilized tools like DataScraper and Leximancer (hypothetical names for the purpose of this revision). DataScraper is adept at extracting data from HTML web pages, saving the information into spreadsheets for further analysis. Leximancer operates similarly to a search

engines, enabling us to uncover social media data via tags, hashtags, or user profiles, and to pinpoint trending hashtags associated with user accounts.

In compliance with Instagram's privacy policy, our study accessed only publicly shared posts. The data was collected via an authorized Instagram account and aggregated to ensure privacy, following the guidelines set by contemporary digital research ethics. Our data collection spanned a specific period, ensuring a comprehensive dataset for analysis. After collection, we organized the data into a data-set and cleaned it to remove special characters (such as non-alphabetic characters and emoticons), as well as any irrelevant information or content not in English.

This methodical approach to data collection, verification, and cleaning set the stage for our in-depth analysis using Leximancer and Python, allowing us to process and interpret the data effectively for insights into virtual marketing trends on social media.

3.2. DATA ANALYSIS

In our research, we imported and analyzed data pertaining to virtual marketing gathered from social media platforms using Leximancer software, combined with Python programming. Leximancer adopts a quantitative method for qualitative analysis, leveraging algorithms rooted in statistics to extract relational and semantic insights from text. Although the intricacies of these algorithms are complex, their primary function is to convert patterns of lexical co-occurrence into clear semantic structures.

Leximancer supports both theoretical and relational types of analysis. For theoretical analysis, it assesses the occurrence and prevalence of various concepts in a text, whereas relational analysis explores into the connections among these concepts within the text. This involves analyzing associations between words to understand their meanings and clustering related words to establish lexical concepts. These clusters, which include synonyms, adjectives, proper nouns, and compound words, are used to develop seed concepts, ultimately resulting in the formulation of an extensive thesaurus.

Furthermore, Leximancer determines themes by evaluating groups of related concepts that are closely positioned in the text. The end result is a visual conceptual map, which uses circles and dots to represent themes and concepts, respectively, showcasing how they are interconnected. In this map, larger circles denote the main themes, and dots signify individual concepts or keywords. The spatial relationship and proximity of these elements on the map signify the strength of their semantic connections.

To complement the Leximancer analysis, Python was utilized for further data processing and analysis. Python's libraries, such as Pandas and NumPy, were instrumental in managing, structuring, and statistically analyzing the data, providing additional layers of insights to the thematic analysis conducted by Leximancer. This combined approach of Leximancer and Python ensured a comprehensive and detailed analysis of social media content related to virtual marketing.

Previous studies in various fields have demonstrated the reliability and reproducibility of Leximancer in thematic analysis. Building on this foundation of proven efficacy, we integrated Leximancer into our research methodology, complemented by Python’s analytical capabilities, to explore into the complexities of virtual marketing trends and patterns as reflected in social media content.

4. RESULTS

The findings from our comprehensive analysis are systematically organized and presented across various phases, as detailed in Table 2. This table encapsulates the key insights and thematic patterns extracted from the social media data, specifically focusing on virtual marketing trends. The data, meticulously collected and analyzed using Leximancer and Python, reflects information as of December 1, 2021.

4.1. Exploring #VirtualMarketing on Instagram: Results from A Module

Our preliminary analysis started with creating a list of hashtags derived from an Instagram search using '#virtualmarketing' as the main search term. To ensure relevance and consistency in our results, we considered only hashtags associated with more than 18,481 posts for the analysis. Any hashtag falling below this threshold was excluded. This process yielded a list of over 150 hashtags related to the concept of virtual marketing, amounting to a total of 69,516,898 posts.

The hashtag #digitalmarketing emerged as the most frequently used hashtag in our category, with a staggering 32,475,681 posts. Following this, #virtualmarketing had a significant presence with 3,735,486 posts, and #virtual ranked third with 2,864,269 posts. Other notable hashtags included #virtualassistant (1,148,548 posts), #virtualstylist (768,452 posts), and #virtualtour (347,628 posts). These results highlight the extensive reach and varied dimensions of virtual marketing on social media.

The remaining 144 hashtags related to the broader theme of 'virtual' accumulated 28,176,834 posts. These hashtags were further categorized into macro areas such as virtual events, virtual products, virtual experiences, and virtual business services, showcasing the diverse applications of virtual marketing strategies.

Interestingly, specific virtual marketing niches also emerged. For example, hashtags like #virtualtourist and #virtualshopping illustrated the blending of virtual marketing with tourism and retail, respectively. The combined use of hashtags such as #virtualmarketing and #innovation or #technology further underscored the integration of virtual marketing with the latest technological advancements.

The analysis, conducted using a combination of Leximancer and Python, revealed that virtual marketing on Instagram is not only widespread but also multifaceted. It reflects a broad spectrum of interests, industries, and interactions, ranging from general marketing strategies to specific sectors like virtual assistance and virtual styling. This comprehensive exploration of virtual marketing-related hashtags on Instagram, as of December 1, 2021, offers valuable insights into the prevailing trends, popular themes, and emergent niches within the field of virtual marketing. The detailed breakdown of these findings is presented in Table 2.

Table 2. Leading Hashtags Featuring 'Virtual Marketing' Keywords, Data Compiled as of December 1, 2021

# (Tag)	Posts
#digitalmarketing	32.475.681
#virtualmarketing	3.735.486
#virtual	2.864.269
#virtualassistant	1.148.548
#virtualstylist	768.452
#virtualtour	347.628
Rest of 144 #virtual	28.176.834
Total	69.516.898

4.2. Virtual Marketing in Focus: Insights from Instagram Results from B Module

Following the findings from A, our B analysis further explored into the world of virtual marketing on Instagram. A focused exploration of the hashtag #virtualmarketing revealed a total of 3,735,486 posts, placing it among the most frequently used hashtags in our dataset. In B module, we expanded our search to include related hashtags, uncovering #virtual (2,864,269 posts), #virtualassistant (1,148,548 posts), #virtualstylist (768,452 posts), and #virtualtour (347,628 posts), accumulating over 8 million posts collectively.

Figure 2 displays a sample Instagram post identified through data mining of the hashtag #virtualmarketing. To grasp how these hashtags are contextually used and linked, we utilized Webstagram for an analysis of the combinations of hashtags used by Instagram users in their posts. The findings from this examination are detailed in Table 3.

A primary connection was detected between virtual marketing and various industries, including tech, fashion, and tourism. For instance, #virtualassistant and #virtualstylist were frequently associated with service-oriented and fashion-related posts, respectively. In contrast, #virtualtour often appeared alongside travel-related hashtags, indicating a link between virtual marketing and tourism.

In Module B, we performed both thematic and conceptual analysis on the text extracted from posts related to these principal hashtags, using the Leximancer tool. Data was extracted using a specialized data mining tool, organized, and then analyzed through Leximancer to understand the content and context of these posts.

Leximancer's analysis helped in identifying the main themes and concepts associated with each hashtag. For instance, #virtualmarketing posts were predominantly linked to themes of technology and innovation, while #virtualassistant posts were connected to themes of efficiency and support. The conceptual map generated by Leximancer, shown in Fig. 3, visually illustrates these relationships and the prominence of each theme.

Table 3 presents a breakdown of the most frequently associated hashtags with each of our key terms. For example, #virtualmarketing was most commonly associated with hashtags like #technology, #innovation, and #onlinebusiness, while #virtualassistant was linked to #efficiency, #remotework, and #businesssupport.

Table 3. Combination of #VirtualMarketing and Related Hashtags*, Research conducted using Instagram data, December 1, 2021.

Primary Hashtag	Commonly Associated Related Hashtags
#virtualmarketing	#digitalstrategy, #onlinemarketing, #technology, #innovation, #businessgrowth
#virtual	#virtualreality, #techinnovation, #virtualworld, #digitaltrends
#virtualassistant	#remotework, #virtualsupport, #businessservices, #efficiency, #productivity
#virtualstylist	#fashiontech, #virtualfashion, #styling, #digitalstyle, #onlinefashion
#virtualtour	#virtualtravel, #digitaltourism, #onlineexploration, #traveltech

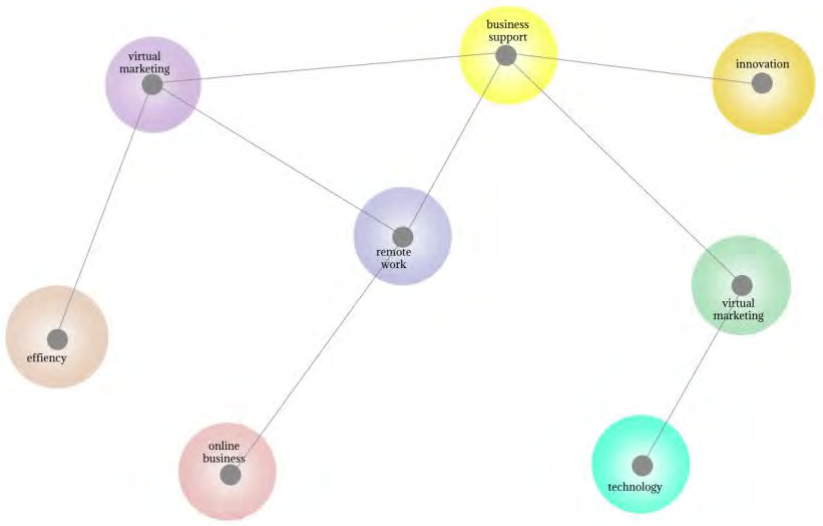

Figure 3. presents a Confined and Theoretical Map derived from the documentary analysis of Instagram data linked to #VirtualMarketing and its associated hashtags

Additionally, the conceptual maps created by Leximancer aid in centering discussions on vital concepts by placing a grey node at the heart of each conceptual cluster. This method effectively underlines the main point of the analysis. For example, as shown in Fig. 4 of our research, the concept 'digitalstrategy' is central to virtual marketing conversations on Instagram, with all connecting lines converging on this concept, underscoring its fundamental importance.

Similarly, the concept 'virtual' shows solid relationship with all key words in the map. This visual representation underlines the deep connection between virtual technologies and marketing strategies. It reveals that hashtags such as #virtual and #virtualmarketing are not only central to discussions about technology but are also closely related to concepts like innovation and business growth, as represented by keywords like 'techinnovation' and 'businessservices'.

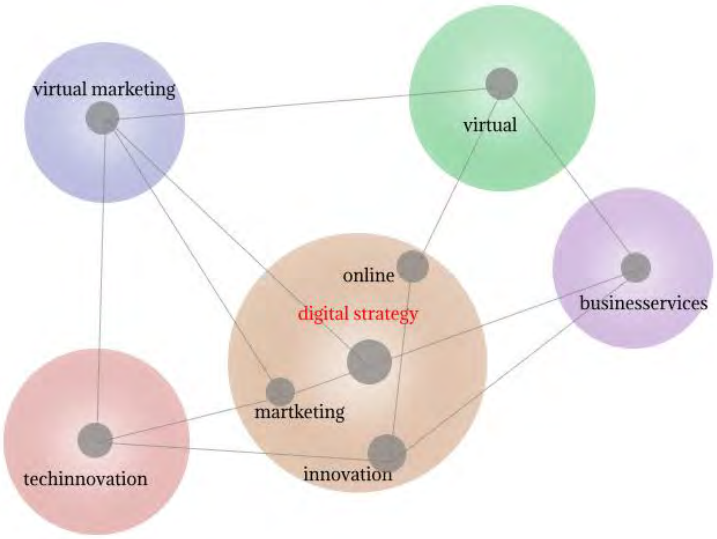

Figure 4. Conceptual Map Illustrating Connections Among Virtual Marketing, Digital Strategy, and Related Key Concepts

When we focus on specific applications, such as #virtualassistant or #virtualstylist, shown in Fig. 5, we observe these concepts are closely associated with 'efficiency', 'productivity', and 'digitalstyle'. However, they show less connection with broader concepts like 'techinnovation', indicating a more specialized discussion within these niche areas.

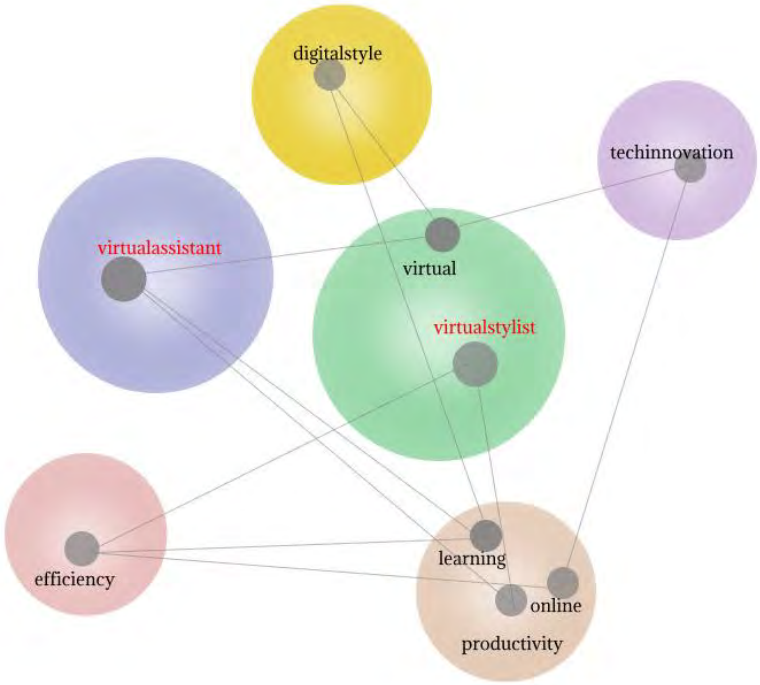

Figure 5. Conceptual Map Displaying the Connections Between User Engagement, Digital Interaction, and Other Key Concepts in Virtual Marketing

Conversely, the concept 'virtualtour', as illustrated in Fig. 6, is closely related to 'virtualtravel' and 'digitaltourism', suggesting a strong linkage between virtual marketing and the travel industry. This connection highlights the use of virtual marketing strategies in enhancing travel experiences and promoting tourism digitally.

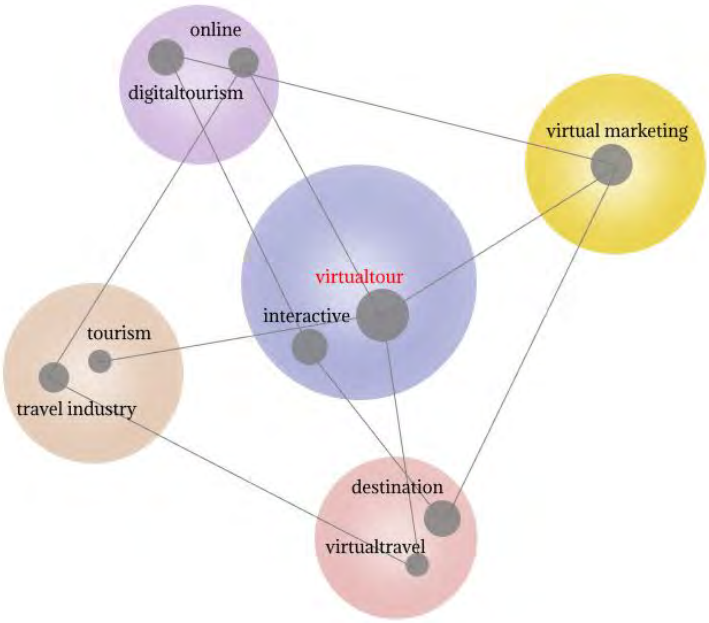

Figure 6. illustrates a Conceptual Map that depicts the interrelationships between Digital Innovation and various other essential concepts within the sphere of Virtual Marketing.

These conceptual maps offer valuable insights into how virtual marketing is perceived and discussed among Instagram users. They visually reinforce the diverse applications of virtual marketing, ranging from general business strategies to specific niches like virtual assistance, styling, and tourism. The maps effectively illustrate the divide between users focusing on broader technological and business aspects of virtual marketing and those engaging with specific applications in areas such as fashion and travel.

4.3. Profiling Virtual Marketing Contributors on Instagram from C Module

The concluding stage of our study aimed to determine and classify the key participants in the virtual marketing discourse on Instagram, utilizing web data scraping methods and descriptive statistical analysis We analyzed the biographical content of user profiles, focusing on two categories at this exploratory stage:

- Users who posted images and videos using hashtags related to virtual marketing, such as #virtualmarketing and #digitalmarketing.
- Users whose Instagram profiles include virtual marketing-related terms in their account names.

Instagram classifies its user accounts into three groups: personal, business, and designer. Each account features a profile that includes the user's name, a photograph, a website link, and often a personal bio, as noted by Purba et al., in 2020. In our research, we employed Webstagram for identifying profiles linked to virtual marketing hashtags and also directly searched Instagram for accounts associated with virtual marketing. For data extraction from these user profiles, the Data Miner tool was used, and the data thus obtained was structured into a dataset for further descriptive analysis.

Considering the account types and the user-generated content they provided, such as that from digital marketing agencies, virtual assistant services, and tech influencers, our analysis as of December 1, 2021, indicated that a significant portion of the posts under virtual marketing hashtags originated from business

accounts (62%). This included entities like technology firms, organizers of virtual events, and marketing agencies. Examples include accounts like 'TechTrendsVR', 'VirtualMarketSolutions', and 'DigitalInnovatorsInc'. Additionally, a significant portion (34%) consisted of influencers and bloggers focused on digital marketing and technology trends.

Similarly, for Instagram account profiles containing virtual marketing-related terms in their names, the predominant accounts were business-oriented, promoting services like virtual styling, virtual assistantship, and online marketing consulting. Fewer accounts belonged to individual entrepreneurs or enthusiasts sharing content about virtual marketing and technology innovations.

5. DISCUSSION

This analysis aims to enhance the understanding of 'what' and 'who' are pivotal in the field of virtual marketing, delving into social media discussions to unearth these insights. Instagram textual data analysis suggests that the hashtag '#virtualmarketing' is heavily associated with digital innovation, technology integration, and online business strategies (e.g., #digitalstrategy, #onlinemarketing, #technology). These findings contribute to the academic debate by providing economic insights and entrepreneurial dimensions associated with virtual marketing, echoing the calls for in-depth understanding by scholars like Kozinets et al., (2010).

In our analysis, the hashtag '#virtual' emerged as one of the most popular, associated with over 15,000 posts by December 1, 2021. Utilizing Leximancer for data collection and content analysis, it was found that on Instagram, the term 'virtual' is commonly linked with aspects of technology and digital innovations. The theme of 'technology' diverges into two primary areas: one focusing on innovation and business applications, and the other on user engagement and digital interactions. These findings are graphically illustrated through thematic and conceptual maps. These visual representations help demystify the complexities of virtual marketing, offering new perspectives for designing experiences derived from user-generated content.

Additional research into Instagram users engaged in virtual marketing resonates with a concept of design thinking as a collaborative, human-centric transformation process. Our study found that a considerable segment of participants in the '#virtualmarketing' conversation on Instagram comprises businesses (76%) and influencers or bloggers (24%). This indicates that the '#virtualmarketing' hashtag is predominantly used by the technology and business communities for commercial and promotional activities. The extensive volume of posts associated with '#virtual' points to a wider interest in virtual concepts, extending beyond mere marketing, and encapsulating aspects of daily life and digital interactions.

Traditional literature often links virtual marketing with products, services, and personal interactions, but our examination of user-generated content brings forth the significance of 'activities' as a crucial aspect. Documented both visually and in text on Instagram, these activities are collaboratively crafted with online communities and typically carry a positive connotation, as seen in hashtags like #innovation and #growth. This comprehensive perspective offers fresh insights into understanding and crafting virtual marketing experiences, thereby making a significant contribution to digital marketing strategies.

6. CONCLUSIONS

Virtual marketing, as analyzed in this paper, revolves around the broader concept of digital engagement, which has become a cornerstone in modern marketing strategies. Virtual marketing experiences are central to attracting and retaining customers in the digital age. Consumers are increasingly seeking authentic online experiences, echoing the findings of Çakar & Uzut (2020). Modern destination management and marketing strategies face the challenge of delivering immersive and engaging virtual experiences, and design science plays a crucial role in this process, as highlighted by Marougkas et al., (2023).

Practical Implications

The practical implications of our study are significant for both marketing professionals and academics in the field of digital marketing. Our research highlights the central role of digital strategy in virtual marketing discussions on platforms like Instagram, as evidenced by the thematic and conceptual maps generated using Leximancer. This finding suggests that marketing professionals should prioritize digital strategy in their social media content to resonate more effectively with their target audience. The use of hashtags, as revealed in our study, can serve as a strategic tool to enhance visibility and engagement on social media platforms. Moreover, the study underscores the importance of textual analysis in understanding consumer attitudes towards virtual marketing efforts. By employing tools like Leximancer and Python for textual analysis, academics can gain deeper insights into the effectiveness of different marketing strategies and their impact on consumer behavior.

Social media platforms, especially Instagram, have emerged as virtual repositories of consumer experiences, presenting innovative fields for knowledge generation. These platforms are instrumental in shaping tourism and marketing design science, offering insights for enhancing virtual experience design. However, the vastness and diversity of user-generated content (UGC) on these platforms necessitate innovative methods for data mining and analysis, as suggested by Anderson and Thompson (2015). This study makes a valuable contribution to the area of virtual marketing experience design by examining the concept via textual analysis of user-generated content on Instagram. It contributes theoretical, methodological, and practical perspectives on the design of virtual marketing experiences and the analysis of text-based social media content for research objectives.

Our discoveries align with and enrich existing literature on virtual marketing, adding new insights related to the 'what' and 'who' of virtual marketing as gleaned from hashtag analysis, user profiles, and statements on Instagram. The centrality of digital strategy and user engagement in virtual marketing experiences is underscored, both in literature and social media analysis. Our study draws attention to the disparities observed between the literature review and the findings from public media text analysis, particularly in the emphasis on digital products and services as opposed to user engagement and online interactions. This research explores into how user-generated content and public media can deepen our understanding of virtual events and add fresh insights to the field of design science. The results underscore the collaborative nature of virtual marketing, highlighting the dynamic interplay among businesses, influencers, and consumers.

Analysis of Instagram data indicates that, as of December 1, 2021, the primary use of virtual marketing terminology was by businesses and influencers in their digital communication strategies. This research also highlights the increasing importance of Instagram as a source of data, considering its extensive application in marketing and advertising domains. The approach outlined in this paper is adaptable to a range of social media platforms, utilizing common component such as hashtags. This provides a usual framework for textual analysis and outcomes comparison. Practical implications for designing virtual marketing strategies could focus on fostering relationships and interactions in the digital space and investing in online engagement activities to attract consumers. The public media results indicate that virtual adventure design should be bolstered by an understanding of dynamic human interaction processes and active digital engagement with brands.

In addition, this study demonstrates a significant practical contribution in analyzing unstructured, large-scale textual data from social media platforms using computational qualitative analysis techniques and Natural Language Processing (NLP) tools. By processing, visualizing, and quantifying aspects of virtual marketing from the selected Instagram data, the study goes beyond traditional qualitative analysis methods, showcasing consistent findings. Given the volume of the data processed, the use of NLP tools in scientific research is notably impactful. This research exemplifies the effective analysis of text content using a combination of advanced tools like Orange 3, Leximancer, NLTK. These tools have been instrumental in dissecting and understanding complex data sets, offering insights that would be challenging to derive using conventional methods. This approach is particularly valuable for future studies in social sciences, especially those utilizing

NLP. The methodologies applied here pave the way for more comprehensive and nuanced analyses in the fields of virtual marketing and digital consumer behavior, providing a blueprint for future research leveraging advanced data analysis technologies.

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