AN INITIAL STUDY OF THE SOCIAL PRESENCE IMPACT ON PURCHASE INTENTION FOR M-COMMERCE APPLICATION INTERFACE

SYAZLI ADAM SHAMSUL BAHRI* AND ZURIANA ABU BAKAR

Faculty of Computer Science and Mathematics, Universiti Malaysia Terengganu, 21030 Kuala Nerus, Terengganu, Malaysia.

*Corresponding author: p5538@pps.umt.edu.my

ARTICLE INFO

ABSTRACT

Due to COVID-19, consumers seem content with their online shopping experiences and are increasingly opting for online purchases compared to the pre-pandemic period. The surge in online shopping during the pandemic has highlighted the importance of understanding consumer behaviour in the digital realm and the factors influencing their purchase decisions. However, marketers encounter significant challenges when selecting the most effective visual representation for promoting products in m-commerce. Thus, this study aims to explore the influence of social presence through visual representation on consumer behaviour in m-commerce interfaces, examining gaze direction, ethnicity and gender as potential moderators. This study adopted a quantitative approach using a within-subjects experiment where participants will go through a simulation of buying a product in m-commerce interfaces. After completing the task, respondents will then be required to complete the post-task questionnaire. The expected outcome of the study is to provide an understanding of how social presence in visual representation influences consumer buying behaviour in m-commerce interfaces. Secondly, the study is expected to reveal the moderating effects of gaze direction, gender, and ethnicity, as well as the impact of visual representation, offering insights valuable for marketers in tailoring their strategies effectively. Thirdly, the research is expected to identify consumer preferences in endorser characteristics specific to the m-commerce context. Overall, this study will contribute practical insights for industry professionals, facilitating the optimisation of social presence and endorser characteristics to positively influence consumer purchase intentions in the evolving landscape of m-commerce.

2020 Mathematics Subject Classification: ©UMT Press

Introduction

After a few years, COVID-19 remains a persistent threat with the emergence of new variants. While certain countries are easing restrictions and reopening shops, consumers seem content with their online shopping experiences and are increasingly opting for online purchases compared to the pre-pandemic period. Worldwide e-commerce was 17.9% of total retail sales in 2020, estimated to grow to 19.0% in 2021 and 20.3% in 2022 [1]. The surge in online shopping during the pandemic has highlighted the importance of understanding consumer behaviour in the digital realm and the factors influencing their purchase decisions.

M-commerce, short for mobile commerce, involves conducting business transactions via mobile devices such as smartphones and tablets. This concept is a subset of e-commerce, which covers all forms of buying and selling over the Internet but specifically focuses on the use of mobile technology. M-commerce allows consumers to shop, make payments, and perform banking tasks while on the move, providing unparalleled convenience and accessibility. Key activities within m-commerce include mobile shopping through apps and mobile-optimised websites, mobile banking, and mobile payments using digital wallets and payment apps. The widespread adoption of smartphones fuels the rapid growth of m-commerce, enhanced mobile internet connectivity, and the development of user-friendly mobile applications. As consumers increasingly rely on their mobile devices for various activities, businesses are focusing on optimising their mobile interfaces to improve user experience, build trust, and drive sales in this fast-evolving digital landscape. In m-commerce, the visual representation of the endorsers of products has emerged as a crucial element in shaping consumer perceptions and buying behaviour.

The problem that this paper addresses is marketers encounter significant challenges when selecting the most effective visual representation for promoting products in m-commerce. The visual representation plays a crucial role in shaping consumer perceptions and influencing buying behaviour. With the rise of mobile devices and the popularity of m-commerce platforms, marketers must navigate the complexities of captivating consumers through compelling visuals that communicate the product's value, build trust, and drive sales. Also, it is important to understand the moderating effect of gender, ethnicity, and gaze direction on shaping the impact of visual representation on consumer purchase intentions.

However, some marketers did not understand this concept, resulting in repercussions for the consumers and damaging the business. Consumers felt misunderstood and undervalued, leading to a loss of trust and loyalty. As a result, these businesses faced a decline in sales and a tarnished reputation in the market. With this lack of understanding, marketers are hindered in their ability to effectively tailor their marketing strategies and optimise the selection of endorsers, thereby impeding their potential to enhance customer engagement, boost trust, and drive sales in the rapidly evolving m-commerce landscape. Thus, the research aims to investigate the impact of social presence through visual representation in m-commerce interfaces on consumer buying behaviour with gaze direction, ethnicity and gender of the endorser as moderator.

This research is significant because it fills a critical research gap by examining the impact of social presence in the m-commerce interface on users' attitudes, providing insights for enhancing user engagement and designing culturally inclusive interfaces. This study will provide valuable insights into the underlying mechanisms that drive consumer decision-making in the digital shopping landscape by examining how different visual representations influence consumers' perceptions, attitudes, and purchase intentions.

The research paper is being organised as follows. Section 2 will explain related works such as social presence, immersion in social presence, personal characteristics and social presence in m-commerce. Section 3 will describe the methodology adopted for this study. It involves the study of how research is conducted, including the theoretical and philosophical assumptions underlying the research process. It covers research design, experimental design and data analysis methods. Section 4 will discuss the expected outcomes. It refers to the anticipated results or findings that the research aims to achieve. Finally, Section 5 will be the conclusion. This section summarises the key findings, suggesting directions for future research and contribution.

Related Works

The related works section reviews and summarises previous research related to this study, highlighting how the current research builds upon, differs from, or fills gaps in existing knowledge. This section will explain social presence, immersion in social presence, personal characteristics and social presence in m-commerce.

Social Presence

The concept of social presence is grounded in social presence theory, which elaborates on the ability of a communication medium to transmit social cues [2]. It is defined as "the salience of the other in a mediated communication and the consequent salience of their interpersonal interactions" [2]. From a psychological standpoint, social presence relates to intimacy and psychological closeness and is viewed as an inherent quality of communication mediums [2].

In the context of online shopping websites, social presence is favourably related to trust, enjoyment, and perceived utility of the website [3]. Trust is enhanced when users feel a sense of human presence, which makes the online shopping experience more enjoyable and increases the likelihood of repeat visits and purchases [3]. Enjoyment, as a result of social presence, can lead to higher satisfaction and a more positive perception of the website's utility [3].

Additionally, social presence is defined as the feeling of being with others in a virtual setting [4]. This feeling can be particularly impactful in virtual environments, where the lack of physical presence can often lead to feelings of isolation or disconnection [4]. By enhancing social presence, virtual environments can create a more immersive and engaging experience for users, fostering a sense of community and interaction [4]. This concept is essential for understanding how digital platforms can replicate the social aspects of face-to-face interactions and improve user satisfaction and engagement [4]. Figure 1 illustrates the social presence aspect that will be explored in this study.
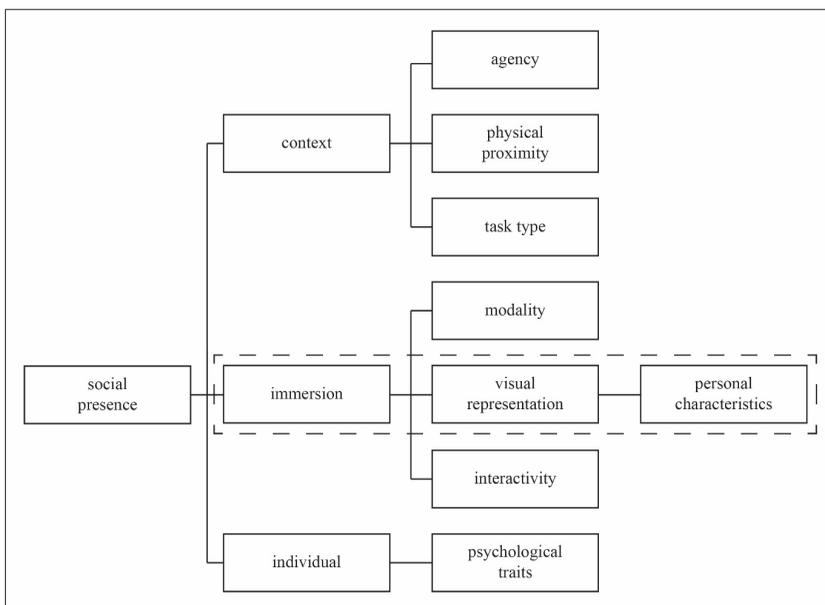

Figure 1: Social presence aspects explored in this study

Immersion in Social Presence

Immersion in social presence refers to the feeling of being present with "real" people in a virtual reality environment [5]. Social presence is distinct from other dimensions of presence, such as telepresence and self-presence [6]. It involves the sense of being there with others in a virtual environment [6]. Factors that contribute to social presence include immersive qualities, contextual differences, and individual psychological traits. These factors can predict the level of social presence experienced by individuals in a virtual environment. Heightened social presence can enhance the overall experience in a virtual environment, but its effects may vary depending on the specific context. The visual representation can be considered as immersion, where the viewer is deeply involved in a particular situation and perceives the virtual environment as real [7]. This study centres on immersion as a predictor of social presence in mobile commerce (m-commerce). Immersion, coupled with contextual nuances and individual traits, foretells the level of social presence. M-commerce experiences differ, illustrating that immersion is not uniform and hinges on the environment, interactions, and personal characteristics. The objective is to reveal how immersion influences social presence dynamics in various m-commerce scenarios. By comprehending the diverse facets of immersion, the study contributes insights to enhance mobile commerce experiences and optimise environments for heightened social presence.

Visual Representation as an Independent Variable

A study conducted found that the communication context, as well as the individual traits of the interactants, can influence perceptions of social presence [8]. One of the most significant contributions of this line of research is that it sheds light on the fact that increasing immersion is (and is not) necessary to induce stronger feelings of social presence [8]. Immersion can be defined as a medium's technological capacity to generate realistic experiences that can remove people from their physical reality [9]. When defined in this way, immersion can be objectively measured by the technological affordances of a medium [9].

Studies of immersion have been conducted by researchers applying different features such as modality [10-12], visual representation [13], interactivity [14, 15], haptic feedback and depth cues [13]. These studies have contributed valuable insights, particularly highlighting that depth cues, haptic feedback, and interaction often lead to increased social presence [6]. Conversely, the impact of general modality and visual representation appeared somewhat weaker [6].

Building upon these outcomes, this study will focus on visual representation as a key area of investigation. Visual representation, as defined by previous research, encompasses the various ways in which visual elements can be used to create a sense of presence and immersion within a medium [13, 16]. By enhancing visual representation, it is possible to create more engaging and immersive experiences for users, thereby increasing their perception of social presence [13, 16].

Moreover, previous research has indicated that specific aspects of visual representation, such as the realism of the images and the use of dynamic visual elements, can significantly impact the level of immersion and social presence experienced by users [13]. This suggests that by focusing on these aspects, it may be possible to create more effective and engaging visual representations that enhance the user experience. Therefore, the current study aims to explore further these elements and their potential to improve social presence in digital environments. This investigation is particularly relevant given the increasing importance of digital media and the need for more effective ways to engage and immerse users in these platforms [13, 16, 18].

Table 1: Literature on predictors of social presence through visual representation

Authors	Presence of Visual Representation	Preferred
Croes *et al.* (2016) [17]	Absent vs. Present	Present
Kim and Sundar (2012) [13]	Absent vs. Present	Absent
Kim *et al.* (2013) [18]	Absent vs. Present	Present
Meyer and Lohner (2012) [16]	Absent vs. Present	Present
Park and Sundar (2015) [19]	Absent vs. Picture vs. Emoticon	Emoticon
Vishwanath (2016) [20]	Absent vs. Present	Present
Xu (2014) [21]	Absent vs. Present (profile picture)	Present

As shown in Table 1, most of the previous studies have mainly focused on the presence or absence of a variable without considering additional traits that might affect consumer preference. Therefore, this study aims to introduce additional personality traits, like gender and ethnicity, as potential moderators in the analysis.

In line with previous research highlighting the impact of facial attractiveness on sales [22], this study includes gender and ethnicity as moderating variables, as suggested in the limitations and future research sections of that study. A study has shown that gender and ethnicity can significantly influence consumer behaviour and decision-making processes [23]. However, while many studies have uncovered these influences, very few have explored them in the context of m-commerce. By examining these factors, we aim to uncover nuanced insights into how different consumer groups interact with m-commerce interfaces.

Understanding the moderating effects of gender and ethnicity is crucial for developing targeted marketing strategies that resonate with diverse audiences. This can lead to more effective communication and higher customer satisfaction across various demographic segments. Furthermore, incorporating these moderators into our study will provide a deeper theoretical understanding of how social presence and visual representation impact purchase intention, thus enriching the existing body of literature.

Given the increasing diversity of the consumer base, marketers need to recognise and address the unique preferences and behaviours of different demographic groups. By doing so, businesses can create more inclusive and successful marketing campaigns, ultimately driving better engagement and sales in the m-commerce landscape.

Personal Characteristics

Personal characteristics of salespeople refer to the unique traits and qualities that individuals possess, influencing their success in sales. These traits encompass personality traits, social skills, and professional skills [24]. A salesperson's touch increases trust, positively affecting product evaluations and purchase intention, particularly when consumers have an inherent need for touch or are from a culture with less prevalent personal touching behaviour [25]. Salesperson behaviour in online shopping is crucial for attracting and persuading prospects, ensuring satisfaction and loyalty, and influencing purchase decision-making [26]. Personality characteristics significantly shape how individuals engage with and perceive interfaces, leading to an effective visual experience [27]. Understanding these traits can inform the development of more tailored and user-centric

m-commerce interfaces [27]. Investigating the impact of personal traits as moderators adds a layer of complexity to the study, contributing to the academic understanding of the dynamics between social presence and purchase intention in m-commerce interfaces. This extension of the current knowledge base explores how individual differences influence the observed relationships.

The identification of gaze direction, gender, and ethnicity as personal characteristics is underscored by these research findings. Gaze direction holds significance as a distinctive personal characteristic [28]. Gender is defined as a composite of speech, behavioural nuances, and personal attributes serving to differentiate between men and women, acknowledging the nuanced influence of culture and spiritual dimensions on gender distinctions [29]. The acknowledgement of ethnicity as a personal characteristic is affirmed [30]. In combining these insights, it is evident that gaze direction, gender, and ethnicity collectively fall under the purview of personal characteristics. Subsequently, the forthcoming sub-topic will delve into the multifaceted dimensions of these three aspects, seeking to unravel their intricate roles within this academic discourse.

Gaze Direction's Impact on Purchase Intentions

Product-focused gaze refers to the direction of a person's gaze towards a specific product in an advertisement [31]. It has been found that when the model in an advertisement looks at the product being advertised, viewers tend to spend more time looking at the product, the brand logo, and the rest of the advertisement [32]. Furthermore, the gaze direction of a featured face in banner advertisements can direct consumers' attention towards specific elements, such as the product, and influence subsequent product evaluations and purchase intentions [33]. These findings suggest that gaze cues provided by endorsers and faces in advertisements can manipulate the focus of attention and influence consumer behaviour.

Direct eye contact also plays an important role in advertising. Eye contact is a crucial factor in decision-making about artificial faces, as participants visually process artificial faces similarly to real ones and do not assess them as artificial as long as the eye regions are not considered [34]. These findings suggest that eye contact in advertisements enhances likeability and contributes to a more positive consumer response.

Table 2: Effects of gaze direction in advertising

Authors	Gaze Direction	Findings
Adil *et al.* (2018) [35]	Towards product	Increases purchase intentions
Andreas *et al*. (2022) [36]	Towards viewer	Increases digital visual engagement, attitude, and purchase intention
Broeder and Remers (2018) [37]	Towards viewer	Profile picture with direct eye contact increases trust
Dirgantari *et al*. (2012) [38]	Towards viewer	Direct eye contact in advertisements increases purchase intention
Droulers and Adil (2015) [39]	Towards product	Participants remember the product better
Hutton (2011) [31]	Towards product	Participants spent longer looking at product
Kumar *et al*. (2020) [40]	Towards product	Participants spend more time looking at the product, the brand logo, and the rest of the advertisement
Valentini *et al*. (2018) [41]	Towards viewer	Direct eye contact increases purchase intention

Table 2 illustrates that previous studies largely focused on the effect of gaze directions on purchase intentions. However, very few delved into the comparison between gaze directions, whether the person in the image looks at the product or directly at the viewer and their impact on purchase intentions. This study aims to address this gap by investigating this aspect. Our goal is to provide valuable insights into which gaze direction could effectively boost purchase intentions.

Ethnicity of Visual Representation

The effectiveness of advertisements, particularly regarding race and cultural representation, varies across different contexts. Table 3 shows the preferred ethnicity in the context of advertising.

Table 3: Literature of preferred ethnicity in advertising

Authors	Presence of Visual Representation	Preferred
Simpson *et al.* (2000) [42]	White vs. Black	Same as consumer
Strebinger *et al.* (2018) [43]	Japanese vs. Chinese vs. Caucasian	Caucasian
Ellis and He (2011) [44]	Caucasian vs. Asian vs. Black	Caucasian
Baumann and Setogawa (2014) [45]	Caucasian vs. Korean vs. Indian	Same as consumer
Kim (2022) [46]	Caucasian vs. Korean	Same as consumer
Leak (2014) [47]	White vs. Black	Black

In Malaysia, advertisements often feature cultural symbols resonating with the diverse Malaysian audience, encompassing the Malays, Chinese, and Indians. However, whitening cream advertisements tend to portray fair-skinned women over dark-skinned women, as fairness is still considered the ideal beauty standard [48]. Additionally, nostalgic ads have been successful in Malaysia, evoking a sense of collective nostalgia across diverse backgrounds transcending ethnic and religious boundaries [49].

While existing studies have explored various aspects of advertisements in Malaysia, one notable gap in the literature is the lack of research on the preferred ethnicity representation in advertisements among Malaysians. Despite the country's diverse population, there is limited information on how different ethnic groups perceive and respond to advertisements that feature models from their ethnic backgrounds. Closing the gap on ethnicity in Malaysia is crucial for marketers to foster relevance, cultural sensitivity, trust, and inclusivity, ultimately leading to improved audience engagement and market opportunities. Therefore, this study will specifically include the main ethnic groups of Malays, Chinese, and Indians, considering the context in which it is conducted in Malaysia [50].

The Role of Gender in Buying Behaviour

In modern times, consumers purchase goods and services through in-store or online transactions, making the decision-making process more complicated and challenging than before. Consumer decision-making styles are highly relevant to market segmentation, allowing marketers to profile their target markets. Previously, marketers segmented their markets based on demographic differences, which could impact decision-making styles and buying preferences [51]. Demographic variables such as age, gender, and income are the most crucial variables used for segmentation, with gender being a fundamental market segmentation index that determines consumer needs, wants, and buying behaviour. The combination of decision-making styles and demographic variables enables marketers to identify and design marketing strategies for their target market segments.

Additionally, gender has a significant relationship with consumer attitudes, purchase decisions, and buying behaviour. Studies have found that women are more likely to find advertising that reinforces female stereotypes offensive, while men do not share this view [52]. Eisend *et al.* [53] found that humorous ads tend to use traditional stereotypes about men, while non-humorous ads tend to use conventional stereotypes about women. Table 4 shows previous studies of consumers' gender preferences across different contexts.

Table 4: Studies of consumers gender preferences for different contexts

Authors	Context	Preferred Gender
Sandhu (2019) [54]	Automobile ads	Male
Chowdhury *et al.* (2018) [55]	Employers' gender preferences in job ads	Male
Esin *et al.* (2014) [56]	Gynaecologists in job ads	Female
Maker and Childs (2003) [57]	Children's television ads	Female
Whipple and McManamon (2002) [58]	Voice of narrator in commercials	Male
Neumark (2018) [59]	Employers' gender preferences for older workers	Male
Lynch and Campbell (2021) [60]	Adolescents voice in auditory ads	No preference
Veld *et al.* (2016) [61]	Plastic Surgeon's Gender	Female

Based on Table 4, different consumer preferences are depending on the context. However, very few studies explored the consumers' gender preference for visual representation in m-commerce interface context. This paper aims to contribute to this area of research by investigating and analysing the factors that influence the buying intentions of consumers, with a specific focus on gender-related differences.

Social Presence in Mobile Commerce (M-Commerce)

Social presence has been identified as an important factor in various disciplines, including online shopping contexts. According to research by [62], consumers' perception of social presence in online shopping is likely to positively influence their trust in the website and their intention to purchase from it. Similarly, Kim and Biocca [63] found that a sense of being present in a computer-mediated environment had a positive effect on attitude change, particularly on buying intention and confidence in product purchase decisions. Seo *et al* [64] suggested that using advertisements that feature human brands in an e-commerce website may lead to greater intent to purchase compared to advertisements that do not feature a human brand. Consumers' perception of social presence in online shopping positively influences their trust and purchase intention on the website, and the use of human brands in e-commerce websites can also lead to greater intent to purchase. There exists a significant body of research on the impact of human images on e-commerce websites, whereas research on the effects of human images on m-commerce interfaces remains relatively sparse.

M-commerce: Advantages and Significance in the Digital Era

M-commerce, also known as mobile commerce, refers to the conduct of electronic commerce activities through mobile devices such as phones or PDAs. The concept of m-commerce encompasses the buying and selling of products and services using mobile devices connected to the internet [65]. Additionally, within the realm of m-commerce, there is a specific form of electronic payment called m-payment, which enables users to make payments through their Internet-connected mobile devices. This mode of payment harnesses the power of communication technology and provides a convenient means for users to engage in financial transactions on the go.

Advantages of m-commerce Over Traditional e-commerce Methods

M-commerce offers several advantages that make it a preferable choice over traditional e-commerce methods. Firstly, one of the key advantages of m-commerce is its ability to facilitate transactions on the go. Users can conduct these transactions anytime and anywhere, even when they are mobile, providing them with a high level of convenience and flexibility [66]. This advantage allows individuals to engage in commercial activities seamlessly, regardless of their location, which is particularly beneficial for today's fast-paced society.

Additionally, m-commerce provides the advantage of establishing direct connections with both current and potential customers. Through mobile platforms, companies can effectively engage with their target audience and cater to their specific requirements and preferences, thereby enhancing customer satisfaction and loyalty [66]. Moreover, m-commerce enables businesses to personalise their marketing messages based on users' positions. By leveraging location data, companies can deliver targeted advertisements and promotional content to their intended markets, maximising the effectiveness of their marketing efforts [67].

Another noteworthy aspect is that m-commerce tends to be more accessible in developing countries than in developed countries. Unlike traditional e-commerce, which may face barriers such as the scarcity and high cost of computers, m-commerce can be more easily adopted in regions with limited computer access but widespread mobile device usage. This accessibility factor makes m-commerce a suitable choice for reaching a broader audience in developing countries, where mobile phones are more prevalent than personal computers.

Moreover, the m-payment system within m-commerce takes advantage of wireless and communication technologies, offering various payment options such as SMS messages, WAP online billing, PIN number transmission, mobile web, direct-to-subscriber billing, and direct credit card transactions. This diverse range of payment methods provides users with convenience and flexibility in conducting financial transactions through their mobile devices. As a result, mobile users are increasingly favouring m-payment methods [68], and the number of m-payment system users is projected to increase significantly in the coming years.

Considering these advantages, it is evident why this study chose to focus on m-commerce instead of traditional e-commerce methods. The ability to conduct transactions on the move, establish direct connections with customers, cater to specific requirements and preferences, and leverage wireless communication technologies for secure and convenient payments makes m-commerce a compelling option for businesses and consumers alike.

Methodology

Research methodology refers to the systematic, theoretical analysis of the methods applied to a field of study. It comprises the theoretical analysis of the body of methods and principles associated with a branch of knowledge. It involves the study of how research is conducted, including the theoretical and philosophical assumptions underlying the research process.
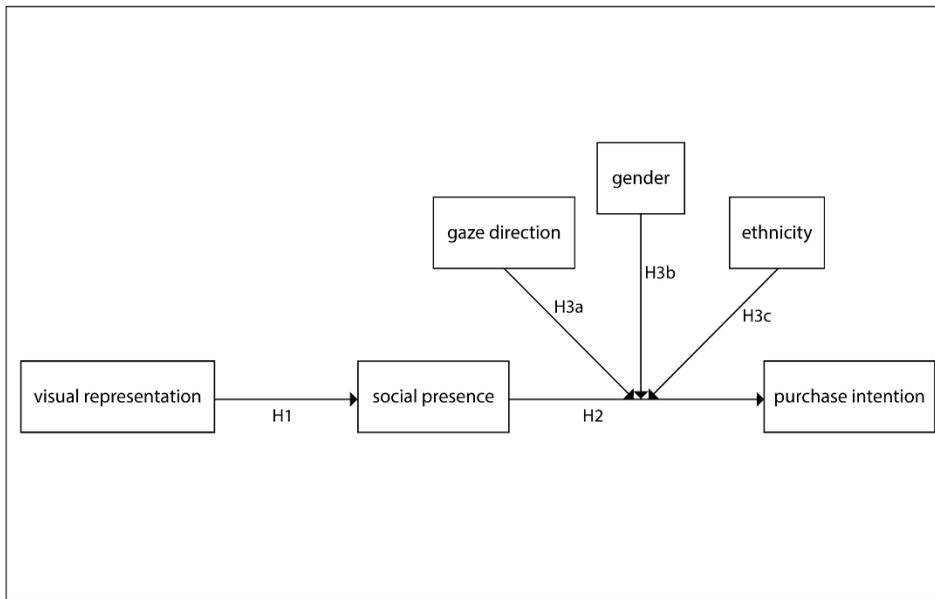
Conceptual Framework

Figure 2: Research model

The proposed research model investigates the relationship between visual representation, social presence, and purchase intention within an m-commerce interface, with a focus on the moderating effects of endorser characteristics. Specifically, the model hypothesises that visual representation (H1) directly influences social presence, which in turn affects purchase intention (H2). The model further explores how the relationship between social presence and purchase intention is moderated by three key endorser characteristics: Gaze direction (H3a), gender (H3b), and ethnicity (H3c).

In this framework, visual representation, which includes the presence of an endorser in the interface, is predicted to enhance the social presence felt by users. This heightened social presence is then anticipated to impact users' purchase intentions positively. The moderators—gaze direction, gender, and ethnicity—are included to evaluate how these factors influence the strength and nature of the relationship between social presence and purchase intention. This comprehensive model aims to provide a deeper understanding of the interaction between these variables and offer insights into how different endorser attributes can affect consumer behaviour in an m-commerce environment.

Research Design

This research consists of three phases which are feasibility study, design and development of m-commerce interface, and data analysis and interpretation.

In the initial phase of this research design, a comprehensive review of past research will be conducted, encompassing a thorough examination of existing literature in the field. This review aims to identify gaps in current knowledge, understand the methodologies employed in similar studies, and gain insights into the factors that influence social presence and purchase intention in m-commerce interfaces. Building on the insights garnered from this literature review, research questions and objectives will be carefully formulated. This foundational phase is crucial for establishing a clear research direction and ensuring that the study contributes meaningfully to the existing body of knowledge in the field of m-commerce and consumer behaviour.

In the second phase, a detailed m-commerce interface will be created based on the identified research objectives and questions. Subsequently, the designed interface will undergo thorough verification by design experts to ensure its usability, visual appeal, and alignment with the research goals. Following the verification, a pilot test will be conducted to assess the functionality and gather feedback on user experience. This iterative process of design, expert verification, pilot testing, and feedback collection aims to refine the m-commerce interface, enhancing its effectiveness and user engagement for the subsequent main study.

For the third phase, during the data collection and analysis phase, information will be systematically gathered to address the research questions. Following the collection, the data will undergo thorough analysis to draw meaningful insights. Subsequently, the findings will be discussed within the context of existing literature, allowing for a comprehensive understanding of the results and their implications in relation to prior research.

Experimental Design

A two (presence of endorser: Presence, not presence) x 2 (gaze direction: Towards a product, towards viewers) x 3 (ethnicity: Malay, Chinese, Indian) x 2 (gender: Male, female) within-subjects experiment will be conducted to explore how social presence and visual representation characteristics affects users buying behaviour. The interfaces will be developed to conduct the study, each addressing specific components: social presence, gaze direction, gender, and ethnicity. Before the main experiment, a pilot test will be conducted to refine the interfaces and ensure their effectiveness, taking ethical considerations into account.

Participants will engage in a sequence of interfaces carefully designed to investigate the influence of an endorser, gaze direction, gender, and ethnicity on their perceptions and preferences within an online shopping setting. Figure 2 illustrates that in Interface 1, participants encounter a single product and decide whether they prefer to view it with or without an endorser. Subsequently, in Interface 2, participants navigate variations in the endorser's gaze direction, gender, and ethnicity. Interface 3 functions as a baseline control condition, presenting the product without an endorser. In Interface 4, participants undertake a direct comparison, evaluating their chosen product without an

endorser against conditions involving an endorser. Throughout the process, participants will find clear instructions to guide their interactions. Figure 3 shows the experiment simulation flowchart for the m-commerce interface that respondents will complete.
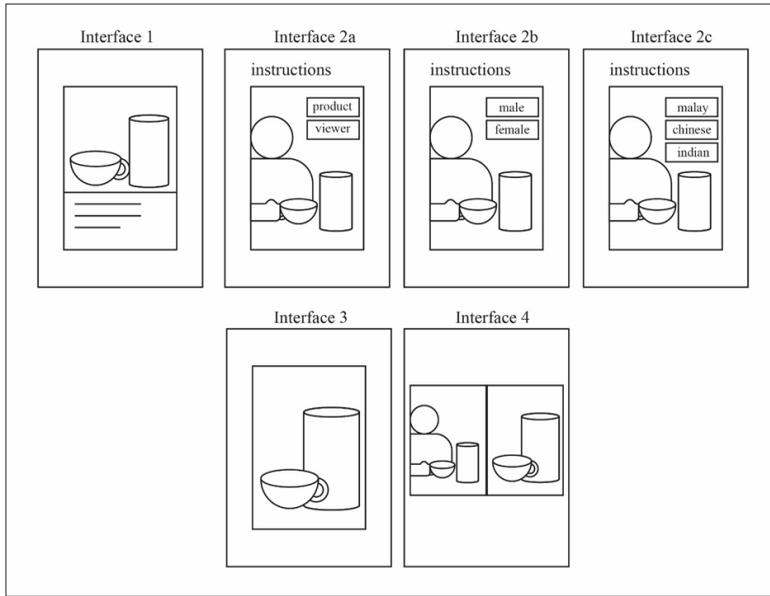

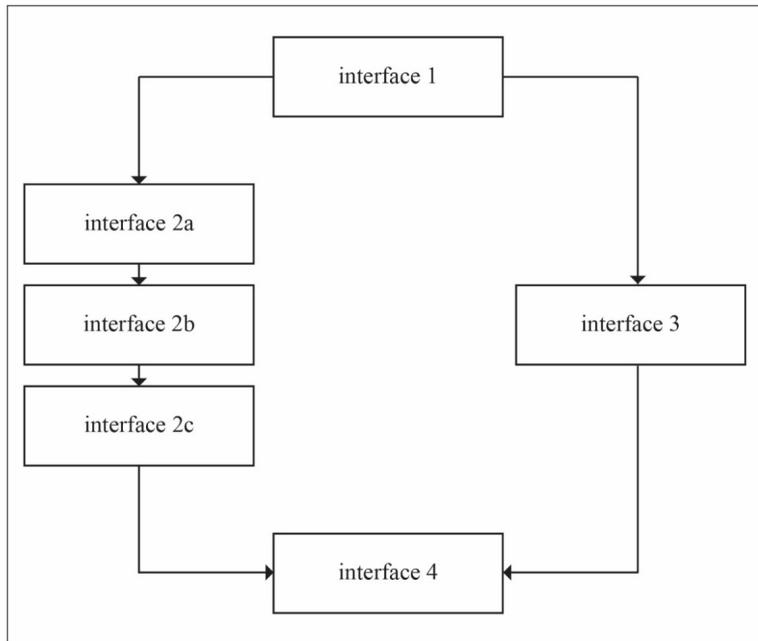Figure 3: M-commerce interface prototype

Figure 4: Interface simulation flowchart

After completing the task, respondents then will complete a five-point Likert scale (1 = "strongly disagree" and 5 = "strongly agree") post-task questionnaire. Responses will be recorded on a five-point Likert scale. Discriminant and convergent validity of the scales will be established using a factor analysis (CFA) with a VARIMAX rotation. In addition, the scale reliability will be assessed by Cronbach's alpha (α).

Target respondents will be young working adults and university students since young people represent the largest mobile device user group in Malaysia, according to a study from the Malaysian Communications and Multimedia Commission.

Data Analysing Method

For data analysis, SPSS and SmartPLS software will be used to evaluate the hypothesised relationships. SPSS software will be utilised for the demographic analysis of the respondents, providing a clear understanding of the sample's characteristics.

Further, researchers will apply the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach using SmartPLS software to analyse the data related to the study constructs and to evaluate the hypothesised relationships. The reason for selecting PLS-SEM over Covariance-Based Structural Equation Modeling (CB-SEM) is multifaceted. Firstly, PLS-SEM is particularly suitable for exploratory research and complex models that include multiple constructs and indicators, as it can handle many relationships between different variables, making it more flexible compared to CB-SEM.

Additionally, PLS-SEM is preferred due to its ability to work effectively with smaller sample sizes and data that may not meet the strict normality assumptions required by CB-SEM. Given the potential variability in the data collected from the diverse demographic background of respondents (including factors such as gender, ethnicity, and gaze direction in the m-commerce interface), PLS-SEM provides a robust analytical approach that can yield reliable results even under non-normal data distributions.

Moreover, PLS-SEM focuses on maximising the explained variance of the dependent constructs, which aligns well with the objective of this study, which is to understand the predictors of social presence and purchase intention in an m-commerce environment. This method also allows for the examination of both direct and moderating effects of variables, making it an ideal choice for the current research model that includes multiple moderating variables (gender, ethnicity, gaze direction).

Outcomes

The expected outcomes will be to provide an understanding of how social presence in visual representation influences consumer buying behaviour in M-commerce interfaces. Secondly, the study is expected to reveal the moderating effects of gender, ethnicity, and gaze direction on the impact of visual representation, offering insights valuable for marketers in tailoring their strategies effectively. Thirdly, the research is expected to identify consumer preferences in endorser characteristics specific to the M-commerce context. Overall, these objectives are anticipated to contribute practical insights for industry professionals, enabling the optimisation of social presence and endorser characteristics to positively influence consumer purchase intentions in the evolving landscape of M-commerce.

Conclusions

This research aims to provide a clear understanding of social presence through visual representation in m-commerce interfaces on consumer buying behaviour. Also, it will investigate the moderating effect of gender, ethnicity, and gaze direction in shaping the impact of visual representation on consumer purchase intentions in the m-commerce context and evaluate the consumer preferences in visual representation characteristics in the m-commerce context. This study adopted a quantitative approach using a within-subjects experiment. The expected outcome of this study is to provide an understanding of how social presence in visual representation influences consumer buying behaviour in M-commerce interfaces. Secondly, the study is expected to reveal the moderating effects of gender, ethnicity, and gaze direction on the impact of visual representation, offering insights valuable for marketers in tailoring their strategies effectively. Thirdly, the research is expected to identify consumer preferences in endorser characteristics specific to the M-commerce context. Overall, this study could contribute practical insights for industry professionals, enabling the optimisation of social presence and endorser characteristics to influence positively.

Conflict of Interest Statement

The authors declare that they have no conflict of interest. The funders had no role in the design of the study, in the collection, analyses, or interpretation of data, in the writing of the manuscript, or in the decision to publish the results.

Acknowledgements

References

[1] Cramer-Flood, E. (2022). Global ecommerce forecast 2022. *Insider Intelligence*.

[2] Short, J. R., Parker, E. B., Williams, E., & Christie, B. (1978). The social psychology of telecommunications. *Contemporary Sociology*, *7*(1), Article 32. https://doi.org/10.2307/2065899

[3] Cyr, D., Hassanein, K., Head, M., & Ivanov, A. (2007). The role of social presence in establishing loyalty in e-Service environments. *Interacting with Computers*, *19*(1), 43-56. https://doi.org/10.1016/j.intcom.2006.07.010

[4] Frank Biocca, Chad Harms, & Judee K. Burgoon. (2003). Toward a more robust theory and measure of social presence: Review and suggested criteria. *Presence: Teleoperators and Virtual Environments*, *12*(5), 456-480. https://doi.org/10.1162/105474603322761270

[5] Mestre, D., & Vercher, J.-L. (2011). *Theoretical and pragmatic approach to virtual reality* (pp. 33-68). CRC Press EBooks. https://doi.org/10.1201/b11612-8

[6] Oh, C. S., Bailenson, J. N., & Welch, G. (2018). A systematic review of social presence: Definition, antecedents, and implications. *Frontiers in Robotics and AI*, *5*. https://doi.org/10.3389/frobt.2018.00114

[7] Maziarczyk, G. (2020). Immersion through Google Street view: Multimodal representation of storyworld in entrances & exits by Reif Larsen. *Word & Image*, *36*(2), 202-210. https://doi.org/10.1080/02666286.2019.1658472

[8] Kang, S. H., & Gratch, J. (2014). Exploring users' social responses to computer counseling interviewers' behavior. *Computers in Human Behavior*, *34*, 120-130.

[9] Slater, M., & Wilbur, S. (1997). A framework for immersive virtual environments (FIVE): Speculations on the role of presence in virtual environments. *Presence: Teleoperators & Virtual Environments*, *6*(6), 603-616.

[10] Alghamdi, M., Regenbrecht, H., Hoermann, S., Langlotz, T., & Aldridge, C. (2016). Social presence and mode of video communication in a collaborative virtual environment. *PACIS 2016 Proceedings*. https://aisel.aisnet.org/pacis2016/126

[11] Gimpel, H., Huber, J., & Sarikaya, S. (2016). Customer satisfaction in digital service encounters: The role of media richness, social presence, and cultural distance. *Research Papers*, *91*. https://aisel.aisnet.org/ecis2016_rp/91

[12] Hauber, J., Regenbrecht, H., Cockburn, A., & Billinghurst, M. (2012). The impact of collaborative style on the perception of 2D and 3D videoconferencing interfaces. *The Open Software Engineering Journal*, *6*(1), 1-20. https://doi.org/10.2174/1874107x01206010001

[13] Kim, Y., & Sundar, S. S. (2012). Anthropomorphism of computers: Is it mindful or mindless? *Computers in Human Behavior*, *28*(1), 241-250.

[14] Lim, Y., & Lee-Won, R. J. (2016). When retweets persuade: The persuasive effects of dialogic retweeting and the role of social presence in organisations' Twitter-based communication. *Telematics and Informatics*, *34*(5), 422-433. https://doi.org/10.1016/j.tele.2016.09.003

[15] Rauwers, F., Voorveld, H. A., & Neijens, P. C. (2016). The effects of the integration of external and internal communication features in digital magazines on consumers' magazine attitude. *Computers in Human Behavior*, *61*, 454-462. https://doi.org/10.1016/j.chb.2016.03.042

[16] Velten, M., Duerr, G. D., Pessies, T., Schild, J., Lohner, R., Mersmann, J., Dewald, O., Zacharowski, K., Klaschik, S., Hilbert, T., Hoeft, A., Baumgarten, G., Meyer, R., Boehm, O., & Knuefermann, P. (2012). Priming with synthetic oligonucleotides attenuates pressure overload-induced inflammation and cardiac hypertrophy in mice. *Cardiovascular research*, *96*(3), 422-432. https://doi.org/10.1093/cvr/cvs280

[17] Rivera, M., Croes, R., & Lee, S. H. (2016). Tourism development and happiness: A residents' perspective. *Journal of Destination Marketing & Management*, *5*(1), 5-15.

[18] Kim, K. J., Park, E., & Sundar, S. S. (2013). Caregiving role in human–robot interaction: A study of the mediating effects of perceived benefit and social presence. *Computers in Human Behavior*, *29*(4), 1799-1806. https://doi.org/10.1016/j.chb.2013.02.009

[19] Park, E. K., & Sundar, S. S. (2015). Can synchronicity and visual modality enhance social presence in mobile messaging? *Computers in Human Behavior*, *45*, 121-128. https://doi.org/10.1016/j.chb.2014.12.001

[20] Vishwanath, A. (2016). Mobile device affordance: Explicating how smartphones influence the outcome of phishing attacks. *Computers in Human Behavior*, *63*, 198-207.

[21] Xu, Q. (2014). Should I trust him? The effects of reviewer profile characteristics on eWOM credibility. *Computers in Human Behavior*, *33*, 136-144.

[22] Peng, L., Cui, G., Chung, Y., & Zheng, W. (2020). The faces of success: Beauty and ugliness premiums in e-commerce platforms. *Journal of Marketing*, *84*(4), 67-85. https://doi. org/10.1177/0022242920914861

[23] Kozitsina, T., Mikhaylova, A., Komkova, A., Peshkovskaya, A., Sedush, A., Menshikova, O., Myagkov, M., & Menshikov, I. (2020). Ethnicity and gender influence the decision making in a multinational state: The case of Russia. *arXiv (Cornell University)*. https://doi.org/10.48550/ arxiv.2012.01272

[24] Tokareva, Y., Polozov, A., Petuhova, M., & Morohov, N. (2023). Identification of the relationship of individual and personal characteristics of sales managers with the effectiveness of professional activity. *Management of the Personnel and Intellectual Resources in Russia*, *12*(2), 70-76. https://doi.org/10.12737/2305-7807-2023-12-2-70-76

[25] Orth, U. R., Bouzdine□Chameeva, T., & Brand, K. (2013). Trust during retail encounters: A touchy proposition. *Journal of Retailing*, *89*(3), 301-314. https://doi.org/10.1016/j. jretai.2013.02.002

[26] Sahney, S., Ghosh, K., & Shrivastava, A. (2013). "Buyer's motivation" for online buying: an empirical case of railway e-ticketing in Indian context. *Journal of Asia Business Studies*, *8*(1), 43-64. https://doi.org/10.1108/jabs-07-2011-0036

[27] Sarsam, S. M., & Al-Samarraie, H. (2018). Towards incorporating personality into the design of an interface: A method for facilitating users' interaction with the display. *User Modeling and User-Adapted Interaction*, *28*(1), 75-96. https://doi.org/10.1007/s11257-018-9201-1

[28] TźSér, Z., Rill, R. A., Faragó, K. B., Jeni, L. A., & LźRincz, A. (2016). Personalisation of gaze direction estimation with deep learning. In *Lecture Notes in Computer Science* (pp. 200–207). https://doi.org/10.1007/978-3-319-46073-4_20

[29] Qizi, N. (2021). The role of gender in expressing speech act of disagreement. *International Journal on Integrated Education*, *4*(4), 344-349. https://doi.org/10.31149/ijie.v4i4.1756, 4, 344-349. https://doi.org/10.31149/IJIE.V4I4.1756

[30] Cornelison, B., Edwards, C., Axon, D. R., Gorman, L., Rudin-Rush, L., Johnson, B., & Alvarez, N. A. (2022). Assessing the association of hispanic ethnicity and other personal characteristics with pharmacy school admissions. *Pharmacy*, *10*(4), Article 88. https://doi. org/10.3390/pharmacy10040088

[31] Hutton, S. B., & Nolte, S. (2011). The effect of gaze cues on attention to print advertisements. *Applied Cognitive Psychology*, *25*(6), 887-892.

[32] Atalay, A. S., Bodur, H. O., & Rasolofoarison, D. (2012). Shining in the center: Central gaze cascade effect on product choice. *Journal of Consumer Research*, *39*(4), 848-866.

[33] Palcu, J., Sudkamp, J., & Florack, A. (2017). Judgments at gaze value: Gaze cuing in banner advertisements, its effect on attention allocation and product judgments. *Frontiers in Psychology*, *8*, Article 881. https://doi.org/10.3389/fpsyg.2017.00881

[34] Schwind, V., Leicht, K., Jäger, S., Wolf, K., & Henze, N. (2018). Is there an uncanny valley of virtual animals? A quantitative and qualitative investigation. *International Journal of Human-Computer Studies*, *111*, 49-61.

[35] Adil, S., Lacoste-Badie, S., & Droulers, O. (2018). Face presence and gaze direction in print advertisements: How they influence consumer responses—an eye-tracking study. *Journal of Advertising Research*, *58*(4), 443-455.

[36] Hernandez, E., Schwettmann, S., Bau, D., Bagashvili, T., Torralba, A., & Andreas, J. (2022). Natural language descriptions of deep visual features. *arXiv (Cornell University)*. https://doi.org/10.48550/arxiv.2201.11114

[37] Broeder, P., & Remers, E. (2018). Eye contact and trust online: the effect of profile pictures on Airbnb booking. In *2018 IEEE 12th International Conference on Application of Information and Communication Technologies (AICT)* (pp. 1-4). IEEE. https://doi.org/10.1109/icaict.2018.8747121

[38] Luckyardi, S., Hurriyati, R., Disman, D., & Dirgantari, P. D. (2022). Significances of marketing education in reducing poverty in Indonesia; special review on quality of life. *Journal of Eastern European and Central Asian Research (JEECAR)*, *9*(1), 101-111. https://doi.org/10.15549/jeecar.v9i1.867

[39] Droulers, O., & Adil, S. (2015). Perceived gaze direction modulates ad memorisation. *Journal of Neuroscience, Psychology, and Economics*, *8*(1), 15-26. https://doi.org/10.1037/npe0000029

[40] Moorthy, K. B., Kumar, M., Subramanian, R., & Gandhi, V. (2020, April). Gazed–gaze-guided cinematic editing of wide-angle monocular video recordings. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems* (pp. 1-11).

[41] Valentini, C., Romenti, S., Murtarelli, G., & Pizzetti, M. (2018). Digital visual engagement: Influencing purchase intentions on Instagram. *Journal of Communication Management*, *22*(4), 362-381.

[42] Simpson, E., Snuggs, T., Christiansen, T., & Simples, K. (2000). Race, homophily, and purchase intentions and the Black consumer. *Psychology & Marketing*, *17*, 877-889. https://doi.org/10.1002/1520-6793(200010)17:10<877::AID-MAR3>3.0.CO;2-K.

[43] Andreas, Strebinger., Xiaoling, Guo., Ferdinand, Klauser., Peter, Grant-Hay. (2018). Is Multi-Ethnic Advertising a globally viable strategy for a Western luxury car brand? A mixed-method cross-cultural study. *Journal of Business Research*, *82*, 409-416. https://doi.org/10.1016/j.jbusres.2017.08.037

[44] Ellis, L. M., & He, P. (2011). Race and advertising: Ethnocentrism or "Real" differences in physical attractiveness? Indirect evidence from China, Malaysia, and the United States. *Mankind Quarterly*, *51*(4), 471-489. https://doi.org/10.46469/mq.2011.51.4.3

[45] Baumann, C., & Setogawa, S. (2014). Asian ethnicity in the West: Preference for Chinese, Indian and Korean service staff. *Asian Ethnicity*, *16*(3), 380-398. https://doi.org/10.1080/14631369.2014.937101

[46] Kim, S. (2022). Different ethnicities with different fashion preferences, or one nationality with similar fashion preferences today? *Breaking Boundaries*. https://doi.org/10.31274/itaa.13447

[47] Leak, R. L. (2014). Situational effects of ethnic phenotype in marketing: Investigating inter- and intra-ethnic preferences for minorities in advertisements. *Academy of Marketing Studies Journal*, *18*(2), Article 135. https://www.questia.com/library/journal/1G1-398828751/situational-effects-of-ethnic-phenotype-in-marketing

[48] Razak, S. R. A. A., Wahab, N. A. A., & Sujak, F. A. (2018). The role of advertising in educating colored women in Malaysia on embracing natural beauty to boost confidence. In *Proceedings of the Art and Design International Conference (AnDIC 2016)* (pp. 315-323). Springer Singapore.

[49] Alam, S. R., Wallrabe, H., Svindrych, Z., Chaudhary, A. K., Christopher, K. G., Chandra, D., & Periasamy, A. (2017). Investigation of mitochondrial metabolic response to doxorubicin in prostate cancer cells: An NADH, FAD and tryptophan FLIM assay. *Scientific Reports*, *7*(1), Article 10451.

[50] Azlan, A. A. (2019). Communicating about inter-ethnic unity: An investigation on differences between youths of the three main ethnic groups in Malaysia. *Jurnal Komunikasi: Malaysian Journal of Communication*, *35*(2), 1-17.

[51] Hefer, Y., & Cant, M. C. (2013). Visual merchandising displays effect on consumers: A valuable asset or an unnecessary burden for apparel retailers. *International Business & Economics Research Journal (IBER)*, *12*(10), 1217-1224.

[52] Theodoridis, P. K., Kyrousi, A. G., Zotou, A. Y., & Panigyrakis, G. G. (2013). Male and female attitudes towards stereotypical advertisements: A paired country investigation. *Corporate Communications: An International Journal*, *18*(1), 135-160.

[53] Eisend, M., Plagemann, J., & Sollwedel, J. (2014). Gender roles and humor in advertising: The occurrence of stereotyping in humorous and nonhumorous advertising and its consequences for advertising effectiveness. *Journal of Advertising*, *43*(3), 256-273.

[54] Sandhu, N. (2019). Fueling gender stereotypes: A content analysis of automobile advertisements. *Business Perspectives and Research*, *7*(2), 163-178. https://doi.org/10.1177/2278533719833815

[55] Chowdhury, A. R., Areias, A. C., Imaizumi, S., Nomura, S., & Yamauchi, F. (2018). *Reflections of employers' gender preferences in job ads in India: An analysis of online job portal data*. (Policy Research Working Paper Series 8379). The World Bank. https://ideas.repec.org/p/wbk/wbrwps/8379.html

[56] Esin, S., Şahin, E., Sari, S. N., Hayran, M., Başer, E., Yalvaç, S., & Kandemir, Ö. (2014). Increase in preference for female obstetricians and gynecologists in job advertisements in Turkey. *International Journal of Gynecology & Obstetrics*, *126*(1), Article 94. https://doi.org/10.1016/j.ijgo.2014.02.006

[57] Maker, J. K., & Childs, N. M. (2003). A longitudinal content analysis of gender roles in children's television advertisements: A 27-year review. *Journal of Current Issues and Research in Advertising*, *25*(1), 71-81. https://doi.org/10.1080/10641734.2003.10505142

[58] Whipple, T. W., & McManamon, M. K. (2002). Implications of using male and female voices in commercials: An exploratory study. *Journal of Advertising*, *31*(2), 79-91. https://doi.org/10.1080/00913367.2002.10673668

[59] Neumark, D. (2018). Experimental research on labor market discrimination. *Journal of Economic Literature*, *56*(3), 799-866. https://doi.org/10.1257/jel.20161309

[60] Lynch, S., & Campbell, M. (2021). Adolescents voice preference in auditory advertisements. *Journal of Student Research*, *10*(1), 1-9. https://doi.org/10.47611/JSRHS.V10I1.1301

[61] Veld, E. a. H. I. ′., Canales, F. L., & Furnas, H. (2016). The impact of a plastic surgeon's gender on patient choice. *Aesthetic Surgery Journal*, *37*(4), 466-471. https://doi.org/10.1093/asj/sjw180

[62] Gefen, N., & Straub, N. (2003). Managing user trust in B2C e-services. *e-Service Journal*, *2*(2), Article 7. https://doi.org/10.2979/esj.2003.2.2.7

[63] Kim, T., & Biocca, F. (1997). Telepresence via television: Two dimensions of telepresence may have different connections to memory and persuasion. *Journal of Computer-Mediated Communication*, *3*(2), JCMC325. https://doi.org/10.1111/j.1083-6101.1997.tb00073.x

[64] Seo, Y. W., Chae, S. W., & Lee, K. C. (2012). The impact of human brand image appeal on visual attention and purchase intentions at an e-commerce website. In *Intelligent Information and Database Systems: 4th Asian Conference, ACIIDS 2012, Kaohsiung, Taiwan, March 19-21, 2012, Proceedings, Part III 4* (pp. 1-9). Springer Berlin Heidelberg.

[65] Duan, L., & Song, X. (2010). The key issues to develop M-business system. In *2010 International Conference on E-Business and E-Government* (pp. 157–160). IEEE. https://doi.org/10.1109/icee.2010.47

[66] Tiwari, R., Buse, S., & Herstatt, C. (2007, February). Mobile services in banking sector: the role of innovative business solutions in generating competitive advantage. In *Proceedings of the International Research Conference on Quality, Innovation and Knowledge Management* (pp. 886-894).

[67] Omonedo, P., & Bocij, P. (2014). E-commerce versus m-commerce: Where is the dividing line. *International Journal of Social, Behavioural, Educational, Business and Industrial Engineering*, *8*(11), 3610-3615.

[68] Dewan, S. G., & Chen, L. (2005). Mobile Payment adoption in the US: A cross-industry, crossplatform solution. *Journal of Information Privacy and Security*, *1*(2), 4-28. https://doi.org/10.1080/15536548.2005.10855765