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The Impact of Food-Related User-Generated Content (UGC) Characteristics on User Engagement Dynamics and Behavioral Outcomes

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ABSTRACT

The study investigates the dynamics of user interactions with food-centric social media content, focusing on how various source attributes impact consumer engagement levels and lead to specific behavioural outcomes, such as food behavioural intention and visual addiction. This study utilized diverse online platforms to administer cross-sectional surveys and collect data. The 350 valid responses were analysed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4. The analysis revealed that the UGC's source attraction, source credibility, source popularity, and source usefulness significantly shape user engagement, categorised as passive, active and collaborative engagement. The different forms of consumer engagement behaviour impact the user's intention toward food-related behavioural intention and their propensity for visual addiction to food images. The study comprehensively assesses the complex links between food-related content source characteristics, user engagement patterns, food-related behaviour intentions, and visual addiction. The findings provide valuable insights to stakeholders in the food industry, highlighting the importance of prioritising visual appeal and establishing regulatory standards to optimise consumer experiences and achieve desired outcomes in food-related content creation and consumption.

Keywords: Source attraction, source credibility, source popularity, source usefulness, user-generated content (UGC), consumer engagement, food behavioural intention, visual addiction

1.0 INTRODUCTION

The rapid advancement of internet technology and social media in recent decades has led to visual content sharing on social media platforms (SMPs) [1]. The trend of photography or visual content rather than text-oriented content sharing has grown viral and become popular over the SMPs [2]. In 2023, global internet users have increased to 5.3 billion, with 4.95 billion social media users actively engaged in SMPs [3]. Amongst the SMPs, Instagram has dominated about 2 billion active users monthly [4, 5]. Furthermore, the introduction of TikTok in 2017, with its innovative short video-sharing format of 15 seconds to 3 minutes, has set a new standard in the ever-changing social media environment [2]. The rise of digitalisation has transformed SMP into a crucial platform where users exchange experiences and information on diverse topics, ranging from fashion and health to hobbies and daily routines, while also facilitating product reviews [4-6]. In this contemporary digitalised culture, everyone can express thoughts and share experiences on diverse subjects because of the accessibility and minimal entry requirements of SMPs [4]. The SMP serves as a rapid and expansive data generation and dissemination platform. Nowadays, millions of users generate massive volumes of content on different SMPs every second [7].

The advancement in mobile phone technology has introduced novel ways of participating in traditional rituals. For instance, it has now become a norm for individuals to snap photographs of their foods during mealtime and subsequently to share these images on SMPs [8]. The camera feature integrated into mobile devices enables people to share food-related content easily [9, 10]. In this digitised era, sharing food-related photography on SMPs has become a routine part of daily life [11-13]. According to Statista [14], 82% of Generation Z reported enjoying food-related content on SMPs in 2021. SMPs like Instagram, TikTok, and Snapchat are crucial in providing food-related inspiration for Generation Z. Meanwhile, familiar food-related topics include sensory food experiences, pantry organisation tips, and the Mukbang series. Moreover, hashtags are always incorporated into the content shared as they enable content to be found by a broader social network beyond the immediate

followers of a user [15].

The prevalence of food-related hashtags is also rising over time [16]. According to Heidorn [16], the most frequently used hashtags are #foodporn, #foodie, and #foodies, with over 291 million, 223 million, and 41 million posts, respectively. The number of posts reflects a significant online presence of food-related content. Besides, among the food-related hashtags, #food4less, #foodasmr, and #foodhealthy had the highest monthly search, with over 862,000, 471,000, and 386,000 times of searches, respectively. The consumption of food turns inherently visual, and the visual appeal of the food becomes crucial in influencing the eating desires and practices of others [17-19].

Concurrently, people are accustomed to acquiring information through SMPs. The information obtained enables people to develop initial awareness and mitigate potential uncertainties in making purchase decisions [4, 20]. In addition, the pervasive integration of digital technology into daily life has encouraged a massive volume of commentary and reflection [21]. Food is a human necessity, and the digital age has greatly influenced the discussion on food-related topics [15]. Diverse virtual platforms, including forums, blogs, social media, and mobile apps, have offered diverse portrayals of food-related activities. These platforms enable individuals to share their geolocation, rate restaurants, reveal dietary habits, participate in food activism, connect with communities, and even order food products [15]. According to Statista [14], aside from merely observing food-related content on SMPs and watching others eat, 70% of Generation Z is motivated to try the foods showcased on the platforms. Despite the growing significance of food-related behaviour and visual hunger on social media, the factors influencing these phenomena remain unclear. This study explores the factors that shape consumer engagement behaviours with their behavioural intentions toward food-related content and addiction to visual representations of food.

2.0 LITERATURE REVIEW

2.1.2 Visual hunger

Food consumption occurs beyond the need for energy fulfilment among populations. Sometimes, the proportion of food intake is motivated by psychological pleasure [22]. A common expression, "We eat first with our eye" by Apicius [23], implies that unappealing foods are normally not eaten. In addition, foods that exhibit discolouration, unusual shapes, or other odd features tend to be viewed with doubt [17, 18]. According to Spence, et al. [17], visual hunger is the innate drive to look at food. The phenomenon of this evolutionary adaptation suggests that human brains have learned to derive pleasure from observing food, possibly as a sign of consumption.

The trend of people interacting with visual food-related content began in the last 50 years with the widespread popularity of various culinary or cooking shows hosted by celebrity chefs [17, 24]. In the past, the discussion on food-related topics followed a top-down approach in which renowned experts provided instructions on cooking to the general public. However, SMPs have revolutionized the practice, enabling food enthusiasts to connect, share their culinary passions, and exchange information about gastronomic interests with like-minded individuals [25-27]. The food-related content shared on social media signifies a subtle cultural change and turns passive media users into active co-creators of content production [25]. Subsequently, the Mukbang, which originated from Korea, was introduced. Mukbang is a contemporary digital food trend where hosts broadcast themselves, eating substantial food while engaging with the viewers [28, 29]. Furthermore, platforms that facilitate content creation, like YouTube, which has always promoted the idea of self-broadcasting, have significantly broadened the possibilities for non-experts to participate in culinary demonstrations. Simultaneously, ordinary consumers have taken charge of restaurant reviewing through blogging sites and restaurant-ranking platforms [15].

The visual representations of foods, including aesthetically pleasing visual or verbal depictions, basically emphasise the qualities of the content itself that will evoke desire [15]. Existing studies have found that appealing food photography will influence people's eating behaviours [30, 31]. These visual contents of foods on SMPs affect consumers' daily lives, including their dietary choices and food preferences. Thus, examining communication and current food trends on social networks in digital food culture is crucial [32, 33].

2.1.3 Consumer engagement behaviour

Numerous studies focused on exploring consumer engagement behaviour have defined engagement behaviour as the action that goes beyond making purchases but is associated with behaviours stimulated by the motivational driver [34, 35]. Social media's interactional features have changed consumers from passive content viewers into engaged contributors [35, 36]. Consumers have become active participants who generate substantial content through online platforms along with respective engagement behaviours [36]. Furthermore, prior literature has noted that engagement behaviour likely arises at diverse levels, ranging from low to high intensive engagement levels [36, 37]. According to Dolan, et al. [35], engagement behaviour encompasses consumers' activities, such as creating, contributing, or consuming content across different SMPs. Additionally,

the engagement behaviours are categorised into low, medium, and high levels based on whether users create, contribute to, or consume content [34, 36, 38].

According to Piehler, et al. [39], consumption behaviour is classified by engaging with brand-generated content or UGC without actively participating in or generating content oneself. Contribution behaviour represents a moderate level of engagement with content. On the other hand, creation behaviour signifies higher content involvement by actively generating and sharing content. Therefore, consumer engagement behaviour can be categorised into passive, active, and collaborative engagement according to the consumption, contribution, and creation behaviour proposed by Piehler, et al. [39].

2.1.4 Source attraction of food-related content and consumer engagement

Food photography has a more significant influence on food choices than its impact on food consumption [40]. The distinctive visual representation of the food reliably predicts the anticipated taste and consumption experience [41]. According to Andersson, et al. [42], the source attraction of appealing food photography is vital to foodie. In addition, the success of strange food-related shows on YouTube like Mukbang is primarily due to the source attraction, such as bringing the eating process in front of the audience with an exaggerated sensitive microphone to log the auditory effects of eating as the background sound is the fundamental attraction of the food shows [43, 44]. Consumers enjoy the unique and spectacular food-related content in the ongoing digital food culture [43].

Moreover, cookbooks and online food blogs use various mediums such as language, drawings, photographs, or videos to guide individuals in preparing food. All the food-related contents convey instructions by emphasising the sensory experiences and actions involved in the process. Additionally, these resources aim to inspire the audience to try the recipes by highlighting the anticipated sensual pleasures of the result [44]. Youtubers and other influencers on SMPs showcase food-related content on their channels and cultivate connections with audiences. Some influencers intended to boast audience sizes comparable to those of traditional media. Today, the consumption of UGC and food-related content among audiences is rising [45, 46]. People are also encouraged to produce and display unique food-related content [43]. Based on the literature, the study posited that the growing prevalence of food-related content with source attraction possesses the potential to captivate passive, active and collaborative engagement from consumers. Thus, these hypotheses H1, H2 and H3 were developed:

H1: Source attraction of food-related content directly impacts passive consumer engagement.

H2: Source attraction of food-related content directly impacts active consumer engagement.

H3: Source attraction of food-related content directly impacts collaborative consumer engagement.

2.1.5 Source credibility of food-related content and consumer engagement

In online settings, the reliability of sources is crucial. It minimizes ambiguity and fosters confidence in the information provided, potentially influencing decision-making processes [47, 48]. In addition, source credibility is significant due to the vast amount of information available through online and offline channels [49, 50]. Ohanian [51] stated that source credibility is a construct with three dimensions, incorporating elements from prior studies such as trustworthiness, expertise, and attractiveness. Source credibility refers to two key aspects, which are the perceived competence of an information source to provide accurate content and its perceived willingness to communicate honestly and impartially. In essence, it measures the degree to which the recipient of information trusts the sender's reliability and intentions [52, 53].

Furthermore, existing studies have found that source credibility is an external cue to influence individual attitudes [54, 55]. Lee, et al. [48] discovered a correlation between the trustworthiness of a source, the scalability of hashtags, and the usefulness of information. The greater utility in food-related content correlates with a higher likelihood of adoption. The growing popularity of Instagram as an information source correlates with increased engagement with food-related content and a higher likelihood of users sharing this information. Moreover, Wai Lai and Liu [56] revealed that the interplay between user engagement on social media and the perceived likability of the content influences content credibility in mobile social networks. Therefore, this study proposed that the source credibility of food-related content has the potential to engage passive, active and collaborative participation among consumers. Consequently, hypotheses H4, H5, and H6 were formulated:

H4: Source credibility of food-related content directly impacts passive consumer engagement.

H5: Source credibility of food-related content directly impacts active consumer engagement.

H6: Source credibility of food-related content directly impacts collaborative consumer engagement.

2.1.6 Source popularity of food-related content and consumer engagement

The popularity of an information source is frequently gauged by its total follower count and "Like" metrics.

These indicators suggest widespread community engagement and broad support for the source of content [48]. Establishing a sense of popularity or likability of online content in SMPs has been consistently recognised as crucial [57, 58]. Against the scenario, prior studies have evaluated the popularity of a source based on a metric or a combination of metrics that can effectively indicate the level of attention the item gained from users within a specific time frame [58, 59].

Based on existing studies, the source popularity typically correlates with several crucial factors. Which are the cumulative number of likes and comments received, the size of its follower base, and how often it is referenced by other users [60-62]. The prevailing social influences on SMPs arise from the source popularity, indicating the widespread approval, acceptance, or preference for a UGC [48]. Hence, this study posited that the source popularity of food-related content can effectively stimulate passive, active, and collaborative consumer engagement. As a such H7, H8, and H9 were developed:

H7: Source popularity of food-related content directly impacts passive consumer engagement.

H8: Source popularity of food-related content directly impacts active consumer engagement.

H9: The source popularity of food-related content directly impacts collaborative consumer engagement.

2.1.7 Source usefulness of food-related content and consumer engagement

The source usefulness of content is very crucial for content sharing on SMPs as it might influence the consumer's beliefs and purchase behaviour [63, 64]. Salamah et al. (2022) state that source usefulness is determined by its reliability, value, and accuracy in providing information to users. The source's usefulness can assist users in decision-making and achieving advancement in their goals [64]. Furthermore, existing literature has validated the implication of content usefulness as a key factor in determining an individual's likelihood of adopting information [65-67]. In addition, Lee, et al. [48] found that the probability of embracing food-related content rises in correlation with its increases in perceived usefulness. As SMPs become increasingly popular for sharing information, there is a growing trend of users posting food-related content on Instagram. Therefore, this study proposed that the source usefulness of food-related content will enhance passive, active, and collaborative engagement among consumers on SMPs. Consequently, hypotheses H10, H11, and H12 were formulated.

H10: The source usefulness of food-related content directly impacts passive consumer engagement.

H11: The source usefulness of food-related content directly impacts active consumer engagement.

H12: The source usefulness of food-related content directly impacts collaborative consumer engagement.

2.1.8 Consumer engagement and food-related behavioural intention

Users generate social media content by contributing, commenting, and liking the content created on SMPs. The reactions of sharing, commenting, and liking a post foster engagement and interaction among other members [38]. Engagement ranges from simple interactions like "liking" a Facebook page to more involved activities depending on consumers' participation in co-creation, like writing reviews and sharing them with other users [35, 37]. Furthermore, co-creation behaviour usually happens spontaneously, including offering suggestions to improve the overall consumption experience, giving support to service providers, and helping fellow customers make more informed consumption decisions [34].

Additionally, previous studies found that individuals who watched food-related content like Mukbang ate something simultaneously [68]. According to Styawan and Buwana [69], food-related content on YouTube, such as Mukbang, holds a strong appeal and has the potential to stimulate increased appetite. Hence, this study posited that passive, active, and collaborative consumer engagement would lead to food-related behavioural intentions. Subsequently, H13, H14 and H15 were formulated:

H13: Passive consumer engagement on food-related content directly impacts food behavioural intention.

H14: Active consumer engagement on food-related content directly impacts food behavioural intention.

H15: Collaborative consumer engagement on food-related content directly impacts food behavioural intention.

2.1.9 Consumer engagement and visual addiction towards food-related content

The advancement features of SMPs have generated a significant change in online consumer behaviour, fundamentally reshaping how customers engage with each other and the communities [35, 37]. The act of seeking information on SMPs fosters engagement behaviour within virtual communities. Moreover, easily accessible information on SMPs stimulates consumers' consumption, contribution, and creation behaviours [39, 70, 71].

According to Phillipov [72], food photography is observed and consumed. By interacting with food photography, eating has transformed. Food photography alters food's texture and essence, ultimately reshaping

the material value of food. Additionally, with the rapid expansion of digital media in recent decades, the accessibility to digital screens has become ubiquitous in daily life. Nowadays, tools such as Photoshop and platforms like Instagram are available, and users can effortlessly enhance the quality of images taken. These advancements have led to a surge in consumers' exposure to digital food images. Meanwhile, there has been a dramatic increase in the public's obsession to photograph and share images of their meals on various SMPs [17, 73].

Furthermore, food-related content such as Mukbang has gained significant popularity, especially among young people. This phenomenon is predominantly observed on SMPs and has captivated the attention of many viewers. This global eating trend has become addictive for those following such videos [68]. Therefore, this study proposed that passive, active, and collaborative consumer engagement would lead to visual addiction to food-related content. Consequently, hypotheses H16, H17, and H18 were developed:

H16: Passive consumer engagement on food-related content directly impacts visual addiction.

H17: Active consumer engagement in food-related content directly impacts visual addiction.

H18: Collaborative consumer engagement on food-related directly impacts visual addiction.

2.2 METHODOLOGY

This survey study's data was gathered through an online questionnaire hosted on Google Forms, which was disseminated across various digital channels, including SMPs and email networks. The current study utilises purposive sampling to ensure a targeted and representative distribution. As part of purposive sampling, screening questions were employed to identify respondents who are both social media users and interested in food-related content on SMPs. The survey began with a consent statement, which informed participants that their personal information would be used solely for research purposes and guaranteed confidentiality. Following the consent statement, the survey proceeded to gather data on the study's variables through a series of measurement items, as well as collect demographic information about the respondents.

The survey instrument was designed to measure the following variables: source attraction, source credibility, source popularity, source usefulness, passive engagement, active engagement, collaborative engagement, behavioural intention, and visual addiction. A six-point Likert Scale was used to measure the items ranging from 1 strongly disagree to 6 strongly agree. Items for source attraction were modified from Leong, et al. [74]. Moreover, the items for measuring source credibility were adapted from Ohanian [51] and Kim and Johnson [75]. Furthermore, the items of source usefulness were modified according to scales suggested by Kim and Johnson [75] and Lee, et al. [48]. Meanwhile, the items of source popularity were adapted from Lee, et al. [48]. In addition, the study categorises engagement behaviour into three types: passive engagement (consumption response), active engagement (contribution response), and collaborative engagement (creation response). The measurement items were adapted from Piehler, et al. [39]. In addition, the items of food-related behavioural intention were adapted from Lee and Ma [76] and Lee, et al. [48]. Ultimately, items of visual addiction were modified by Noor, et al. [77].

The study utilised partial least square (PLS) modelling, specifically SmartPLS version 4 [78], to evaluate the measurement and structural model. Given that survey data often deviate from normality [79], PLS is an appropriate choice as it does not require normality assumptions. The measurement model was evaluated to determine the validity and reliability of the instrument, adhering to the guidelines established by Hair, et al. [80] and Ramayah, et al. [81]. A structural model was subsequently constructed to facilitate the testing of the study's hypotheses.

3.0 RESULTS

The ultimate dataset used for data analysis included 350 participants, including 196 women (56%) and 154 men (44%). The majority of participants (45.4%) fell within the 20-23 age bracket. In terms of educational background, a significant proportion of respondents (69.4%) held a Bachelor's degree as their highest level of educational attainment. In terms of annual earnings, most survey participants indicated yearly earnings ranging from RM20,000 to RM100,000, with 34.6% earning below RM20,000, 12% earning between RM71,000 and RM100,000, and 16.9% earning between RM20,000 and RM35,000. Conversely, a minority of respondents reported higher incomes, with just 2% earning above RM1 million. Amongst the respondents, 31.7% spend between RM 50 and RM 100 monthly on internet subscriptions, followed by 28.9% spending less than RM 50 a month. Moreover, most respondents (34.6%) spend between 5 to 7 hours online daily.

The issue of Common Method Bias (CMB) was addressed by applying the method proposed by Kock [82] through full collinearity testing. The method entails regressing all variables against a shared variable and assessing Variance Inflation Factors (VIFs). A VIF of (≤ 5.0) indicates no significant bias restricting from a single data source. The results showed that all VIF values were below the threshold of 5.0, suggesting that the

data are not substantially affected by single-source bias.

Besides, the measurement model was evaluated per the individual loadings, Cronbach's alpha (α), average variance extracted (AVE), and composite reliability (CR). The values of loadings should be (≥ 0.5), the AVE should be (≥ 0.5), and the CR should be (≥ 0.7). As presented in Table 1, the results indicate that the AVE values exceeded the recommended threshold of 0.5, and the CR values surpassed the threshold of 0.7. Furthermore, the individual item loadings were strong, with all factor loadings exceeding 0.7, and the α values also exceeded 0.7, demonstrating acceptable convergent validity and reliability [80]. The measurement model exhibited robust reliability, with satisfactory results at both the individual item and overall construct levels.

Table 1. Construct reliability and validity

Variable	Item	Loading	α	CR	AVE
Sources Attraction (SA)	Visual Features of UGC image:				
	SA1: Tastiness	0.740	0.907	0.923	0.572
	SA2: Filling	0.780			
	SA3: Delicious	0.753			
	SA4: Tempting	0.736			
	SA6: Authentic	0.755			
	SA7: Special Flavours	0.749			
	SA8: Visually Attractive.	0.724			
	SA9: Appealing	0.785			
	SA10: Mastery	0.781			
Sources Credibility (SC)	Perception of people posting the information [e.g., blogger, influencer, page/portal/platform/]				
	SC1: Valuable	0.774	0.900	0.921	0.627
	SC2: Informative	0.789			
	SC3: Reliable	0.783			
	SC4: Honest	0.811			
	SC5: Trustworthy	0.825			
	SC6: An expert	0.737			
	SC7: Experienced	0.817			
Sources Popularity (SP)	SP1: The posts from this source have lots of "Likes."	0.776	0.852	0.894	0.627
	SP2: Others duplicate the posts from this source.	0.765			
	SP3: This source of food content has numerous updated content.	0.813			
	SP4: Many SMP users like the re-posts of food content.	0.82			
	SP5: The source of food content has a multitude of newest content.	0.784			
Sources Usefulness (SU)	SU1: The postings create a positive atmosphere regarding the food	0.822	0.834	0.889	0.667
	SU2: The postings create positive emotions about the food	0.804			
	SU3: The food content made it easier for me to make a decision (e.g., purchase, visit, etc.)	0.84			
	SU4: The food content helped me make a purchase decision effectively.	0.801			
Passive Engagement (PE)	PE1: I often read posts on food-related UGC.	0.816	0.859	0.899	0.64
	PE2: I often watch videos on food-related UGC.	0.820			
	PE3: I often view pictures of the food-related UGC.	0.777			

	PE4: Read the comments of the food-related UGC.	0.813			
	PE5: I often saved the post for my own use.	0.772			
Active Engagement (AE)	AE1: I often "like" food-related UGC posts.	0.721	0.852	0.894	0.629
	AE2: I often comment on food-related UGC posts.	0.809			
	AE3: I often comment on other followers' comments on food-related UGC posts.	0.774			
	AE4: I often share the food-related UGC pages with my social media circles.	0.805			
	AE5: I often repost the food-related UGC pages in my timeline.	0.851			
Collabrative Engagement (CE)	CE1: I often write posts on the food-related UGC.	0.862	0.897	0.923	0.707
	CE2: I often upload pictures on the food-related UGC.	0.864			
	CE3: I often upload videos on the food-related UGC.	0.840			
	CE4: I "talk up" about the UGC from this source with friends and acquaintances.	0.822			
	CE5: I bring up UGC from this source positively in conversations with friends and acquaintances.	0.816			
Visual Addiction (VA)	VA1: I watched food/cooking videos despite not wanting to.	0.913	0.920	0.943	0.806
	VA3: I needed to watch the food posting to feel at ease.	0.917			
	VA4: I feel happy when watching the food posting.	0.863			
	VA5: I tried to cut down the time spent watching food posts.	0.897			
Food Behavioural Intention (FBI)	FBI1: I intend to try the food/recipe posted by UGC.	0.838	0.880	0.913	0.676
	FBI2: If I have time, I plan to try the food/ recipe posted by the UGC.	0.812			
	FBI3: I predict I will try the food/ recipe the UGC posted soon.	0.805			
	FBI4: The UGC food posting helped me make a purchase decision effectively.	0.824			
	FBI5: The UGC food posting enhanced my effectiveness in making purchase decisions.	0.832			

Discriminant validity was assessed using the HTMT criterion proposed by Henseler, et al. [83] and refined by Franke and Sarstedt [84]. According to this criterion, HTMT values should not exceed 0.85 for the stricter criterion and 0.90 for the more lenient criterion. Table 2 displays the HTMT values, all below the stricter threshold of 0.85. Consequently, it can be inferred that respondents perceived the nine constructs as distinct. The test result demonstrated the validity and reliability of the measurement items.

Table 2. Heterotrait-Monotrait Ratio (HTMT)

	AE	FBI	CE	PE	SA	SC	SP	SU	VA
Active Engagement (AE)									
Food Behavioural Intention (FBI)	0.734								
Collabrative Engagement (CE)	0.840	0.655							
Passive Engagement (PE)	0.850	0.843	0.734						
Sources Attraction (SA)	0.508	0.604	0.386	0.695					
Sources Credibility (SC)	0.645	0.715	0.508	0.741	0.763				
Sources Popularity (SP)	0.649	0.763	0.519	0.807	0.768	0.812			
Sources Usefulness (SU)	0.652	0.678	0.507	0.748	0.775	0.843	0.848		
Visual Addiction (VA)	0.425	0.459	0.581	0.374	0.231	0.304	0.312	0.315	

3.1 Structural model

As Hair, et al. [80] and Cain, et al. [85] suggested, the study also assessed the multivariate skewness and kurtosis. The results showed that the data collected was not multivariate normal, as evidenced by significant values for Mardia's multivariate skewness ($\beta = 22.479$, $p < 0.01$) and Mardia's multivariate kurtosis ($\beta = 150.278$, $p < 0.01$). Consequently, following the guidelines of Becker, et al. [86], the structural model's path coefficients, standard errors, t-values, and p-values were derived using a 10,000-sample re-sample bootstrapping approach [81]. Additionally, Hahn and Ang [87] argued that the p-value is not a good criterion for testing the hypothesis's significance and suggested using a combination of criteria such as p-values, confidence intervals, and effect sizes. Table 3 summarises the criteria utilised for hypothesis testing in this study.

Table 3. Structural model of path analysis

Relationship	Std. Beta	Std. Dev.	t-value	p-value	f^2
H1: Sources Attraction (SA) → Passive Engagement (PE)	0.149	0.066	2.255	0.012**	0.154
H2: Sources Attraction (SA) → Active Engagement (AE)	-0.021	0.077	0.275	0.392	0.479
H3: Sources Attraction (SA) → Collabrative Engagement (CE)	-0.051	0.085	0.597	0.275	0.417
H4: Sources Credibility (SC) → Passive Engagement (PE)	0.204	0.080	2.544	0.005**	0.114
H5: Sources Credibility (SC) → Active Engagement	0.260	0.096	2.720	0.003**	0.102
H6: Sources Credibility (SC) → Collaborative Engagement	0.223	0.097	2.306	0.011**	0.142
H7: Sources Popularity (SP) → Passive Engagement (PE)	0.351	0.073	4.789	0.001***	0.014
H8: Sources Popularity (SP) → Active Engagement (AE)	0.250	0.087	2.870	0.002**	0.106
H9: Sources Popularity (SP) → Collaborative Engagement (CE)	0.225	0.077	2.929	0.002**	0.090
H10: Sources Usefulness (SU) → Passive Engagement (PE)	0.135	0.090	1.504	0.066	0.267
H11: Sources Usefulness (SU) → Active Engagement (AE)	0.208	0.093	2.227	0.013**	0.186
H12: Sources Usefulness (SU) → Collaborative Engagement (CE)	0.156	0.100	1.554	0.060	0.261
H13: Passive Engagement (PE) → Behavioral Intention (BI)	0.536	0.069	7.737	0.001***	0.000
H14: Active Engagement → Behavioral Intention (BI)	0.170	0.087	1.956	0.025*	0.199
H15: Collaborative Engagement (CE)→ Behavioral Intention (BI)	0.117	0.063	1.856	0.032*	0.206
H16: Passive Engagement (PE) → Visual Addiction (VA)	-0.010	0.061	0.169	0.433	0.492
H17: Active Engagement → Visual Addiction (VA)	-0.012	0.068	0.174	0.431	0.491
H18: Collabrative Engagement → Visual	0.552	0.059	9.417	0.001**	0.001

Addiction (VA)					

Notes: Significant at * $p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Table 3 reveals that hypotheses source popularity ($\beta = 0.351$, $p < 0.01$), passive engagement ($\beta = 0.536$, $p < 0.01$), and collaborative engagement ($\beta = 0.552$, $p < 0.01$) were positively associated with passive engagement, behavioral intention, and visual addiction, respectively. Consequently, H7, H13, and H18 were supported with statistical significant. Subsequently, source attraction ($\beta = 0.149$, $p = 0.012$) and source credibility ($\beta = 0.204$, $p = 0.005$) were positively related to passive engagement with f^2 greater than 0.02. According to Cohen [88], the f^2 value must exceed 0.02 to indicate the effect size in the relationship. Thus, H1 and H4 were supported. In addition, source credibility ($\beta = 0.260$, $p = 0.003$), source popularity ($\beta = 0.250$, $p = 0.002$), and source usefulness ($\beta = 0.208$, $p = 0.013$) positively affected the active engagement with f^2 exceeding 0.02. Therefore, H5, H8, and H11 were supported. Meanwhile, source credibility ($\beta = 0.223$, $p = 0.011$, $f^2 = 0.142$) and source popularity ($\beta = 0.225$, $p = 0.002$, $f^2 = 0.090$) were associated with collaborative engagement positively, and H6 and H9 were supported. Besides, active engagement ($\beta = 0.170$, $p = 0.025$, $f^2 = 0.199$) and collaborative engagement ($\beta = 0.117$, $p = 0.032$, $f^2 = 0.206$) were positively associated with behavioural intention. Thus, H14 and H15 were supported. However, H2, H3, H10, H12, H16 and H17 were not supported due to the insignificant p-values and confidence intervals (See Table 3).

In this study, the R^2 value was calculated to assess the predictive relevance of the theoretical model. Hair, et al. [80] accordingly categorised R^2 values of 0.25, 0.50, and 0.75 as indicating weak, moderate, and substantial predictive power. Meanwhile, according to Falk and Miller [89], R^2 values exceeding 0.10 are sufficient for an endogenous construct to explain the variance adequately. Table 3 presents the path coefficients and t-values of the constructs. Figure 1(a) reveals the R^2 value for the constructs. The R^2 for passive engagement was approximately 0.556, which indicates that 55.6% of the variance in passive engagement could be explained by integrating source attraction, source credibility, source popularity, and source usefulness within the model.

Furthermore, the R^2 value for active engagement (0.399) indicates that active engagement can explain 39.9% of the variance for the same constructs within the model. The relationships between source attraction, source credibility, source popularity, and source usefulness with collaborative engagement yielded an R^2 value of 0.258, which can explain 25.8% of the variance in collaborative engagement. Moreover, when considering the effects of active engagement, passive engagement, and collaborative engagement on behavioural intention, the model demonstrates an R^2 value of 0.573; this suggests that approximately 57.3% of the variance in behavioural intention can be attributed to these engagement types. The model also shows that active, passive, and collaborative engagement can explain around 28.8% of the variance in visual addiction, with an R^2 value of 0.288.

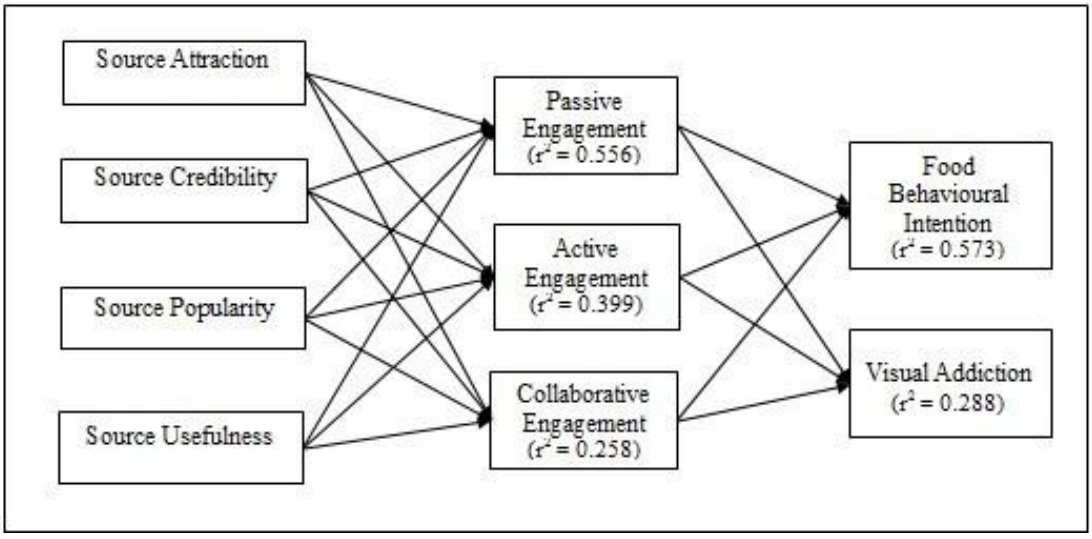

Figure 1(a) Structural model

Cross-validated redundancy (Q2) was also assessed in this study to evaluate the predicted relevancy using the SmartPLS version 4 software via blindfolding. Based on Fornell and Cha [90], the Q2 values must be greater than zero (0) to determine whether the model possessed considerable predictive power. The Q2 values for passive engagement, active engagement, collaborative engagement, behavioural intention, and visual addiction are 0.349, 0.235, 0.172, 0.382, and 0.223, respectively. All Q2 values exceeded 0, indicating the model

possessed adequate predictive significance.

Following the recommendations of Shmueli, et al. [91], the PLSpredict methodology was implemented. The approach utilised a holdout sample-based procedure to generate case-level predictions at the item or construct level. Employed a 10-fold procedure, PLS-Predict was analysed to assess the predictive relevance. Additionally, Shmueli, et al. [91] proposed that if the discrepancies among items (PLS-LM) are consistently lower, it indicates a high predictive power. Based on results, all errors associated with the PLS model were lower than those of the LM model. Consequently, it can be asserted that the model exhibits a strong predictive power.

4.0 DISCUSSION

The study examined the relationships between source attraction, source credibility, source popularity, and source usefulness of food-related content on passive engagement, active engagement, collaborative engagement, food-related behavioural intention, and visual addiction. The source attraction, source credibility, and source popularity of food-related content positively impacted the passive engagement from consumers. Aligned with Bauman [92] and Allen [93], people are obsessed with watching other cooking via virtual platforms and enjoy viewing aesthetic food-related content. Furthermore, the finding is consistent with prior research, indicating that content credibility can increase consumer engagement [56]. In addition, the popularity of content influences the passive engagement of consumers, such as viewing or reading food-related content. The result of this study supports the findings of Chang, et al. [94]. However, the relationship between source usefulness and passive engagement was insignificant, which is inconsistent with the findings of Lee, et al. [48]. The result implies that people view or watch the food-related content regardless of the source's usefulness.

Nevertheless, the result indicates that content credibility will lead to more consumer engagement in content likability. The finding supports the findings of Wai Lai and Liu [56]. The study reveals that the popularity of a content source is positively associated with increased engagement behaviour. This finding aligns with previous studies indicating that content with more likes tends to attract greater attention and is more prone to be shared [95]. Furthermore, consistent with previous studies, the source usefulness of food-related content tends to increase the probability of its adoption. As the dissemination of information on SMPs grows, so does the propensity for continuous engagement with food-related content on the platform and the inclination to share such information [48]. However, the result indicates that the source attraction of food-related content alone does not significantly impact consumer engagement. Visual attractiveness does not appear to be the primary driver for people to interact with, such as liking, commenting on, or sharing food-related content.

Additionally, source credibility and popularity were found to be positively correlated with collaborative engagement as passive and active consumer engagement. The impacts of source credibility and popularity outweighed other factors in eliciting responses for food-related content creation, whether in the form of writing posts or uploading content [39]. On the other hand, source attraction and source usefulness do not positively contribute to collaborative engagement. While a source may be appealing or useful, its presence does not necessarily enhance collaborative engagement among individuals or groups.

Furthermore, the finding demonstrates that active and collaborative engagement positively influenced food-related behavioural intentions such as the intention to try recipes, predictions of trying new foods, providing recommendations to social circles, and the impact on decision-making processes related to purchasing or visiting food restaurants [48, 76]. Conversely, based on the findings, passive engagement in reading and viewing food-related content is not convincing enough to drive behavioural intentions.

Regarding food visual addiction, collaborative engagement was discovered to have a positive impact on behaviours such as persistent thoughts about food postings even while concentrating on other tasks, feeling distressed when unable to cease thoughts about food content, compulsively watching food or cooking videos, feeling a need to view food postings for comfort, deriving happiness from consuming such content, and making efforts to decrease time spent on posting and consuming food-related content [17, 77]. However, it is noteworthy that food visual addiction is not significantly influenced by passive engagement, like simply observing content without active interaction or active engagement alone.

5.0 IMPLICATION

The findings of this study offer valuable insights for practitioners, marketers, platform managers, policymakers, and content creators in the food industry for food-related content creation and consumption. The implications derived from the relationships between source attraction, credibility, source popularity, source usefulness, and various forms of consumer engagement can inform strategic decisions and initiatives to optimise user experiences and achieve desired outcomes.

Establishing and maintaining source credibility is crucial in driving consumer engagement. Content creators should prioritise accuracy, reliability, and transparency to foster trust and enhance consumer likability [56]. Content creators or marketers can leverage the source popularity of food-related content to amplify reach and

engagement [48, 95]. Moreover, the findings suggest a need for creators to align food-related content with trending topics or formats that resonate with the target audience. Additionally, respective platform managers should recognise the significance of collaborative engagement in fostering meaningful user interactions [39]. Implementing features that facilitate collaboration, such as group discussions or collaborative content creation platforms, can enhance user satisfaction and retention. Moreover, emphasising source credibility by displaying credible content can empower users to make informed decisions about the content they consume [54, 55].

Additionally, marketers should prioritise strategies to encourage active consumer participation and collaboration. For instance, interactive campaigns, food-related UGC initiatives, and community engagement efforts can drive deeper connections and increase brand loyalty. Marketers should leverage visual appeal with source attraction to capture attention and enhance the appeal of food-related content [48, 54]. In addition, platform developers and content creators should be mindful of the potential for food visual addiction and take proactive measures to motivate engagement. Meanwhile, policymakers can establish regulations and standards for content creators and platform developers to ensure the accuracy, reliability, and ethical dissemination of food-related content. Additionally, governments can collaborate with industry stakeholders, including content creators, platform developers, and consumer groups, to develop voluntary guidelines and best practices for responsible content creation and consumption.

6.0 CONCLUSION

The proliferation of digital platforms has transformed how consumers engage with food-related content, offering extraordinary opportunities for interaction, collaboration, and consumption. This study has illustrated the complex relationships between source attraction, source credibility, source popularity, source usefulness, and various forms of consumer engagement with food-related content, as well as the impact on food-related behavioural intentions and visual addiction. In summary, this study offers valuable insights for marketers, content creators, and policymakers, revealing the complex relationships between sources of content attributes, consumer engagement, behavioural intentions, and addictive behaviours within the digital food culture. Examining these dynamics is essential for formulating responsible and ethical strategies to engage consumers effectively within the digital food culture, which encompasses creating and consuming food-related content.

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