

# The Impact of Perceived Complementarity on Customer Value and Satisfaction in Mobile Food-Ordering Apps

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Perceived complementarity

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## Abstract

This study addresses the gap in research regarding the influence of perceived complementarity on customers' perception of value and satisfaction with mobile food ordering apps. By integrating network effect theory, customer value, and expectancy confirmation theory, a conceptual model is proposed and tested to investigate how the perceived complementarity of mobile food ordering apps affects customers' perception of value, specifically hedonic and utilitarian value, and how these factors, along with perceived complementarity, impact customer satisfaction. Data was collected from 385 customers who had previously used food-ordering apps online in Gauteng province, South Africa. Structural equation modelling using SmartPLS software was applied for data analysis.

The results reveal a negative impact of hedonic value on customer satisfaction with mobile food ordering apps. Conversely, a significant and positive relationship is found between perceived complementarity and both hedonic value and utilitarian value. Moreover, perceived complementarity and utilitarian value significantly and positively influence customer satisfaction with the apps. These findings emphasise the importance of perceived complementarity in the context of food-ordering apps. The implications of the study's findings for improving customer satisfaction with the use of mobile food ordering apps are discussed.

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# 1. Introduction

With the advent of online-to-offline mobile tech, food-ordering apps have revitalized the hospitality industry, particularly restaurants and other fast-food outlets worldwide (Dirsehan & Cankat, 2021). Food ordering apps refer to mobile applications and services that facilitate online ordering and offline delivery of food (Muangmee, Kot, Meekaewkunchorn, Kassakorn & Khalid, 2021). Such apps have enabled consumers to access multiple eateries of their choice in real-time with unprecedented ease and convenience (Ramos, 2022; Shah, Yan & Qayyum, 2021). Research has shown that restaurants or other fast-food outlets have adopted the use of mobile commerce applications to attract and maintain customer relationships in the intense market competition (Alalwan, 2020). Chen, Hsu and Wu (2012) point out that consumer adoption plays a crucial role in determining the success of mobile applications.

In today's competitive landscape, consumers are now familiar with food-ordering apps. Therefore, restaurants face the challenge of attracting consumers' attention by only emphasizing the convenience of food ordering apps. Okumus, Bilgihan and Ozturk (2018) and Alalwan (2020) believe that mobile applications must have a high degree of flexibility and incorporate distinctive features that allow users to navigate quickly. This level of flexibility is important in preventing unnecessary exhaustion or confusion that can negatively affect users' performance. Hanafiah and Che Shalifullizam (2023) argue that improving apps by adding features may augment their key functions such as convenience and access to multiple restaurants or other fast-food outlets. It is further explained that such an approach is aligned with complementarity services, which refers to app users' perceptions of the resemblance between an added product or services to the core brand of an app in satisfying their needs (Tseng & Lee, 2018). According to Li and Fang (2022) perceived complementarity is one the most important elements of indirect network externalities representing the accessibility of applications or functions that can enhance product or service performance. The prior study by Lin and Lu (2011) pointed out that in the context of network externalities, the perceived value of specific information technology has an impact on the adoption rate and level of customer satisfaction.

Following is the structure of the remaining part of the paper. The following section summarizes the study's problem statement, research objectives, literature review, hypothesis, conceptual research model and the relationship between constructs. This section is followed by a discussion of the study's methodology. Afterward, the data analysis and results, the discussions and the implications are discussed. Finally, the conclusion and recommendations for future research are outlined.

## 1.1. Problem Statement

The concept of mobile food-ordering apps has been a trending topic of research for the demi-decade worldwide. However, a number of previous studies were focused on the factors affecting the adoption and acceptance and continued usage (Alalwan, 2020; Okumus *et al.*, 2018; Shen, 2015; Carter & Yeo,

2016) of such technological innovation ignoring the unique contribution that perceived complementarity may offer. Perceived complementarity is becoming a highly impactful factor and little research has explored its influence on customer shopping value and satisfaction with food-ordering apps. Based on prior studies, perceived complementarity has attracted the attention of scholars in the context of banking (Kuo, 2020), tourism and hospitality (Beerli-Palacio, Martin-Santana & Román-Montoya, 2020; Mahmoud & Abdel Rady, 2020) and telecommunication (Cheng, Lee & Choi, 2019; Zhang, Li, Wu & Li, 2017) in developing countries such as America and China. However, perceived complementarity is yet to be studied in the context of mobile food ordering apps, especially in the South African market. Food ordering apps, providing complementarity services will enhance ordering frequency, customer value and the level of user satisfaction to serve as a competitive advantage. Therefore, this research is intended to fill this gap by integrating the concept of perceived complementarity into the framework of perceived shopping to examine how it impacts utilitarian value, hedonic value and customer satisfaction in the context of mobile food-ordering apps. This study further analysed the influence of utilitarian and hedonic value on mobile food-ordering app user satisfaction.

## **1.2. Research objectives**

The aim of this study is to examine the impact of perceived complementarity on customer value and satisfaction in mobile food-ordering apps. In order to accomplish the aforementioned aim, the following objectives are set:

- To examine the impact of hedonic value on users of food-ordering app level of satisfaction.
- To assess the influence of perceived complementarity on hedonic value.
- To analyse the impact of perceived complementarity on users of food-ordering app level of satisfaction.
- To examine the impact of perceived complementarity on utilitarian value.
- To examine the impact of utilitarian value on users of food-ordering app level of satisfaction.

## **2. Literature Review**

Detailed theoretical background is provided in this section, along with a discussion of the relationship between the constructs in the study.

### **2.1. Theoretical background**

This study is grounded on the network effect theory which is integrated with the perceived customer value and expectancy confirmation theory. According to Verhoef, Broekhuizen, Bart, Bhattacharya, Dong, Fabian and Haenlein (2021) the network effect theory states that technological value creation is determined by the number of complementary services that ultimately influence consumers' reactions and behaviour. It further explained that innovative technology adoption is adversely affected by direct and indirect network externalities (Li & Fang, 2022). Indirect network externalities are linked to complementary services or products, whereas direct externalities depend on the number of network

consumers (Chiu, Cheng, Huang & Chen, 2013; Song, Xue, Rai & Zhang, 2018). Network externalities suggest that IT value or benefits increase as complementary products or services are introduced (Lin & Bhattacharjee, 2008). Li and Fang (2022) state that perceived complementarity pertains to the relative accessibility of applications and functions.

‘Customer value’ has a theoretical basis in customer-value expectancy theory (Woodruff, 1997). According to this theory, desired value directly influences customers’ perceptions of received value and comparison standards for consequence attributes. Furthermore, the value received may lead directly to overall satisfaction or to disconfirmation of consequences and attributes. Lastly, comparison standards for consequence attributes are proposed to influence only disconfirmation on consequence and attributes. The basic principle of this customer-value expectancy theory is to illustrate the importance of understanding how consumers pursue different goals when shopping, that what they perceive as ‘value’ varies, and the possible outcomes after consumption in a dynamic competitive market (Woodruff, 1997). Prior scholars such as Zeithaml (1988) and Day (1990) defined ‘customer value’ as the difference between the perceived benefits and sacrifices from customers. However, Junaid, Hussain, Akram, Asghar, Zafar and Hou (2020) argue that ‘customers’ perceived value’ is a subjective construct that differs for generations of value-driven customers around the world.

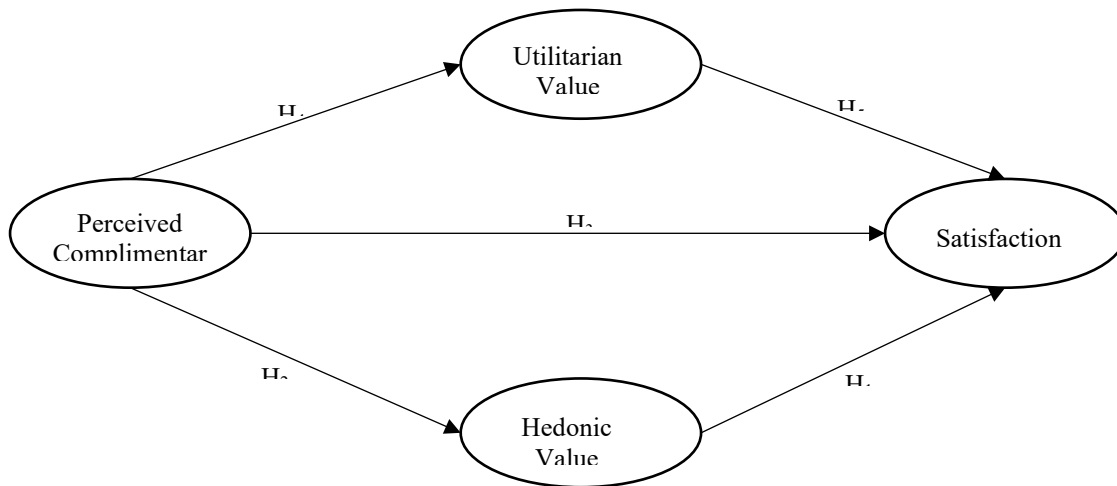
Customer-value expectancy theory has been adopted in several previous studies to predict consumer behaviour in different industries. In a study conducted by Hapsaria, Clemes and Deana (2016), it was revealed that Indonesian airline passengers who perceived the service they received to be of a high value were shown to have a high level of customer satisfaction. However, in the tourism industry, desired goals, such as special offers, are perceived to be important attributes that the tourist values and that are influential in making a final decision about the destination choice (Carvalho & Alves, 2023). The ability to provide reliable services by the personnel and after-sales service in the insurance sector for motor cars is a valuable function that is perceived to have an influence on overall customer satisfaction (Marcos & Coelho, 2022). In general, prioritising higher customer values leads to higher levels of satisfaction and possible long-term relationships with customers (Tzavlopoulos, Gotzamani, Andronikidis & Vassiliadis, 2019; Jessen, Hilken, Chylinski, Mahr, Heller, Keeling & de Ruyter, 2020).

## **2.2. Research Model and Relationship Between Constructs**

The proposed research model and the relationships between constructs are discussed in detail in the next section.

### **2.2.1. Research model**

In line with previous studies (Kim, Park, Park & Ahn, 2019; Mouakket & Sun, 2019; Zhang *et al.*, 2017), this study presents a conceptual model (Figure 1) depicting that perceived complementarity will have significant positive effects on utilitarian value, hedonic value, and user satisfaction with mobile food-ordering apps. Furthermore, the proposed research model suggests that hedonic and utilitarian values will positively affect user satisfaction with mobile food-ordering apps.



**Figure 1: Proposed research model**

### 2.2.2. Relationships between constructs

#### Hedonic value (HV)

The concept of hedonic value refers to the pleasurable experience and enjoyment from consuming a product or service, not the task completion (Cao, Foster, Yaoyuneyong & Krey, 2019; Chauhan, Banerjee, Chakraborty, Mittal, Shiva & Ravi, 2021). Sweeney and Soutar (2001) suggest that hedonic value results from gratifying consumption activity. According to Alnawas and Aburub (2016), hedonic value refers to the ability of mobile app technology to reward and relax users, lighten their moods and hold their attention, surprise them and provide fun while they are engaged, and encourage them to continue. Hedonic value for consumers ordering food via apps may include trying new and exciting culinary experiences, different food types or flavors, and enticing food imagery (Capito & Pergelova, 2023). Furthermore, the hedonic value is derived through interaction with others, sharing experiences and opinions about the overall enjoyment of the mobile food-ordering process (Lee & Wu, 2017).

Several researchers including Jin and Xu (2021), Poong, Yamaguchi and Takada (2017), as well as Zhang, Wang, Cao and Wang (2019) have demonstrated that the hedonic value, such as the pleasurable shopping experience through technology, positively influences customer satisfaction. Alnawas and Aburub (2016) investigated “the benefits of using mobile apps” and found that hedonic benefits such as fun experience and enlightened mood of using apps have a positive effect on user satisfaction. Similarly, the study of Chauhan *et al.* (2021) has revealed that hedonic value such as perceived excitement of using the app significantly affects consumer satisfaction. Several studies examining technology adoption have constantly revealed support for the positive relationship between hedonic value and satisfaction (Avcilar & Özsoy, 2015; Prebensen & Rosengren, 2016; Evelina, *et al.*, 2020). However, the study by Ampong *et al.* (2018) revealed that hedonic value does not significantly predict satisfaction, contrary to prior research findings.

### **Perceived complementarity (PCM)**

According to Loh, Lee & Leong (2022) perceived complementarity refers to “the value-added benefits that complement the main service, it thus serves to improve the overall usefulness of mobile apps”. Perceived complementarity is also described as the availability of added functions or applications to enhance the general functionality of technological applications (Chiu *et al.*, 2013; Hsu & Lin, 2016). Jain, Basu, Ray and Das (2023) are of the view that the presence of complementarity services is an important determinant affecting the perceived value of a product or service when evaluating its features and attributes. In addition, Wan, Zhao, Lu and Gupta (2017) concur that the availability of complementary services increases the appeal of mobile applications to users as it is perceived to provide more excellent value. Perceived complementarity is viewed as an impactful factor that drives consumers to adopt mobile apps (Li & Fang, 2019).

Park, Kwak, Lee and Ahn (2018) have analysed the influence of numerous characteristics that affect the adoption of smart technologies. Their results reported that product-related factors, including perceived complementarity, positively impact the perceived product benefit, which is the link to the perceived product value. In another study, Khare, Dixit and Sarkar (2020) reported a positive link between perceived complementarity and perceived shopping value. Specifically, prior research studies have explored the impact of perceived complementarity on perceived shopping value: utilitarian and hedonic value (Chunmei & Weijun, 2017; Sari & Ardiansari, 2019; Evelina, Kusumawati & Nimran, 2020). Perceived complementarity is found to have a significant effect on utilitarian and hedonic values (Pang, 2023).

The findings of such studies demonstrated that perceived complementarity impacts perceived utilitarian value in the context of mobile app platforms (Wu *et al.*, 2021; Xiong & Zuo, 2022). A study by Jain *et al.* (2023) confirmed that perceived complementarity and utilitarian value are related, particularly in task accomplishment and information access in e-commerce. It has been found that perceived complementarity positively affects utilitarian value, implying that when consumers are aware of how to obtain complementary services, their perception of efficiency and effectiveness is improved (Li, Fang & Sukoco, 2021). In addition, Hong, Cao and Wang (2017) found that complementary services significantly improve users' utilitarian value, thereby generating additional value.

Existing studies have confirmed the positive effect of perceived complementarity on hedonic value in the adoption and acceptance of technology (Ampong, Mensah, Boakye, Simpson, Ofori & Addae, 2018; Pal, Arpnikanondt & Razzaque, 2020). For instance, Sharma, Devi, Naidu, Greig, Singh & Slack (2023) uncovered that easy order customization, personalized recommendations, loyalty programs and easy and secure payment options could positively enhance the hedonic value. A recent study by Jain *et al.*

(2023) revealed that the presence of perceived complementarity positively impacts app users' perceptions of hedonic value.

Providing complementary services on a single digital platform improves users' perceived satisfaction (Zhao & Lu, 2012). The previous results of Chiu *et al.* (2013) have confirmed that perceived complementarity has the capability to increase the level of consumer satisfaction. Consistent with previous research, the findings of Loh *et al.* (2022) and Li and Fang (2019) highlighted that perceived complementarity is the most valuable factor that positively impacts customer satisfaction. Moreover, a recent study conducted by Lyu, Guo and Chen (2023) revealed that perceived complementarity has a positive association with satisfaction.

### **Utilitarian value (UV)**

Lin and Lu (2015) define utilitarian value as benefits and costs in consumers' functional evaluation after they use the overall product or service. It is important to note that utilitarian value is closely linked with efficiency, goal-oriented behavior, and economic possession (Kesari & Atulkar, 2016; Sharma, Hamari, Kesharwani & Tak, 2022 ). Prior researchers concur that utilitarian value is associated with the efficiency of a product or service aligned to its functional, instrumental or practical benefits and sacrifices made by the consumers (Jin & Xu, 2021; Jasin, Sesunan, Aisyah, Fatimah & Azra, 2023; Kim & Park, 2019). In simple terms, utilitarian value is related to achieving the desired outcome conveniently and efficiently (Evelina *et al.*, 2020). In the context of this study, the consumers using mobile food-ordering apps desire to order food easily and quickly from different restaurants or other eateries with ease and efficiency (Chetan Panse, Sharma & Dorji, 2019; Rabaa'i, 2022). It has been examined in several previous studies whether utilitarian values affect customer satisfaction.

The findings of a study conducted by Jasin *et al.* (2023) have highlighted a strong positive relationship between utilitarian value and satisfaction, suggesting that an increase in utilitarian value has a positive and significant effect on customer satisfaction, the higher the level of utilitarian value, the higher the level of customer satisfaction. The utilitarian benefits of using technological apps (e.g., app quality, convenience, etc.) are found to significantly affect satisfaction (Akel & Armağan, 2021). Similarly, the study by Pang (2021) examined the factor that influences perceived values and found that utilitarian value or benefits significantly impact satisfaction among mobile app users. It is evident numerous studies have constantly confirmed that utilitarian value has an influence on customer satisfaction (Arizzi, Breitenreiter, Khalsa, Iyer, Babin & Griffin, 2020; Loureiro, Miranda & Breazeale, 2014; Zainurrafiqi, Amar, Rohmaniyah, Aristin, Muchtar, Rusnani, Arifin, Hadi, Bangsa & Hidayati, 2021).

The next section provides a detailed overview of this study's research methodology.

### **3. Research Methodology**

The research methodology section focuses on the research approach and design, data collection techniques, sample, and sample size.

#### **Measurement**

The quantitative research approach and descriptive research design were employed to achieve the study's objectives. For the purpose of the study, the constructs were measured using a scale with multiple items. These items were adapted from earlier works in this area. The four items of perceived complementarity were adapted from Hubert, Blut, Brock, Backhaus, and Eberhardt (2017). The three items of utilitarian value were adapted from Ozturk, Bilgihan, Salehi-Esfahani and Hua (2017). The four items used to measure hedonic value were adapted from Yeo, Goh and Rezaei (2017); Chung, Song and Lee (2017), respectively. While the four items used to measure mobile food-ordering app users' satisfaction were adapted from Song, Jeon and Jeon (2017). All items were evaluated using a Likert scale with five points ranging from 1 (strongly disagree) to 5 (strongly agree).

The questionnaire-based measurement instrument in the form of a Google Form was shared with friends, family members and colleagues who were known to the researcher and were requested to share the link with possible individuals who are users of food-ordering apps on their social media groups. In process, the researcher managed to limit the number to 60 which was appropriate for the pilot study. Furthermore, the researcher tracked the IP addresses of the respondents in Google Forms to ensure that they were duplicates of participants. The pilot study's primary objective was to determine whether the questionnaire's content, instructions, and structure were appropriate. The response was positive with minor adjustments, such as amending spelling mistakes and rewording a few words, to work on the nature of the last poll to gather information.

#### **Sampling and data collection**

The target population in this study was consumers over the age of 18 years living in Gauteng Province, South Africa and who had previously used mobile food-ordering apps in the month prior to the survey. When collecting the data, non-probability snowballing sampling techniques were used due to a sampling frame's unavailability. Participation in the survey was completely voluntary, and participants were informed that they could withdraw from the study at any point without detrimental consequences.

The researcher created a group of users of mobile food-ordering apps on social media, such as Facebook, targeting those residing in Gauteng Province only. Users were invited to participate in the study, and emailed addresses were requested from those interested. Then, those who shared their email were sent the questionnaire's Google Forms link. Before participating in the survey, respondent was required to



read a consent form on the questionnaire's first page outlining the terms and conditions. Participants who completed the questionnaire were asked to share the link with any potential respondents in their network who meet the participation criteria. A total of 385 usable responses were obtained over three months (May to July) in 2020.

After discussing the research methodology, the following section presents the hypotheses that will be tested in the study.

### **3.1. Hypotheses**

This study hypothesises the following relationships:

**H<sub>1</sub>:** *Hedonic value will have a significant positive relationship with user satisfaction on mobile food-ordering apps*

**H<sub>2</sub>:** *Perceived complementarity will have a significant positive relationship with hedonic value.*

**H<sub>3</sub>:** *Perceived complementarity will have a significant positive relationship with user satisfaction of mobile food-ordering apps.*

**H<sub>4</sub>:** *Perceived complementarity will have a significant positive relationship with utilitarian value.*

**H<sub>5</sub>:** *Utilitarian value will have a positive and significant relationship with user satisfaction of mobile food-ordering apps.*

### **3.2. Ethics**

This survey was conducted following the ethical standards and preapproval from the College of Business and Economics Research Ethics Committee (CBEREC) and its subcommittees was obtained. This clearance code provided is 2020SCiiS29.

## **4. Results and Findings**

In this study, the data were analysed using the partial least squares structural equation modelling (SEM) technique employing SmartPLS 3 software. This technique was deemed suitable because the primary purpose of the research was to analyse the perceived complementarity in influencing customer shopping value and customer satisfaction with mobile food-ordering apps. The validity of the measurement model was examined, and the structural model was evaluated to validate the significance of the proposed hypotheses.

### **Measurement model analysis**

This study assessed the convergent and discriminant validity of the measurement model. The convergent validity of the data was measured by factor loadings, composite reliability (CR), average variance extracted (AVE) and Cronbach's alpha. Factor loadings are recommended to exceed 0.5 while CR and Cronbach's alpha exceed 0.7 to assure convergent validity. Additionally, AVEs should be

greater than 0.5 (Borah, Mishra, Mishra, Balas & Polkowski, 2022). The results in Table 1 indicate that factor loadings varied from 0.608 to 0.892, exceeding the recommended threshold. The CR ranged from 0.805 to 0.854, and Cronbach's alpha varied from 0.728 to 0.829, above the 0.7 threshold. Moreover, the AVEs ranged between 0.624 and 0.661, exceeding the recommended threshold of 0.5. The results support the validity of the measurement model in terms of convergent validity.

**Table 1: Convergent validity of the measurement model**

	<b>Factor loading</b>	<b>Composite reliability</b>	<b>Average variance extracted</b>	<b>Cronbach's alpha</b>
<b>Hedonic value</b>		0.854	0.652	0.818
HV1	0.857			
HV2	0.841			
HV3	0.892			
HV4	0.608			
<b>Perceived complementarity</b>		0.728	0.648	0.728
PCM1	0.808			
PCM2	0.829			
PCM3	0.777			
<b>Satisfaction</b>		0.836	0.661	0.829
SAT1	0.850			
SAT2	0.751			
SAT3	0.822			
SAT4	0.825			
<b>Utilitarian value</b>		0.805	0.624	0.798
UV1	0.842			
UV2	0.730			
UV3	0.787			
UV4	0.795			

Following the convergent validity validation, the measurement model's discriminant validity was evaluated using the Fornell and Larcker (1981) technique. As per this technique, discriminant validity is achieved when the correlation between the latent constructs is less than the square root of the AVEs. The results presented in Table 2 indicate that the inter-factor correlation was 0.675 (utilitarian and satisfaction). This correlation estimate is less than the lowest square root of AVE (0.790). Therefore, the conditions for discriminant validity as per the Fornell and Larcker (1981) technique are met, thus providing supporting evidence that the discriminant validity of the measurement model was also confirmed.

**Table 2: Discriminant validity**

		1	2	3	4
1	Hedonic value	<b>0.807</b>			
2	Perceived complementarity	0.484	<b>0.805</b>		
3	Satisfaction	0.439	0.513	<b>0.813</b>	
4	Utilitarian value	0.592	0.581	0.675	<b>0.790</b>

Having confirmed the convergent and discriminant validities, the research model was analysed to determine the significance of the hypotheses.

### Structural model analysis

A structural model was constructed to test the hypotheses after confirmation of measurement validity. The variance inflation factor (VIF) was used to assess structural model collinearity between independent constructs (satisfaction). Based on Hair, Hult, Ringle and Sarstedt (2021), collinearity is not critical when VIF estimates are below 3. The present study's results show that VIF estimates range from 1.00 to 2.475. Given that these are below the 3 thresholds, it is concluded that collinearity does not present a critical threat to the study. The size and significance of the path coefficients and  $R^2$  of the predicted constructs' path effect size ( $f^2$ ) were evaluated after collinearity had been ruled out. Results are shown in Figures 2 and 3 as well as Table 3.

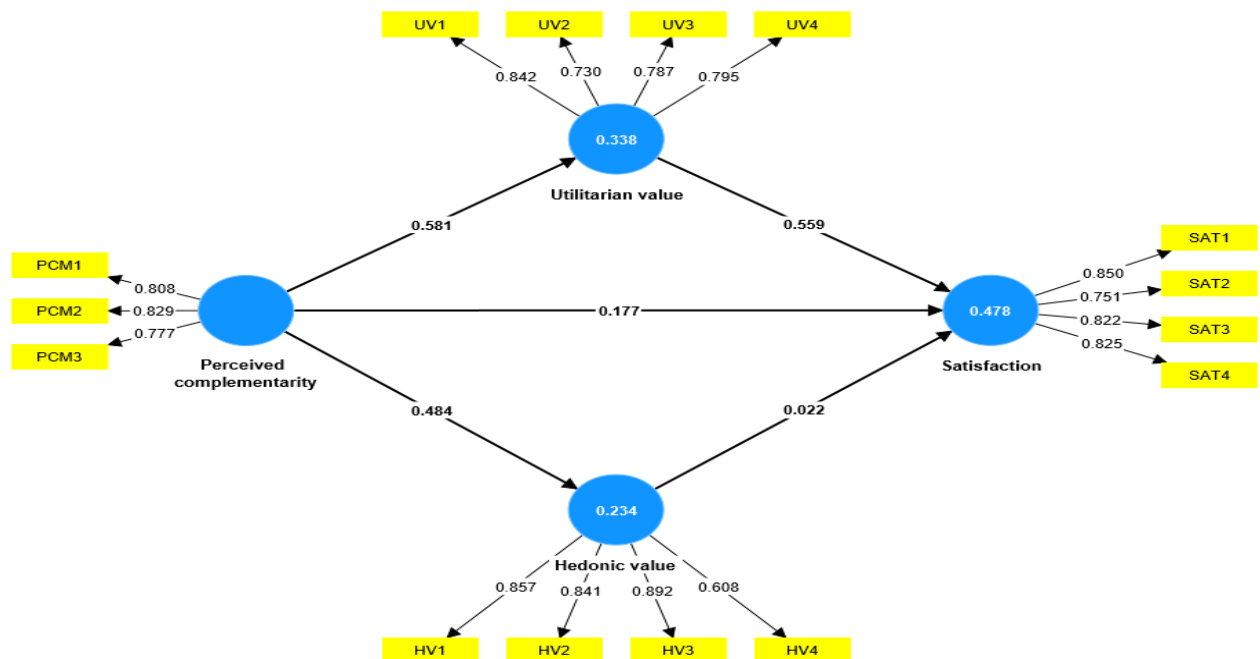
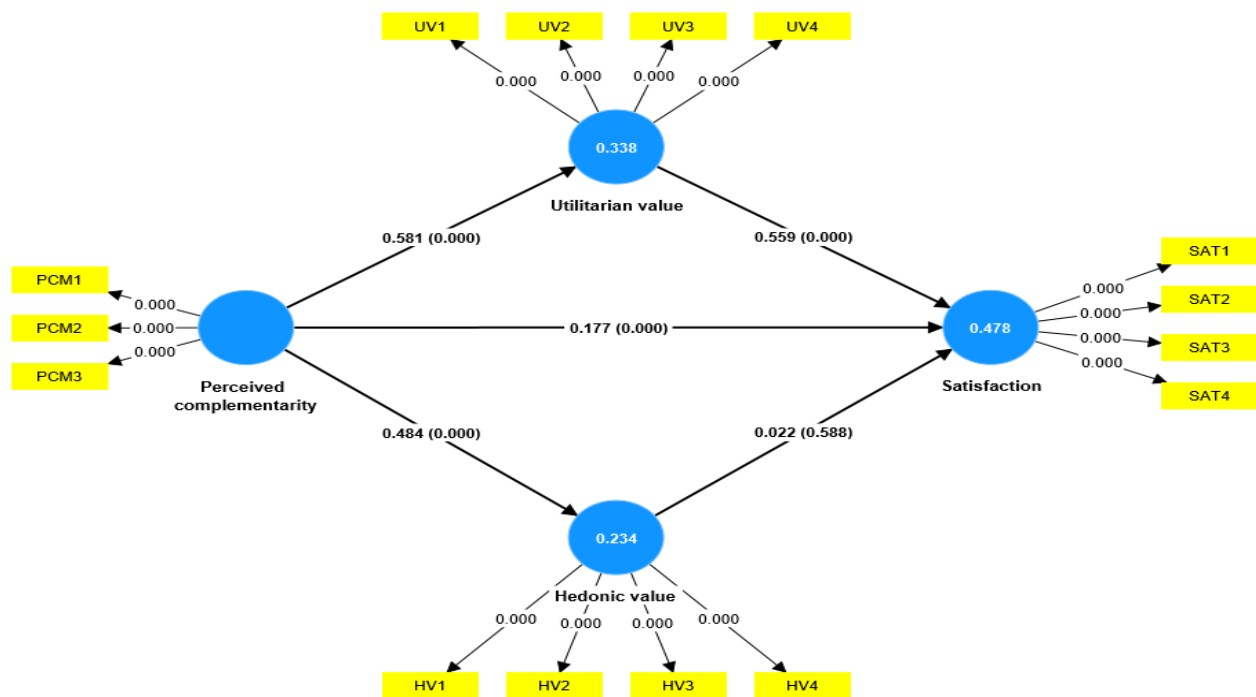


Figure 2: Path estimates with  $R^2$  values



**Figure 3: SmartPLS results of path estimates with t-values**

After confirming the validity of the measurement, the structural model was examined to determine the significance of the proposed hypotheses and to explain the variance in the dependent variable (user satisfaction) using the significant independent variables. As a first step in assessing the structural model, collinearity among the independent constructs in the model was examined using VIF. Hair *et al.* (2017) suggested that collinearity is not critical if the VIF estimates are below 3. The results obtained for the present study showed that the VIF estimates ranged from 1.00 to 2.475. Given that these were below the threshold of 3, it was concluded that collinearity was not a critical threat to the study. Having ruled out the threat of collinearity, the size and significance of the path coefficients and the  $R^2$  of the predicted constructs, as well as the effect size ( $f^2$ ) of the paths, were examined. These results are presented in Figures 2 and 3.

**Table 3: Path estimates**

	Path coefficient	T statistics	P values	Results	$f^2$
<b>H<sub>1</sub>: HV → SAT</b>	0.022	0.541	0.588	Not supported	0.001
<b>H<sub>2</sub>: PCM → HV</b>	0.484	12.057	0.001	Supported	0.306
<b>H<sub>3</sub>: PCM → SAT</b>	0.177	3.498	0.001	Supported	0.038
<b>H<sub>4</sub>: PCM → UV</b>	0.581	17.063	0.001	Supported	0.510
<b>H<sub>5</sub>: UV → SAT</b>	0.559	10.95	0.001	Supported	0.321

**Effective size ( $f^2$ ) interpretation: 0.35 (large), 0.15 (medium), 0.02 (small) (Cohen, 1988).**

The results of the hypothesis testing show that hedonic value has an insignificant and negative impact on users of mobile food-ordering app satisfaction level ( $\beta = 0.022$ ;  $t = 0.541$ ;  $p < 0.588$ ), therefore, H<sub>1</sub> was

not supported. However, the results further showed that perceived complementarity has a significant and positive relationship with the hedonic value associated with using mobile food-ordering apps ( $\beta=0.484$ ;  $t=12.057$ ;  $p<0.001$ ), thus providing statistical support for H2. The effective size for the impact of complementarity on hedonic value is medium. In addition, the results demonstrated that perceived complementarity was associated with satisfaction among food-ordering app users ( $\beta=0.177$ ;  $t=3.498$ ;  $p<0.001$ ), hence, H2 and H3 are statistically supported. Similarly, the results also indicated that perceived complementarity has a significant effect on the utilitarian value relating to the use of mobile food-ordering apps ( $\beta=0.581$ ;  $t=17.063$ ;  $p<0.001$ ); thus, H4 was statistically supported. There is a substantial effect of perceived complementarity on utilitarian value. Similar statistical support can also be found for H5, where the results of the analysis indicate that utilitarian value significantly influences user satisfaction with food-ordering apps ( $\beta=0.559$ ;  $t=10.95$ ;  $p<0.001$ ), therefore, H5 is statistically supported. The effective size for the impact of utilitarian value on the satisfaction link is strong.

Regarding the  $R^2$ , the results indicated that perceived complementarity accounts for 33.8% of the variance in utilitarian value, 23.4% in hedonic value, and 47.8% in satisfaction among food-ordering app users. The relatively high  $R^2$  values indicate robust explanatory power and reinforce the validity of the factors in predicting their respective outcome variables.

## **5. Discussions and Managerial Implications**

This study aimed to examine the impact of perceived complementarity on customer value and satisfaction in mobile food-ordering apps. The findings showed that hedonic value has a negative impact on users of mobile food-ordering app satisfaction level of food-ordering app users, which contradicts the results of prior studies that confirmed the positive relationship between those two constructs (Chauhan *et al.*, 2021; Poong, Yamaguchi *et al.*, 2017; Lee & Kim, 2019). This indicates that hedonic aspects associated with excitement or fun in the context of mobile food-ordering apps are sufficient to influence their overall experience and level of satisfaction. These findings further highlight the significance of functional aspects that could improve food-ordering app user satisfaction. Therefore, app developers, restaurants, or other fast-food outlets must ensure that while their apps incorporate enjoyable and entertaining features, they must be balanced with proper maintenance of the key functionalities of apps that users rely on to meet their needs effectively.

The findings further revealed that the perceived complementarity aligned with using mobile food-ordering apps significantly and positively impacted the hedonic value. These results are similar to those of Pal *et al.* (2020) and Jain *et al.* (2023), who confirmed that the availability of complementarity services positively impacted app users' perceptions of hedonic value. These findings imply that restaurants or other fast-food outlets and app developers should highlight perceived complementarity services to augment and improve users' hedonic experiences. For instance, developers of mobile food-

ordering apps should include additional features of functions such as personalized recommendations for meals for different occasions that will contribute to a delightful user experience (Shi & Yang, 2022; Nguyen, Huang & Nguyen, 2023).

Moreover, the findings also revealed that perceived complementarity correlates with satisfaction among food-ordering app users. This finding supports prior results of Lyu *et al.* (2023) and Loh *et al.* (2022), which reported that service providers that offer additional services at no extra cost contribute positively towards customer satisfaction. These findings suggest that food-ordering app users who effectively perceive the app to complement their needs, preferences, and goals are more likely to experience higher user satisfaction. Moreover, the findings of this study suggest that mobile food-ordering apps, restaurants, and other fast-food outlets must identify perceived complementarity services such as reward points to enhance value proposition and customer satisfaction. For instance, giving users special birthday treats, recommending healthy meals, and inviting them to taste the new menu items as a token of appreciation can generate a satisfying and positive user experience.

Furthermore, the findings corroborate those of Jain *et al.* (2023), who found that perceived complementarity positively influences utilitarian value in using technology to complete tasks efficiently. This finding has practical implications for app developers, restaurants or other fast-food outlets interested in maximizing the utilitarian value of additional free supporting services available to users. For instance, providing instant in-app chat assistance as support services will enhance the user's perception of utilitarian value.

The study's findings also show that utilitarian value is another important factor underlying customer satisfaction. Indeed, the results have proven that utilitarian value significantly influences users of food-ordering app level of satisfaction. This finding supports prior results (Akel & Armağan, 2021; Pang, 2021), which highlighted that consumers' perception levels of utilitarian value reinforce their satisfaction because that helps them easily accomplish their shopping tasks. These results imply that satisfied utilitarian shoppers are willing to utilize mobile food-ordering apps that offer economic benefits (easy access to restaurants or other fast-food outlets delivered to consumers' doorstep or office). This finding implies that app developers and restaurants or other fast-food outlets must ensure that their apps perform effectively and reliably with limited system crashes to prevent negativities affecting users' satisfaction.

## **6. Conclusions, Limitations and Future Research**

Developers of mobile food applications, restaurants or other fast-food outlets need to be knowledgeable about how the perceived complementarity effect has an effect on utilitarian value, hedonic value, and

user satisfaction. Through such knowledge, all parties involved will be equipped to identify features and functions relating to perceived complementarity to meet customers' needs better. As a result, the perceived shopping value (utilitarian and hedonic) and user satisfaction will increase. Recognizing the significance of perceived complementarity may also assist restaurants or other fast-food outlets in selecting the best applications to reach and meet the needs of their target clients successfully.

Despite the study's contribution by integrating the network effect theory, customer value and expectancy confirmation theory in examining the effect of perceived complementarity on South African consumers' using mobile food-ordering apps, several limitations are acknowledged. Data were obtained from 385 users of food delivery apps in Gauteng Province; therefore, the findings must not be generalized. The study found that perceived complementarity had a significant and positive effect on both customer value factors and customer satisfaction. However, the hedonic value was statistically proven not to have any impact on satisfaction. Future studies could expand the sample demographics in order to reach the entire mobile food-ordering app user from all provinces in South Africa. Furthermore, similar studies could explore the impact of specific social factors such as social class on the adoption of mobile food-ordering apps and customer satisfaction. In these studies, probability sampling, diverse data collection methods, and longitudinal designs can provide in-depth insights from a broader population, enabling a more improved understanding of the issue.

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## **Reference List**

- Akel, G. & Armağan, E. (2021). Hedonic and utilitarian benefits as determinants of the application continuance intention in location-based applications: The mediating role of satisfaction. *Multimedia Tools & Applications*, 80(5), 7103-7124.
- Alalwan, A.A. (2020). Mobile food ordering apps: An empirical study of the factors affecting customer e-satisfaction and continued intention to reuse. *International Journal of Information Management*, 50, 28-44.
- Alnawas, I. & Aburub, F. (2016). The effect of benefits generated from interacting with branded mobile apps on consumer satisfaction and purchase intentions. *Journal of Retailing & Consumer Services*, 31, 313-322.
- Ampong, G.O.A., Mensah, A., Boakye, K.G., Simpson, G., Ofori, K.S. & Addae, J.A. (2018). Exploring mobile social networking sites continuance intention from the perspective of network externalities and mobile value. *The 18<sup>th</sup> International Conference on Electronic Business. Guilin: China, December 2-6*, 295-302.
- Arizzi, G., Breitenreiter, J., Khalsa, R., Iyer, R., Babin, L.A. & Griffin, M. (2020). Modeling business student satisfaction: Utilitarian value and hedonic value as drivers of satisfaction. *Marketing Education Review*, 30(4), 196-207.

- Arsat, A., Hanafiah, M.H. & Che Shalifullizam, N.I.F. (2023). Fast-Food Restaurant Consumer Preferences in Using Self-Service Kiosks: An Empirical Assessment of the 4As Marketing Mix. *Journal of Culinary Science & Technology*, 1-12.
- Avcilar, M.Y. & Özsoy, T. (2015). Determining the effects of perceived utilitarian and hedonic value on online shopping intentions. *International Journal of Marketing Studies*, 7(6), 27-49.
- Beerli-Palacio, A., Martin-Santana, J.D. & Román-Montoya, C. (2020). Complementary services at hotels in accordance with their pricing strategy and the price sensitivity of tourists. *International Journal of Hospitality Management*, 87, 102458.
- Borah, S., Mishra, S.K., Mishra, B.K., Balas, V.E. & Polkowski, Z. (2022). *Advances in data science and management: Proceedings of ICDSM 2021*. Singapore: Springer Nature Singapore.
- Cao, J.T., Foster, J., Yaoyuneyong, G. & Krey, N. (2019). Hedonic and utilitarian value: the role of shared responsibility in higher education services. *Journal of Marketing for Higher Education*, 29(1), 134-152.
- Capito, S. & Pergelova, A. (2023). Treat yourself: food delivery apps and the interplay between justification for use and food well-being. *Journal of Consumer Affairs*, 57(1), 479-506.
- Carter, S. & Yeo, A.C.M. (2016). Mobile apps usage by Malaysian business undergraduates and postgraduates: Implications for consumer behaviour theory and marketing practice. *Internet Research*, 26(3), 33-757.
- Carvalho, P. & Alves, H. (2023). Customer value co-creation in the hospitality and tourism industry: a systematic literature review. *International Journal of Contemporary Hospitality Management*, 35(1), 250-273.
- Chauhan, S., Banerjee, R., Chakraborty, C., Mittal, M., Shiva, A. & Ravi, V. (2021). A self-congruence and impulse buying effect on user's shopping behaviour over social networking sites: an empirical study. *International Journal of Pervasive Computing & Communications*, 17(4), 404-425.
- Chen, K. Y., Hsu, Y. L. & Wu, C.C. (2012). Mobile phone applications as innovative marketing tools for hotels. *The International Journal of Organizational Innovation*, 5(2), 116-140.
- Cheng, S., Lee, S.J. & Choi, B. (2019). An empirical investigation of users' voluntary switching intention for mobile personal cloud storage services based on the push-pull-mooring framework. *Computers in Human Behavior*, 92, 198-215.
- Chetan Panse, D.S.R., Sharma, A.R.P.I.T.A. & Dorji, N.A.M.G.A.Y. (2019). Understanding consumer behaviour towards utilization of online food delivery platforms. *Journal of Theoretical & Applied Information Technology*, 97(16), 4353-4365.
- Chiu, C.M., Cheng, H.L., Huang, H.Y. & Chen, C.F. (2013). Exploring individuals' subjective well-being and loyalty towards social network sites from the perspective of network externalities: The Facebook case. *International Journal of Information Management*, 33(3), 539-552.
- Chung, N., Song, H.G. & Lee, H. (2017). Consumers' impulsive buying behavior of restaurant products in social commerce. *International Journal of Contemporary Hospitality Management*, 29(2), 709-731.
- Chunmei, G. & Weijun, W. (2017). The influence of perceived value on purchase intention in social commerce context. *Internet Research*, 27(4), 772-78.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2<sup>nd</sup> ed.). Hillsdale, NJ: Erlbaum.
- Day, G. (1990). Market-driven strategy: *Processes for creating value*. New York: The Free Press.
- Dirsehan, T. & Cankat, E. (2021). Role of mobile food-ordering applications in developing restaurants' brand satisfaction and loyalty in the pandemic period. *Journal of Retailing & Consumer Services*, 62, 102608.



- Evelina, T.Y., Kusumawati, A. & Nimran, U. (2020). The influence of utilitarian value, hedonic value, social value, and perceived risk on customer satisfaction: survey of e-commerce customers in Indonesia. *Business: Theory & Practice*, 21(2), 613-622.
- Fornell, C. & Larcker, D.F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39-50.
- Hapsari, R., Clemes, M. & Dean, D. (2016). The mediating role of perceived value on the relationship between service quality and customer satisfaction: Evidence from Indonesian airline passengers. *Procedia Economics & Finance*, 35, 388-395.
- Hong, H., Cao M. & Wang, G.A. (2017) The effects of network externalities and herding on user satisfaction with mobile social apps. *Journal of Electronic Commerce Research*, 18(1):18-31
- Hsu, C.L. & Lin, J.C.C. (2016). Effect of perceived value and social influences on mobile app stickiness and in-app purchase intention. *Technological Forecasting & Social Change*, 108, 42-53.
- Hubert, M., Blut, M., Brock, C., Backhaus, C. & Eberhardt, T. (2017). Acceptance of smartphone-based mobile shopping: Mobile benefits, customer characteristics, perceived risks, and the impact of application context. *Psychology & Marketing*, 34(2), 175-194.
- Jain, S., Basu, S., Ray, A. & Das, R. (2023). Impact of irritation and negative emotions on the performance of voice assistants: Netting dissatisfied customers' perspectives. *International Journal of Information Management*, 72, 102662.
- Jasin, M., Sesunan, Y., Aisyah, M., Fatimah, C. & Azra, F. (2023). SMEs repurchase intention and customer satisfaction: Investigating the role of utilitarian value and service quality. *Uncertain Supply Chain Management*, 11(2), 673-682.
- Jessen, A., Hilken, T., Chylinski, M., Mahr, D., Heller, J., Keeling, D.I. & de Ruyter, K. (2020). The playground effect: How augmented reality drives creative customer engagement. *Journal of Business Research*, 116, 85-98.
- Jin, X. & Xu, F. (2021). Examining the factors influencing user satisfaction and loyalty on paid knowledge platforms. *Aslib Journal of Information Management*, 73(2), 254-270.
- Junaid, M., Hussain, K., Akram, U., Asghar, M.M., Zafar, S. & Hou, F. (2020). Brand love: the emotional bridge between tourists' perceived value and well-being. *Asia Pacific Journal of Tourism Research*, 25(12), 1329-1342.
- Khare, A., Dixit, S. & Sarkar, S. (2020). Factors affecting website continuance intention: a study of Indian travel websites. *Information Technology & Tourism*, 22, 243-271.
- Kim, D., Park, K., Park, Y. & Ahn, J.H. (2019). Willingness to provide personal information: Perspective of privacy calculus in IoT services. *Computers in Human Behavior*, 92, 273-281.
- Kim, J.H. & Park, J.W. (2019). The effect of airport self-service characteristics on passengers' perceived value, satisfaction, and behavioral intention: based on the SOR model. *Sustainability*, 11(19), 5352.
- Lee, C.H. & Wu, J.J. (2017). Consumer online flow experience: The relationship between utilitarian and hedonic value, satisfaction and unplanned purchase. *Industrial Management & Data Systems*, 117(10), 2452-2467.
- Li, C.Y. & Fang, Y.H. (2019). Predicting continuance intention toward mobile branded apps through satisfaction and attachment. *Telematics & Informatics*, 43, 01248.
- Li, C.Y. & Fang, Y.H. (2022). The more we get together, the more we can save? A transaction cost perspective. *International Journal of Information Management*, 62, 102434.
- Li, C.Y., Fang, Y.H. & Sukoco, B.M. (2021). Value proposition as a catalyst for innovative service experience: the case of smart-tourism destinations. *Service Business*, 15(2), 281-308.

- Lin, C.P. & Bhattacharjee, A. (2008). Elucidating individual intention to use interactive information technologies: The role of network externalities. *International Journal of Electronic Commerce*, 13(1), 85-108.
- Lin, K. Y. & Lu, H. P. (2011). Why people use social networking sites: An empirical study integrating network externalities and motivation theory. *Computers in Human Behavior*, 27(3), 1152-1161.
- Lin, K.Y. & Lu, H.P. (2015). Predicting mobile social network acceptance based on mobile value and social influence. *Internet Research*, 25(1), 107-130.
- Loh, X.M., Lee, V.H. & Leong, L.Y. (2022). A multi-dimensional nomological network of mobile payment continuance. *Journal of Computer Information Systems*, 1-23.
- Loureiro, S. M. C., Miranda, F. J. & Breazeale, M. (2014). Who needs delight? The greater impact of value, trust and satisfaction in utilitarian, frequent-use retail. *Journal of Service Management*, 25(1), 101-124.
- Lyu, T., Guo, Y. & Chen, H. (2023). Understanding people's intention to use facial recognition services: the roles of network externality and privacy cynicism. *Information Technology & People*, 0959-3845
- Mahmoud, A. & Abdel Rady, H.A.W. (2020). assessing passenger attitudes and perception towards service quality of Egypt Air In-Flight Services by using satisfaction measure. *Minia Journal of Tourism & Hospitality Research*, 9(1), 115-138.
- Marcos, A.M.B.D.F. & Coelho, A.F.D.M. (2022). Service quality, customer satisfaction and customer value: holistic determinants of loyalty and word-of-mouth in services. *The TQM Journal*, 34(5), 957-978.
- Mouakket, S. & Sun, Y. (2019). Examining factors that influence information disclosure on social network sites from the perspective of network externalities. *Industrial Management & Data Systems*, 119(4), 774-791.
- Muangmee, C., Kot, S., Meekaewkunchorn, N., Kassakorn, N. & Khalid, B. (2021). Factors determining the behavioral intention of using food delivery apps during COVID-19 pandemics. *Journal of Theoretical & Applied Electronic Commerce Research*, 16(5), 1297-1310.
- Okumus, B., Ali, F., Bilgihan, A. & Ozturk, A. B. (2018). Psychological factors influencing customers' acceptance of smartphone diet apps when ordering food at restaurants. *International Journal of Hospitality Management*, 72, 67-77.
- Ozturk, A.B., Bilgihan, A., Salehi-Esfahani, S. & Hua, N. (2017). Understanding the mobile payment technology acceptance based on valence theory: A case of restaurant transactions. *International Journal of Contemporary Hospitality Management*, 29(8), 2027-2049.
- Pal, D., Arpnikanondt, C. & Razzaque, M.A. (2020). Personal information disclosure via voice assistants: the personalization–privacy paradox. *SN Computer Science*, 1, 1-17.
- Pang, H. (2021). Identifying associations between mobile social media users' perceived values, attitude, satisfaction, and eWOM engagement: The moderating role of affective factors. *Telematics & Informatics*, 59, 101561.
- Pang, H. (2023). Do direct and indirect network externalities matter? Unpacking the causal antecedents of perceived gratifications and user loyalty toward mobile social media. *Aslib Journal of Information Management*, 2050-3806.
- Park, K., Kwak, C., Lee, J. & Ahn, J.H. (2018). The effect of platform characteristics on the adoption of smart speakers: Empirical evidence in South Korea. *Telematics & Informatics*, 35(8), 2118-2132.
- Prebensen, N. K. & Rosengren, S. (2016). Experience value as a function of hedonic and utilitarian dominant services. *International Journal of Contemporary Hospitality Management*, 28(1), 113-135.

- Rabaa'i, A.A. (2022). What's for Dinner? Factors contributing to the continuous usage of Food Delivery Apps (FDAs). *Asia Pacific Journal of Information Systems*, 32(2), 354-380.
- Ramos, K. (2022). Factors influencing customers' continuance usage intention of food delivery apps during COVID-19 quarantine in Mexico. *British Food Journal*, 124(3), 833-852.
- Sari, A.N. & Ardiansari, A. (2019). The influence of utilitarian value and hedonical values on customer loyalty through customer satisfaction. *Management Analysis Journal*, 8(2), 146-155.
- Shah, A.M., Yan, X. & Qayyum, A. (2021). Adoption of mobile food ordering apps for O2O food delivery services during the COVID-19 outbreak. *British Food Journal*, 124(11), 3368-3395.
- Sharma, S., Devi, K., Naidu, S., Greig, T., Singh, G. & Slack, N. (2023). From brick and mortar to click and order: consumers' online food delivery service perceptions post-pandemic. *British Food Journal*, <https://doi.org/10.1108/BFJ-04-2023-0351>.
- Sharma, T.G., Hamari, J., Kesharwani, A. & Tak, P. (2022). Understanding continuance intention to play online games: roles of self-expressiveness, self-congruity, self-efficacy, and perceived risk. *Behaviour & Information Technology*, 41(2), 348-364.
- Shen, G.C.C. (2015). Users' adoption of mobile applications: Product type and message framing's moderating effect. *Journal of Business Research*, 68(11), 2317-2321.
- Song, P., Xue, L., Rai, A. & Zhang, C. (2018). The ecosystem of software platform: a study of asymmetric cross-side network effects and platform governance. *Management Information Systems Quarterly*, 42(1), 121-142.
- Song, Y.E., Jeon, S.H. & Jeon, M.S. (2017). The effect of mobile food delivery application usage factors on customer satisfaction and intention to reuse. *Culinary Science & Hospitality Research*, 23(1), 37-47.
- Tseng, T.H. & Lee, C.T. (2018). Facilitation of consumer loyalty toward branded applications: the dual-route perspective. *Telematics Inform*, 35(5), 1297-1309.
- Tzavlopoulos, I., Gotzamani, K., Andronikidis, A. & Vassiliadis, C. (2019). Determining the impact of e-commerce quality on customers' perceived risk, satisfaction, value and loyalty. *International Journal of Quality & Service Sciences*, 11(4), 576-587.
- Verhoef, P.C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Dong, J.Q., Fabian, N. & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research*, 122, 889-901.
- Wan, J., Zhao, L., Lu, Y. & Gupta, S. (2017). Evaluating app bundling strategy for selling mobile apps: an ambivalent perspective. *Information Technology & People*, 30(1), 2-23.
- Woodruff, R.B. (1997). Customer value: The next source for competitive advantage. *Journal of the Academy of Marketing Science*, 25(2), 139-153.
- Xiong, J. & Zuo, M. (2022). Understanding factors influencing the adoption of a mobile platform of medical and senior care in China. *Technological Forecasting & Social Change*, 179, 121621.
- Yeo, V.C.S., Goh, S.K. & Rezaei, S. (2017). Consumer experiences, attitude and behavioral intention toward online food delivery (OFD) services. *Journal of Retailing & Consumer Services*, 35, 150-162.
- Zainurrafiqi, Z., Amar, S.S., Rohmaniyah, R., Aristin, R., Muchtar, R.M., Rusnani, R., Arifin, M., Hadi, A., Bangsa, K.K. & Hidayati, N. (2021). The effect of utilitarian value and hedonic value on customer loyalty with customer satisfaction as an intervening variable: Empirical evidence from Indonesia. *International Journal of Multicultural & Multireligious Understanding*, 8(5), 291-305.
- Zeithaml, V.A. (1988). Consumer perceptions of price, quality, and value: A means-end model and synthesis of evidence. *Journal of Marketing*, 52(3), 2-22.

- Zhang, T., Wang, W.Y.C., Cao, L. & Wang, Y. (2019). The role of virtual try-on technology in online purchase decision from consumers' aspect. *Internet Research*, 29(3), 529-551.
- Zhao, L. & Lu, Y. (2012). Enhancing perceived interactivity through network externalities: An empirical study on micro-blogging service satisfaction and continuance intention. *Decision support systems*, 53(4), 825-834.