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Exploring the effect of relative advantage and challenge on customer engagement behavior with mobile commerce applications

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Exploring the effect of relative advantage and challenge on customer engagement behavior with mobile commerce applications

Abstract

This research explores the drivers of customer engagement behavior with mobile commerce applications (m-commerce apps), using the stimulus (S), organism (O), and response (R) framework. Customer engagement is conceptualized through four dimensions: co-developing, influencing, augmenting, and mobilizing behavior. The proposed model was tested using data collected from 717 users of m-commerce apps through an online survey. This study shows that relative advantage and perceived challenge positively influence customer perceptions of enjoyment and control, which leads to higher customer engagement behavior. Customers' perceived enjoyment was also found to mediate the relationship between perceived relative advantage, perceived challenge, and three customer engagement dimensions (i.e., co-developing, influencing, and mobilizing behavior). By studying the factors that might be able to develop customers' engagement behavior in m-commerce app settings, this research is a novel contribution to the literature, as previous studies in mobile apps focused more on adoption than user engagement behavior.

Keywords: customer engagement behavior; relative advantage; challenge; control; enjoyment; mobile commerce application.

1. Introduction

Currently, many companies attempted to develop mobile applications (apps) as a new channel to interact with customers (Julsrud & Krogstad, 2020). A key factor for success in mobile apps is customer engagement (CE). Recent research reveals that CE impacts customer loyalty (Alalwan et al., 2020) in the context of mobile apps.

Despite the essential outcomes of customer engagement, hitherto few studies have explored the antecedents of CE with a mobile commerce app (m-commerce app). Among the several conceptualizations of CE that have emerged from the literature in recent years, this study aims to fill the research gap by exploring drivers influencing customer engagement behavior (CEB) with m-commerce apps.

In order to explore the antecedents of CEB, the present study draws on an environmental psychology perspective using the stimulus-organism-response (SOR) framework. The SOR framework, developed by Mehrabian & Russel (1974), suggests that environmental stimuli (S) might lead to ones' internal states (O) and drive behavioral response (R). In the retail context, stimuli have been conceptualized as the atmospheric cues of the environment, organism as ones' emotional and cognitive states, and response as approach or avoidance behavior (Donovan & Rossiter, 1982).

The SOR framework has been previously used in online shopping behavior studies (e.g., Molinillo et al., 2021) and, particularly, in the context of mobile commerce apps (e.g., Chopdar & Balakrishnan, 2020). Recently, the SOR framework has been used to explain social media discontinuance intention (Liu et al., 2021). It provides an appropriate theoretical foundation and parsimonious structure to examine the impact of technological features on users' virtual experiences; it also captures [how they influence individuals' organismic states and responses \(Chopdar & Balakrishnan, 2020\)](#). This is imperative since customer engagement with technology is iterative (Tak & Gupta, 2021). The customer needs a sequential process to

absorb their experience before continuing the adoption. Moreover, m-commerce apps provide a more dynamic environment to shop (e.g., personalization offering) due to their technological features compared to the other online channels (Chopdar & Balakrishnan, 2020). Hence, it is essential to understand how m-commerce provides stimuli through its technology and how consumers perceive and respond to it.

Stimuli include the sets of the store's attributes, which affect the consumers' perception (Mazursky & Jacoby, 1986). In the online context, store atmosphere is represented by the website design which features can be categorized as human or computer factors; human factors refer to elements that add hedonic value, whereas computer factors refer to elements that provide functionality (Hausman & Siekpe, 2009). Previous research has shown the effect of a variety of online environmental cues as stimuli such as website features and apps design (Hu et al., 2016).

The present research explores the role of customers perceived relative advantage and perceived challenge as environmental stimuli of m-commerce apps. The relative advantage construct captures the customer's perception of the superiority of an app in comparison to others in terms of its results, convenience, and ease to use (Roy et al., 2017). Likewise, perceived challenge refers to the user's subjective perception of performing their skills in operating the apps (Mulcahy et al., 2020; Novak et al., 2000). Therefore, customer perceived relative advantage and perceived challenge create a context that lends to customer behavioral manifestations toward the app. However, although the effects of these stimuli on the adoption of mobile apps have been widely demonstrated in the literature, their impact on CEB has received little attention from researchers so far. Therefore, the study of the role of perceived relative advantage and perceived challenge as antecedents of CEB will contribute to improve the understanding of customer behavior in their relationship with m-commerce apps.

The SOR framework argues that the stimuli effect on customer behavior is mediated by the individual organism, reflecting in customers' emotional and cognitive states (Carlson et al., 2018). Organism includes the process of converting stimuli into meaningful information through the psychological, thinking, and feeling activities that lead to the customer's pleasure or arousal (Koo & Ju, 2010). In this research, the organism is represented by affective and cognitive constructs: customers' perceived enjoyment and customers' perceived control during their interaction with the m-commerce app. Customers perceived enjoyment resembles the positive affective and emotional states towards the apps (Shiau & Luo, 2013). Perceived control refers to the cognitive process of the customers feeling of control and attention focused on using m-commerce apps (Roy et al., 2017). These factors represent affective and mental states that lead to customer response (Chan et al., 2017). For example, when the customer feels the m-commerce apps are working consistently on various devices and internet connection quality, they will enjoy using the apps, leading the customer to influence others to use the apps. Hence, this research proposes that perceived relative advantages and challenges might influence the CEB with the m-commerce apps.

Lastly, Jacoby (2002) argued that the customer response to environmental stimuli could be illustrated in various forms, including the mental response, internal or nonvisible response, and the external or visible response. In this research, the concept of response is represented by the CEB, which refers to the user's particular resource provision during the interaction with the m-commerce app (Alexander et al., 2018). Following the theoretical framework developed by Jaakkola and Alexander (2014), CEB is conceptualized as a multidimensional construct with four dimensions (i.e., co-developing, influencing, augmenting, and mobilizing behavior). This conceptualization is essential because, in recent years, it has been shown that the consumer can engage in behaviors that go beyond purchasing and positive word-of-mouth, such as co-creation, co-production, and service delivery (Roy et al., 2018a). However, to the best of the

author's knowledge, so far no empirical study has used this conceptualization of CEB in the context of m-commerce apps.

The present research offers four contributions. First, previous research in CEB mostly focuses on two dimensions, customer participation for innovation and customer communication about the product (i.e., Beckers et al., 2017; Carlson et al., 2018). However, in the current online service delivery context, the customer can provide to the process through a more diverse contribution of resources toward the focal object. The present study is the first that, based on Jaakkola and Alexander (2014) 's proposal, conceptualizes and empirically evaluates the CEB with m-commerce apps as a concept with four dimensions (i.e., co-developing, influencing, augmenting, and mobilizing behavior), which improves knowledge in the research field. Second, previous research has shown the drivers of CEB as a second-order construct (i.e., Roy et al., 2018b), but the present study will explore the antecedents of each CEB dimension. This is critical as the co-developing, influencing, augmenting, and mobilizing behavior are posed through a different form of resource contribution, captured in different action forms, and resulted in different forms of value creations. Third, while most literature on CEB uses customer satisfaction, trust, and perceptions of the focal object performance as antecedents from the customers' perspective, this study provides field evidence of the influence of perceived control and perceived enjoyment on the CEB dimensions. Fourth, this study contributes to the literature by empirically examining the direct and indirect effects of perceived relative advantage and perceived challenge on CEB, filling an essential gap in the research field. Implications for managers are discussed, giving way for suggestions to enhance customer engagement behavior with m-commerce apps.

2. Literature Review

The current study is derived from the perspective of environmental psychology by using the stimulus-organism-response (SOR) framework in understanding the antecedent of CEB. The environmental psychology perspective explains the interplay between the environment on human experiences and behavior (Steg et al., 2012). The perspective is also represented in the SOR framework, which treats the environmental aspect as stimuli (S) that impact an individual's internal state or organism (O) that result in both acceptance or avoidance as the response (R) (Mehrabian & Russel, 1974; Vieira, 2013).

2.1 The Stimuli-Organism-Response (SOR) Framework.

The SOR framework has been used extensively by previous research both in online and offline retail settings to explain the process of customers' decision-making (Kaur et al., 2017). For example, in online settings, Peng and Kim (2014) contended that the customers' hedonic and utilitarian shopping value and environmental stimuli might influence the customers' attitude toward online shopping and emotional purchase, which ultimately leads to repurchase intention. Kühn and Petzer (2018) proposed the role of the website's visual appeal, perceived usability, website trust, and flow toward the customers' purchase intention. Molinillo et al. (2021) showed that information quality and service quality as environmental stimuli in online social commerce impact perceived value (organism), which drives customer loyalty toward the website. In the present research, stimuli are represented by the customer perceived relative advantage and perceived challenges of m-commerce app; the organism is captured by customers' perceived enjoyment and perceived control, while the CEB dimensions represent the response: co-developing, influencing, augmenting, and mobilizing behavior. By this, the SOR framework is appropriate to be used in the current study as it represents stimuli as the external drivers which attract consumer's eyeballs, while organism related to the consumer's psychological process, which leads to the consumer's responses (Tak & Gupta, 2021)

2.1.1 *Stimuli: Perceived Relative Advantages and Perceived Challenge*

The concept of stimuli might include various environmental cues, such as object and social psychological stimuli (Peng & Kim, 2014). Stimuli might be able to arouse customers through both internal (e.g., customer characteristics) and external factors (e.g., website stimuli, situational stimuli) (Chan et al., 2017). For example, in a virtual environment, stimuli might comprise the brand's infrastructure and sets of characteristics that influence an individual internal state (Mollen & Wilson, 2009). In the technological product, stimuli often consist of users' perception of the product's characteristics, including its design, performance, and even communication embedded in the individual's experience of usage (Lee et al., 2011).

In this research, the stimuli are depicted in the customer's perceived relative advantage and challenge of using the m-commerce app. The relative advantage illustrates the degree to which the service provided is better than other retail technologies in terms of convenience, functionality, and performance (Roy et al., 2017). At the same time, the perceived challenge illustrates the subjective perception of the required ability, capability, and skills to use the app (Novak et al., 2000).

2.1.2 *Organism: Perceived Enjoyment and Perceived Control*

The environmental cues (stimuli) may affect customers' internal experience and evaluation (organism). The organism represents both the cognitive and affective individual's states, which intermediate the stimuli and the individual response (Islam & Rahman, 2017). The cognitive state illustrates the customers' mental process, while affective state represents emotions that arises when customers interact with the stimuli; both states lead to customer response (Chan et al., 2017).

In the present study, perceived enjoyment captures the affective state of the customer derived from the environmental stimuli of using a technology such as m-commerce apps (Roy et al., 2017). It reflects the sense of pleasant experiences in using the app regardless of any

performance outcomes (Natarajan et al., 2017). Perceived control represents customers' belief in having enough resources to control the app (Roy et al., 2017). When individuals feel in control, they can concentrate more on interacting with the app than maintaining control (Domina et al., 2012). Past studies have considered perceived enjoyment and control as customer's organism responses to environmental stimuli in their interaction with technology (Hong et al., 2017; Qin et al., 2021). Thus, both perceptions of enjoyment and control might act as intermediaries between the stimuli and CEB.

2.1.3 Response: CEB (Co-developing, Influencing, Augmenting, and Mobilizing Behavior)

The third component of the SOR framework is the consequence and final customer reaction (Mehrabian & Russell, 1974). Jacoby (2002) argued that the response could be represented in various forms, including the psychological response, internal or nonvisible response, and the external or visible response. This research aligns with previous studies examining behavioral engagement as a response variable in a technological context (Hu & Chaudhry, 2020). Specifically, the concept of response is represented by the CEB dimensions: co-developing, influencing, augmenting, and mobilizing behavior. The engagement behavior represents the customer's particular resource investment in the interaction with the engagement object (i.e., an m-commerce app) (Alexander et al., 2018).

Van Doorn et al. (2010, p. 253) defined CEB as "customer behavioral manifestation toward a brand or firm, beyond purchase, resulting from motivational drivers (e.g., word-of-mouth activity, recommendations, helping other customers, blogging, writing reviews, and engaging in legal action." Consistent with Jaakkola and Alexander (2014) and Hollebeek et al. (2019), in this study, the focal object of the CEB is the m-commerce app with which the customer interacts in a service relationship.

Previous literature has conceptualized the notion of CEB through a multidimensional concept (e.g., Barger et al., 2016; Hinson et al., 2019; Roy et al., 2018b). Jaakkola and Alexander (2014) conceptualized CEB through four dimensions: co-developing, influencing, augmenting, and mobilizing behavior. The co-developing behavior resembles the customer action to solve the product or service's problem. Influencing is represented in the customers' word-of-mouth and recommendation. The augmenting behavior occurs when customers contribute with some of their resources, including knowledge, skills, labor, and time, to improve the firm's product offering. For example, when the customers post additional information about the product function, the firm has never realized it in their social media account. In this case, both augmenting and co-developing required the customers to contribute their resources. However, while the co-developing action allows the firm to choose whether to approve or reject the customers' feedback and ideas, the customers' augmenting activities are not. This is because customers directly augment the improvement of the firm's product offering directly with their resources. Lastly, mobilizing behavior illustrates the customers' actions to mobilize others to do something for the firm's product or services.

This conceptualization is very appropriate in m-commerce apps because it reflects possible engagement behaviors in a broader way than other conceptualizations mainly focused on buying and recommendation behaviors. However, so far it has not been used empirically to study consumer behavior in that context. Recently, Roy et al. (2018a) examined the different types of CEB in a customer hotel experience context, using Jaakkola and Alexander's (2014) conceptualization as a second-order factor construct with four dimensions. That approach neglects the study of each behavioral dimension's different antecedents and outcomes. This is critical as the co-developing, influencing, augmenting, and mobilizing behavior are posed through a different form of resource contribution, captured in different action forms, and

resulted in different forms of value creations. Hence, the current research explores each CEB dimension's antecedents representing the SOR framework's response element.

3. Hypotheses Development

The relative advantage concept represents the technology's superiority over the other in terms of its convenience, ease of use, and performance for the customers, which is included as part of the customers' cognitive experiences (Roy et al., 2017). Although perceived enjoyment focuses on the emotional aspect of the customer experiences related to customer pleasure in using the technologies, Alan et al. (2015) contended that positive evaluations of experience-related cognition might arouse positive states of emotion. For example, an easy-to-use system might encourage one's enjoyment (Moon & Kim, 2001), which is driven by the fulfillment of motivational needs and the user's perceived quality of outputs in using the technology (Pe-Than et al., 2014). In this case, the perception of the products' superior features and function might lead to a more favorable affective evaluation, including the perceived enjoyment (Roy et al., 2018b). Therefore, the following hypothesis is proposed:

H1a. Relative advantage positively affects perceived enjoyment

Individuals will feel more in control over a situation if they think they can get the desired outcome (Wortman, 1975). This might be facilitated by the atmospheric cues of the online environment (Lunardo & Mbengue, 2009).

The relative advantage represents the users' belief that the m-commerce app provides a superior service to existing alternatives (Kim et al., 2016). In the present study, the relative advantage is represented by superior easiness to use, convenience, and consistent outcomes over time (Roy et al., 2017). These superiorities provide chances for customers to exert their influence during the interaction. For example, the easiness of navigating the apps enables

customers to obtain information that helps them in the process control. In this case, the greater the chances for customers to interact with the app, the greater the customers' sense of control (Guo et al., 2016). Thus, the following hypothesis is presented:

H1b. Relative advantage positively affects perceived control.

The perceived challenge refers to the customer's subjective experience that might occur when an individual feels that his/her abilities and skills are being tested during the interaction with an object (Merikivi et al., 2017). In the present research, customers feel challenged when they can perform to the best of their ability and skills to gain the most favorable result from the interaction (c.f., Novak et al., 2000).

According to cognitive evaluation theory (Deci & Ryan, 2000, p. 260), individuals enjoy optimal challenges (not too easy and not too difficult) because "it is success at optimally challenging tasks that allows people to feel a true sense of competence". Thus, often, customers enjoy more relatively challenging activities than easy activities.

Previous research has confirmed that perceived challenge might arouse customer enjoyment of goal-directed activities (Mulcahy et al., 2020). The sensation-seeking customers preferred a high level of physical and psychological stimulation to obtain enjoyment and excitement (Baumann et al., 2016). When the users address a relatively challenging online shopping experience through the app and overcome the challenge, the experience might bring pleasure and enjoyment to them (Wang & Hsiao, 2012). This leads to the following hypothesis:

H2a. Perceived challenge positively affects perceived enjoyment.

The state of challenge occurred when individuals perceived that they possessed relevant and sufficient resources to face and exceed the demands of the activity (Uphill et al., 2019). When the environment is highly challenging, customers must put more effort, such as greater attention

and concentration, in doing the activities (Wang & Hsiao, 2012). Previous research suggested that the shopping environment might influence consumers' perceived control of their shopping experiences (Ward & Barnes, 2001). When the online environmental situation is challenging, the customers will pay more attention and concentration while shopping (Koufaris, 2002). Therefore, it is proposed that the challenge of discovering information and features of the m-commerce app might cause customers to focus its attention on the process, which leads them to the perception of control. Hence, the following hypothesis is suggested:

H2b. Perceived challenge positively affects perceived control.

The co-developing behavior might include a process where customers were assisting in developing new products or brands to enhance organizational performance (Brodie et al., 2013). Co-developing behavior occurs due to various situational factors within the surrounding environment, including the customers' perceived benefits during the interaction (Groeger et al., 2016).

Positive states of enjoyment reflect situations where the environment fulfills the motivational needs and expectations in using technology (Pe-Than et al., 2014). [Enjoyment creates pleasures in using the technologies, which triggers the usage and satisfaction of the mobile commerce apps \(Shiau & Luo, 2013\), including a longer time to stay in the shopping facilities \(e.g., retail website\) \(Kim et al., 2007\). Those individuals who spend more time represents the involved customers \(Kim et al., 2007\), who possess more willingness to search information and explore new stimuli from the site \(Balabanis and Reynolds, 2001\)](#)

Previous studies have shown that perceived hedonic values motivate customers to participate in product support activities in online environments (Nambisan & Baron, 2007). Thus, we suggest that positive beliefs regarding the potential to enjoy will motivate the

customer participation in co-production activities such as developing new features or alternative uses of the apps. Therefore, the following hypothesis is proposed:

H3a. Perceived enjoyment positively affects co-developing behavior

Enjoyment towards technology shows the intrinsic motives or gratifications for using technologies. Hedonic motives are important drivers of users' attitudes towards mobile services (Cyr et al., 2006). Prentice et al. (2019) argued that customers' positive affective states drive them to actively promote the technology and their experiences. This is because, based on the uses and gratifications theory, the more the consumers perceive their interaction with the technology as enjoyable, the more satisfied they will be and more likely to recommend m-commerce services (San-Martin et al., 2016). Thus, the following hypothesis is presented:

H3b. Perceived enjoyment positively affects influencing behavior

Augmenting behavior refers to the condition where the customer contributed with their resources to directly add the firm's product offering beyond the transaction (Jaakkola & Alexander, 2014). This behavior requires customers' exploration of the use of the app and sharing their positive experiences with m-commerce app on social media, which might make the app more appealing for other users. In this case, Eroglu et al. (2003) argued that a more approaching and exploratory behavior might occur when customers are pleased by their experience in doing shopping activities. Hence, the following hypothesis is proposed:

H3c. Perceived enjoyment positively affects augmenting behavior.

Mobilizing behavior is one of engagement behavior, which might include high customer participation as they not only put their resources towards the product but also influence other users' actions towards the product. In order to gain this form of involvement, mobile commerce

apps should assure the affective commitment of the customer. According to the literature, perceived enjoyment leads to the customer's positive emotional states, which can enhance one's affective commitment towards the product that might drive customers' participation in value creation activities (Claffey & Brady, 2014). Previous research also confirmed the positive role of perceived enjoyment toward one's intention to engage with a product or services (Yang et al., 2017). Moreover, perceived hedonic value has been found an important antecedent of customer collaborations intentions with other users (Carlson et al., 2018). This reasoning leads to the following hypothesis:

H3d. Perceived enjoyment positively affects mobilizing.

Co-developing behavior leads the customer to contribute their resources in facilitating the focal firm's development (Jaakkola & Alexander, 2014). This kind of behavior requires a high interest and initiative from the customer to proactively communicate suggestions to improve the app performance and services.

A state of control is mainly achieved when an environmental condition facilitates the achievement of goals (Uhrich, 2011). This condition might lead to favorable emotional states such as pleasure (Hui & Bateson, 1991), interest, and joy (Uhrich, 2011). Hence, when the customer feels in control using m-commerce apps, their interest in the apps will increase. Perceived control also enhances the customer's sense of involvement during their interaction with the product or services (Lunardo & Mbengue, 2009; Ward & Barnes, 2001). This sense of involvement might drive their interest to contribute their ideas to increase product functions. Therefore, the following hypothesis is proposed:

H4a. Perceived control positively affects co-developing.

Customer influencing behavior includes positive word-of-mouth and recommendations of products and services. Usually, it occurs when customers are satisfied with the offered product or service (Currás-Pérez et al., 2013).

Perceived control measures how well a user can execute the app to get his/her goal. The perception of control mostly occurs along with good experiences and outcomes in using the product or services. This kind of control might enable a sense of satisfaction and sustained use of the app over time, which increases the intention to spread positive word-of-mouth about the m-commerce app (Belanche et al., 2020; San-Martin et al., 2016). Hence, the following hypothesis is presented:

H4b. Perceived control positively affects influencing behavior.

Perceived control refers to the users' confidence to behave in a certain way (Ajzen, 1991). Higher perceived control over the online environment drives users to co-create value on social media by writing and posting information, as they will be less concerned about data collection when sharing their personal information (Shirazi et al., 2021). The positive customer experience derived from perceived control will trigger users' willingness to augment behavior by posting content and sharing product uses on social media (Schau et al., 2009). It is a compensation mechanism since perceived control enhances the outcome experience, which drives customers' willingness to engage in online co-creation (Gabisch & Milne, 2014). This leads to the following hypothesis:

H4c. Perceived control positively affects augmenting.

The mobilizing behavior requires sharing information directly with the app provider or with other users about the user's own knowledge and experience. Customers' ability to control the information access in using the apps might influence their effectiveness and efficiency of the

shopping activities (Merrilees, 2016; Cyr et al., 2006). Hence, higher control shows a higher ability for a consumer to intervene in the transaction process to reach intended outcomes. When users feel that they control the information, it increases their desire to share it with other users (Hajli & Lin, 2016). Moreover, perceived control positively impacts the mental state of involvement and immersion, leading to an attempt to develop their capabilities while increasing the likelihood of their desire to share the information to help other users improve their outcomes (Lin & Joe, 2012). Therefore, it is suggested that the more the customers perceived control over the app use, the more they can help other users achieve their goals and find new app features that might enhance their experience. Thus, the following hypothesis is proposed:

H4d. Perceived control positively affects mobilizing.

Figure 1 shows the proposed research model.

[Please insert Figure 1 here]

4. Methodology

4.1. Instrument and Procedure

This study is focused on the Indonesian market, one of the largest in the world. By January 2019, 142.8 million people actively used mobile internet services, reaching USD 9,536 billion in total annual sales revenue for consumer goods through e-commerce platforms (Kemp, 2020). Unfortunately, with an average number of installed apps of 71 apps per device, only an average of 34 are being actively used after installation (Kemp, 2020). This shows a challenging condition of customer engagement as the installation does not always lead to usage. Unfortunately for companies that have implemented apps, this is a very common behavior in many countries. Hence, investigating consumer engagement behavior in m-commerce apps in the Indonesian market is worthy to be explored.

Data was collected through an online survey with the help of an Indonesian market research company. The invitation link to the online survey was sent to the panel of the market research company. The items in the questionnaire were translated into Indonesian from previous studies. Relative advantage perceived enjoyment and perceived control were measured through the scale developed by Roy et al. (2017) with three items for each factor. These items were used since Roy et al. (2017) also investigated the factor in the m-commerce app's context, which is relevant to the current research.

Moreover, the perceived challenge was measured using Novak et al. (2000), which comprised three-question items. This measurement is appropriate for the current study because it previously measured online consumer challenges. The co-developing, augmenting, mobilizing, and influencing behavior were measured through 16 items developed by Roy et al. (2018a). The measurement items were developed based on the CEB conceptualization by Jaakkola and Alexander (2014), and already tested and show consistent results in both developed and developing countries such as China and India (Roy et al., 2018a).

In order to ensure the accuracy of the translation, back-translation into English was also completed for each question. This method was used to check the accuracy of the translation. Moreover, before obtaining the data, pilot testing to 20 respondents was conducted to ensure the adequacy of the translation of the items and avoid ambiguous questions.

4.2 Data Analysis

Except for the demographical questions, all questionnaire items are measured using 7 Likert scales from strongly disagree to strongly agree. The data to test the proposed model was collected from a sample of 717 m-commerce app users. The characteristics of the respondents were: 55.4% men and 44.6% women; 63.3% under 24 years of age, 24.5% between 25-34 years

old, 12.1% above 35 years old. This sample composition represents the country's general population (Katadata, 2019).

Before the data analysis, the checking and cleaning process is done to evaluate similar or incomplete responses. Moreover, data is saved in excel format (.csv) and imported to the SmartPLS to be analyzed.

This study uses a partial least squares-structural equation model (PLS-SEM) to analyze the data. PLS-SEM was chosen as the primary approach of the data analysis for several reasons (Hair et al., 2019a): (1) the complexity of the structural model, which includes many constructs, indicators and/or model relationships; and (2) the objective of this study, which is to better understand increasing complexity by exploring theoretical extensions. Moreover, the present study also assesses the mediating effects of perceived enjoyment and perceived control. Hair et al. (2019b) note that PLS-SEM is superior to assessing mediation analysis than regression analysis. There will be a two-staged approach in running the analysis: first, evaluating the inner model and then assessing the outer model (Hair et al., 2011).

5. Result and Analysis

5.1 Reliability and Validity of the Measures

The score of composite reliability (CR) and Cronbach's alpha (CA) were used to test the reliability and validity of each construct's measures. The CR and CA scores should be minimum at 0.60 to show that the construct is reliable (Bagozzi & Yi, 1988). In this study, all of the construct's measures are considered reliable (see Table I).

[Please insert Table I Here]

Moreover, the average variance extracted (AVE) was used to assess convergent validity. Table II shows that AVE scores and the correlation of the study are above 0.50 as the

main threshold. This condition indicates the achievement of convergent validity (Fornell & Larcker, 1981). The discriminant validity is also achieved as the square root of AVE exceeds the inter-correlation (IC) score (Fornell & Larcker, 1981). Heterotrait-monotrait (HTMT) ratio is also checked to estimate the research's discriminant validity. Henseler et al. (2015) suggested a maximum score of 0.90 as the threshold for this criterion. In this research, all the HTMT score is below 0.90, which resembles the achieved score of HTMT (see table II).

[Please insert Table II Here]

5.2 Hypotheses Testing

In testing the common-method bias, current research uses the Harman's single-factor test. The problem in common-method mostly occurs when a single unrotated factor solution is available from the exploratory factor analysis (EFA), or the appearance of one general factor for the majority of covariance within the measures (Podsakoff & MacKenzie, 2003). In this research, it was shown that the EFA test reveals factors with eigenvalues higher than one. The result account for 64.65% where the first factor accounts for 46.17% of the total variance. This result indicates that the common-method variance was not a significant problem in the research. Moreover, hypotheses were tested through the inner model and the bootstrapping procedure up to 5000 subsamples. The hypothesis testing result can be seen in Table III.

[Please insert Table III Here]

According to Hair et al. (2019a), squared multiple correlations values of 0.25, 0.50, and 0.75 indicate weak, moderate, and substantial, respectively. In the current research, the model explained 61.3% of the variance (R^2) in perceived enjoyment, 52.5% in perceived control, 36.6% of the variance in co-developing, 45.8% of the variance in influencing, 30.2% of the variance in augmenting, and 36.7% of the variance in mobilizing. Thus, the proposed model

has relatively good prediction power. The predictive capabilities of the structural model are also displayed through the effect size (f^2). Researchers note that f^2 values higher than 0.02, 0.15, and 0.35 indicate small, medium, and large f^2 effect sizes (Hair et al., 2019a). The f^2 values in this study were in the range of 0.003 to 0.670 (see Table III).

On the other hand, the calculation of Q^2 also aimed to assess the model's predictive capabilities. Through a blindfolding procedure of the Stone-Geisser test, the Q^2 values were 0.469 and 0.365 for perceived enjoyment and control. Meanwhile, co-developing, influencing, augmenting, and mobilizing have Q^2 values of 0.275, 0.322, 0.210, and 0.255, respectively. Q^2 values higher than 0, 0.25, and 0.50 indicate small, medium, and large predictive relevance (Hair et al., 2019). Thus, the proposed model suggests high predictive relevance. From the hypothesis testing result in Table III, all hypotheses with the direct relationship are supported with strong significance.

Both hypotheses 1A and 1B are accepted, which shows that relative advantage is positively associated with perceived enjoyment ($PC=0.61$; $P<0.001$) and with perceived control ($PC=0.45$; $P<0.001$). Hypotheses 2A and 2B are also accepted, which illustrates that perceived challenge positively influences perceived enjoyment ($PC=0.25$; $P<0.001$) and perceived control ($PC=0.37$; $P<0.001$). The result confirmed the importance of the apps' relative superiority and sense of challenges as antecedents of the customers' enjoyment and control.

Hypotheses 3A, 3B, 3C and D are accepted which portrays the positive relationship between perceived enjoyment and each of engagement behavior: co-developing, influencing, augmenting and mobilizing ($PC=0.25$, $P<0.001$; $PC=0.44$, $P<0.001$; $PC=0.20$, $P<0.001$; $PC=0.32$, $P<0.001$). Last, hypotheses 4A, 4B, 4C, and D are also accepted which resembles the positive relationship between the perceived control and each of engagement behavior: co-developing, influencing, augmenting, and mobilizing ($PC=0.36$, $P<0.001$; $PC=0.27$, $P<0.001$; $PC=0.28$, $P<0.001$; $PC=0.28$, $P<0.001$). By this, in order to obtain more engaged customers,

the firm should be able to develop apps that deliver a sense of enjoyment and control for the customers.

5.3 Mediation Analysis

The mediation analysis findings can be seen in the Table IV. The results show that the indirect effect of the relative advantage on co-developing and mobilizing behavior through perceived enjoyment is significant (PC=0.088;95% CI: 0.014 to 0.168; PC=0.118;95% CI: 0.043 to 0.198), which leads to a full mediation. Perceived control also confirmed to fully mediates the relationship between relative advantage and three engagement behaviors: co-developing, augmenting and mobilizing behavior (PC= 0.113;95% CI: 0.064 to 0.171; PC= 0.052;95% CI: 0.04 to 0.107; PC=0.069;95% CI=0.11 to 0.125).

Likewise, as the direct relationship between relative advantage and influencing behavior is significant (PC= 0,198; $p<0.001$), partial mediation of perceived enjoyment and perceived control occurs in the model. However, perceived enjoyment does not mediate the relationship between relative advantage and augmenting behavior (PC=0.048;95% CI: -0.022 to 0.122).

Most of the findings on the mediating role of perceived enjoyment and perceived control in the relationship between perceived challenges and each engagement behavior (i.e., co-developing, influencing, augmenting, mobilizing) are partial mediation. For example, the significant direct and indirect relationship between perceived challenges and co-developing (PC=0.251; $p<0.001$), perceived challenges and influencing (PC=0.112; $p<0.01$), and perceived challenges and mobilizing (PC=0.289; $p<0.001$) lead to partial mediation of perceived enjoyment and perceived control toward the relationships. However, while perceived enjoyment does not significantly mediate the perceived challenge and augmenting behavior relationship

(PC=0.20;95%; CI:-0.008 to 0.051), perceived control partially mediates the relationship between both variables (PC=0.042;95%; CI: 0.003 to 0.086).

[Please insert Table IV Here]

6. Discussion

6.1 Theoretical Implication

The current study provides several contributions. First, the study unveils the factors that might develop the customers' engagement behavior in m-commerce apps settings. This is essential as previous studies in mobile apps focus more on adoption (e.g., Jiang et al., 2021; Roy & Moorthi, 2017) rather than the user's behavior (Molinillo et al., 2020).

Secondly, this study provides a more thorough investigation of the driver of each customers' engagement behavior dimensions. The analysis confirmed the relationships between the apps' relative advantage and perceived challenge towards consumers' perception of enjoyment and control, leading to mobilizing, augmenting, influencing, and co-developing behavior. These findings respond to van Doorn et al.'s (2010) suggestions to develop research that unveils how the antecedents might impact the different types of customer engagement behavior.

Moreover, the utilization of augmenting, co-developing, influencing, and mobilizing behavior in this study provides a more comprehensive form of customer engagement behavior. In this case, although previous studies (e.g., Romero, 2017; Roy et al., 2018b) have already attempted to investigate antecedents of various behavioral forms of customer engagement, the utilized concept of the behavior is different. For example, Romero (2017) depicts engagement behavior only in the word-of-mouth and co-creation behavior concepts, while Roy et al.

(2018b) illustrate it in word-of-mouth, customer helping customers, and customer helping company behavior.

The co-creation behavior in Romero (2017) only portrays how consumers can suggest the company for its development, which is also reflected in the current study's co-developing behavior concept. However, our research also adds augmenting behavior to illustrate the condition where the consumer might act directly to improve the firm's offering with its resources. Moreover, though previous studies such as Roy et al. (2018a) had used the conceptualization of mobilizing, augmenting, influencing, and co-developing behavior, the study utilizes it as a second-order factor model, which is unable to investigate the relation towards each engagement behavior directly. Hence, the current study provides additional insight by differentiating engagement behavior into mobilizing, influencing, augmenting, and co-developing behavior and directly investigates the drivers toward each of the behavior.

Third, this study provides new insight through the use of perceived enjoyment and control as the driver of each engagement behavior, which has been rarely discussed. Previous studies have shown the perceived enjoyment role as a driver for intention to adopt (Rouibah et al., 2016), and impulsive buying behavior (Xiang et al., 2016). Moreover, perceived control has been related to information sharing behavior (Hajli & Lin, 2016), perceived justice or fairness (Guo et al., 2016), and various attitudes towards the platform include pleasure, stress, and intention to return (Lunardo & Mbengue, 2009). Through the current study, it can be concluded that ones' enjoyment and sense of control are influential towards the transactional behavior of the customer and behavior beyond the transaction.

Fourth, the current study also provides additional insight through the use of mediation analysis of perceived enjoyment and perceived control concepts. The result shows that the relative advantage of mobile commerce apps might ignite the customer's willingness to co-develop, mobilize, and augment the services if it enhances their enjoyment and sense of control

within the interaction. This is essential as previous research mostly analyzes the mediating role of perceived enjoyment and perceived control individually. For example, the investigation of enjoyment as a mediating variable has been done by Brom et al. (2017), which seen enjoyment mediates the relation between individual activities and their retention towards the activities. On the other hand, Leung et al. (2014) argued that enjoyment as part of intrinsic motivation mediates the relationship between ones' goal orientation and creativity outcomes. However, both Brom et al. (2017) and Leung et al. (2014) researches have occurred within the educational field, which focused on the individual's task as the driver of enjoyment. Current research provides insight as enjoyment is also pivotal in shopping activities and mediates the relationship between consumer's evaluation over the object's stimuli and acts as an intrinsic driver towards ones' behavioral decision.

Likewise, Previous research (i.e., Dabholkar & Sheng, 2009; Rippé et al., 2016) examined the mediating role of perceived control in the case of the online customer. Both of the research unveils how perceived control mediates the platform's quality and individual behavior factor towards the behavioral outcomes. While Dabholkar & Sheng (2009) focus more on the website's speed quality and intention to use, Rippé et al. (2016) investigate the mediating role of perceived control between user's search behavior and purchase intention. Current research provides a more thorough perspective in the research model as it reflects both the mediating role of perceived control between the superiority of the apps and the apps' challenge towards the engagement behavior.

6.2 Practical Implications

The research shows that relative advantage and perceived challenges influence customers' engagement behavior, both directly and indirectly. Hence, the firm should focus on the apps' feature superiority, including convenience, outcomes consistency, and ease of usage.

The apps should be reliable enough to provide consistent results overtimes. Likewise, managers should also consider the ability of the apps to allow a consumer to perform their skills in operating the apps. For example, though the user interface of the apps should be clear, pleasant, and user friendly, it should allow customers to perform various shopping strategies based on their preference (e.g., advanced filtering choices on prices, product, brand, etc.) to add the sense of challenging experience.

Moreover, mobile commerce applications should also consider the enjoyment and control of the customer experiences. Many current mobile commerce consumers now use the apps for shopping and working, watching videos, listening to music, and social networking (Chong, 2013). Enjoyment can be retrieved from the sense of fun and pleasure in using the apps (see: Pe-Than et al., 2014), while control gained through customer intervention and influence within the interaction with the apps (Roy et al., 2017).

For example, current m-commerce utilizes augmented reality, which might provide effective communications that enhance the usefulness of the services (Yim et al., 2017). This is because the more interactive the apps', the more possibilities for customers to gain more in-depth information about the product or services (Ariely, 2000). For example, the virtual try-on menu as an augmented reality application enables customers to visualize the product in their home, their body, or even the surrounding environment (cf. McLean et al., 2020; Mulcahy & Riedel, 2020). These kinds of features facilitate customers to achieve their shopping goals through their involvement and ability to operate the features.

6.3 Limitation and Further Research Avenues

Although the study provides theoretical and practical implications, this study also possesses several limitations. This study accounted for most of the smart customer experience, including perceived relative advantage, control, and enjoyment (see: Roy et al., 2017) as predictors of

engagement behavior. Future research should consider the inclusion of other factors, for example, the customers' perceived fairness and sense of trust towards the apps. This occurs since fairness role as a fundamental factor for customer to evaluate their relationship towards the firm includes customer extra roles behavior (Roy et al., 2018b), and trust as outcomes of fairness might enhance the likelihood of ones to perform engaged behavior (Roy et al., 2018b).

Second, the current study focused more on the overall challenge in using the m-commerce app. It did not consider the level of challenge or the challenge magnitude faced by consumers while using the m-commerce app. This is critical as a different challenge magnitude might result in different consumers' responses. Novak et al. (2000) argued that the level of challenge should be balanced with the consumer's level of skills to avoid anxiety or boredom. For example, when the m-commerce app provides too much challenge, consumers might feel anxious or less enjoy their usage experience. Otherwise, when the challenge is too simple, there might be a chance for them to be bored in using the m-commerce apps. Hence, future research should consider using experiments to investigate which challenge level the consumer will enjoy.

Third, the study uses a cross-sectional survey that captured only one-time market conditions. Hence, a longitudinal method is suggested as it provides temporal separation, which might reduce the respondent's cognitive ability to access their responses towards predictors that are collected earlier (Rindfleisch et al., 2008).

Last, the study includes a sample from a single nation (Indonesia), reflecting only one country's cultural background. Previous research (i.e., Leung et al., 2014) argued that including another cultural context might enhance the cultural generality of the study.

7. Conclusion

In conclusion, the current study contributes to the engagement behavior literature by investigating the drivers of a different form of engagement behavior through the SOR framework. The finding shows that perceived relative advantage and challenge as mobile app's stimuli might influence internal customer response, including enjoyment and perceived control, leading to behavioral responses such as mobilizing, augmenting, co-developing, and influencing behavior. The finding has significant implications for managers in enhancing customer enjoyment and sense of control when developing the apps' superior features to enhance customer engagement.

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Figure 1. Research Framework

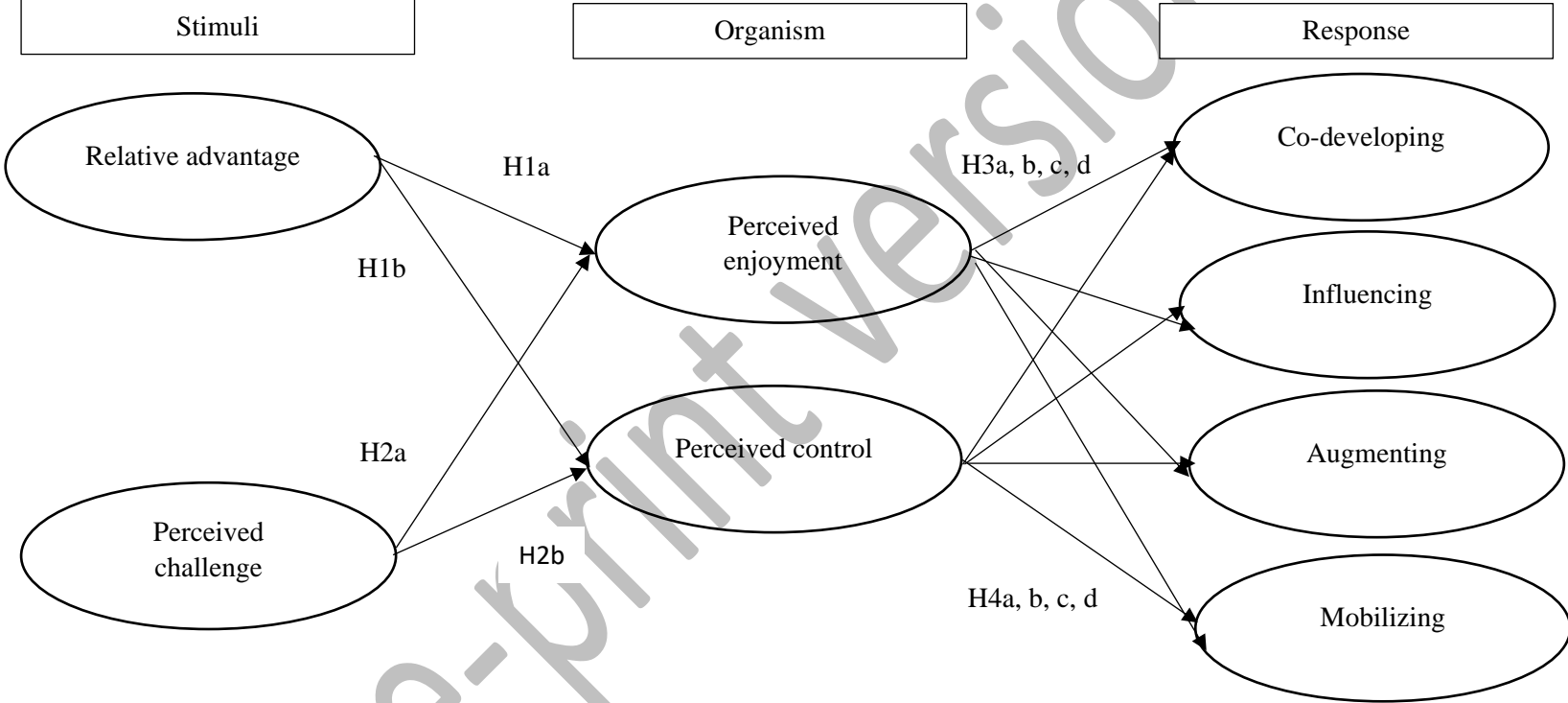


Table I. Measurement items and the path coefficients (PC)

Constructs and items	FL	M	SD	CA	CR
Relative Advantage		5.31	1.07	.79	.88
Using m-commerce apps is more convenient than other retail technologies.	.84				
M-commerce apps offers consistent results over time.	.82				
It is easier to use m-commerce apps compared to other retail technologies.	.87				
Perceived Challenge		4.75	1.34	.88	.92
Using the m-commerce app challenges me to perform to the best of my ability.	.88				
Using the m-commerce app provides a good test of my skills.	.90				
I find that using the m-commerce app stretches my capabilities to my limits.	.90				
Perceived Enjoyment		5.37	1.11	.85	.91
I have fun interacting with m-commerce apps	.87				
Using m-commerce apps provides me with a lot of enjoyment.	.89				
I enjoy using m-commerce apps.	.88				
Perceived Control		5.20	1.11	.79	.88
When using m-commerce apps, I feel in control.	.84				
When using m-commerce apps my attention is focused totally on using it.	.85				
I have the necessary means and resources to use m-commerce apps.	.82				
Customer-Engagement Behavior					
Co-Developing		4.98	1.21	.85	.91
I proactively communicate with the m-commerce apps about potential service-related problems.	.87				
I make constructive suggestions to the m-commerce apps about how to improve its services.	.88				
I let the m-commerce apps know of ways that can better serve my needs.	.88				
Influencing		5.13	1.08	.80	.88
I said positive things about this m-commerce apps and its employees to others.	.85				
I recommend this m-commerce apps and its employees to others.	.87				
I encourage friends and relatives to use this m-commerce apps in the future.	.82				
Augmenting		4.38	1.44	.86	.91
I post photographs of my activity with the m-commerce apps on social media.	.85				
I would write blogs about my positive experience with the m-commerce apps.	.86				
The m-commerce apps provides opportunities to share my experience with others via social media.	.84				
I engage in forwarding the promotions offered by this m-commerce apps to others.	.82				
Mobilizing		4.88	1.21	.92	.94
I assist other customers if they need my help.	.84				
I give advice to other customers regarding the services of the m-commerce apps.	.85				
I teach other customers to use services correctly.	.84				
I help other customers if they seem to have problems.	.85				
I am willing to stand to protect the reputation of the m-commerce apps.	.81				
I am willing to clarify other customers or outsiders misunderstanding regarding the m-commerce apps.	.85				

Note: FL = Factor Loading; M = Mean; SD = Standard Deviation; CA = Cronbach's Alpha; CR = Composite Reliability

Table II. Correlations, Validities and HTMT.

	1	2	3	4	5	6	7	8
1. Relative Advantage	.71	.67	.92	.83	.57	.74	.43	.56
2. Perceived Challenge	.56	.80	.69	.75	.60	.60	.61	.60
3. Perceived Enjoyment	.76	.60	.77	.90	.61	.76	.47	.60
4. Perceived Control	.66	.62	.73	.70	.66	.74	.51	.61
5. Co-Developing	.47	.52	.52	.55	.77	.83	.79	.75
6. Influencing	.59	.50	.63	.59	.69	.72	.70	.82
7. Augmenting	.36	.53	.41	.43	.68	.59	.71	.83
8. Mobilizing	.47	.54	.53	.52	.67	.71	.74	.71

Note: The diagonal values in bold indicate the average variances extracted (AVE). The scores below the bold diagonal indicate inter-construct correlations (IC). HTMT refers to Heterotrait-Monotrait Ratio. HTMT values are above the bold diagonal.

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Table III. Results of Structural Equation Analysis

Relationships		f ²	PC	t-value
H1a	Relative Advantage → Perceived Enjoyment	.670	.61	18.00***
H1b	Relative Advantage → Perceived Control	.297	.45	11.45***
H2a	Perceived Challenge → Perceived Enjoyment	.112	.25	7.20***
H2b	Perceived Challenge → Perceived Control	.194	.37	9.08***
H3a	Perceived Enjoyment → Co-Developing	.011	.25	4.42***
H3b	Perceived Enjoyment → Influencing	.049	.44	8.87***
H3c	Perceived Enjoyment → Augmenting	.003	.20	3.64***
H3d	Perceived Enjoyment → Mobilizing	.019	.32	5.66***
H4a	Perceived Control → Co-Developing	.039	.36	6.74***
H4b	Perceived Control → Influencing	.023	.27	5.38***
H4c	Perceived Control → Augmenting	.008	.28	5.08***
H4d	Perceived Control → Mobilizing	.015	.28	5.11***
Variance explained (R ²)				
Perceived Enjoyment		.61		
Perceived Control		.53		
Co-Developing		.33		
Influencing		.43		
Augmenting		.20		
Mobilizing		.32		

Note: PC: Path Coefficient; *** $p < .001$; ** $p < .01$; * $p < .05$; ^{ns} Not Significant.

Table IV. Results of Mediation Analysis

Relationship	Indirect Effect	Bias Corrected Bootstrap 95% Confidence Level		Direct Effect	Type
		Lower	Upper		
RA → PE → CO	0.088	0.014	0.168	0.054 ^{ns}	Full Mediation
RA → PE → IN	0.175	0.111	0.245	0.198 ^{***}	Partial Mediation
RA → PE → AUG	0.048	-0.022	0.122	-0.017 ^{ns}	No Mediation
RA → PE → MO	0.118	0.043	0.198	0.069 ^{ns}	Full Mediation
RA → PC → CO	0.113	0.064	0.171	0.054 ^{ns}	Full Mediation
RA → PC → IN	0.080	0.029	0.138	0.198 ^{***}	Partial Mediation
RA → PC → AUG	0.052	0.004	0.107	-0.017 ^{ns}	Full Mediation
RA → PC → MO	0.069	0.011	0.125	0.069 ^{ns}	Full Mediation
CHA → PE → CO	0.036	0.006	0.072	0.251 ^{***}	Partial Mediation
CHA → PE → IN	0.072	0.042	0.110	0.112 ^{**}	Partial Mediation
CHA → PE → AUG	0.020	-0.008	0.051	0.425 ^{***}	No Mediation
CHA → PE → MO	0.048	0.018	0.084	0.289 ^{***}	Partial Mediation
CHA → PC → CO	0.092	0.051	0.143	0.251 ^{***}	Partial Mediation
CHA → PC → IN	0.065	0.027	0.107	0.112 ^{**}	Partial Mediation
CHA → PC → AUG	0.042	0.003	0.086	0.425 ^{***}	Partial Mediation
CHA → PC → MO	0.056	0.012	0.100	0.289 ^{***}	Partial Mediation

Note: RA: Relative Advantage; CHA: Perceived Challenge; PE: Perceived Enjoyment; PC: Perceived Control; CO: Co-Developing; IN: Influencing; AUG: Augmenting; MO: Mobilizing; *** $p < .001$; ** $p < .01$; * $p < .05$; ^{ns} Not Significant.