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**Article**

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## MARKETING | RESEARCH ARTICLE

# Determinants of intention to continue usage of online shopping under a pandemic: COVID-19

Hamood Mohammed Al-Hattami<sup>1\*</sup>

**Abstract:** Although numerous reports predict huge growth potential for online shopping under COVID-19 pandemic, many do not know about determinants of user intention to continue using online shopping under such a pandemic. Given that how to motivate continuousness and retain consumers under a pandemic is critical to the online retailers and relevant stakeholders' success, research on the determinants of intention to continuance using online shopping has attracted widespread attentiveness. The determinants of intention to continue using online shopping under COVID-19 pandemic, especially in India, have not yet been researched. Therefore, this study proposes a model combining the expectation-confirmation model (ECM) with task-technology fit (TTF) model and the trust factor to examine intention to continue using online shopping under COVID-19. Based on data gathered from 222 online participants during the period of social distancing due to COVID-19, the findings revealed that perceived TTF is much significant factor; satisfaction, perceived usefulness, and trust have positive impacts on consumers' intention to continue usage of online shopping under COVID-19. Additionally, confirmation directly affects satisfaction, perceived usefulness, and indirectly affects consumers' intention to continuance usage. The study's findings provide online retailers and related stakeholders with significant managerial implications.

**Subjects:** Business, Management and Accounting; Marketing; Retail Marketing; Information Technology; Internet

**Keywords:** Online shopping; continuous usage; ECM; TTF; trust; pandemic; COVID-19



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### PUBLIC INTEREST STATEMENT

Online shopping is described as a mechanism whereby consumers buy products or services via the Internet using a web browser or mobile app.

As uncertainty persists amid the novel COVID-19, consumers have become more cautious about shopping in public. This pandemic has forced consumers to adopt new behaviors, for example, wear face masks, social spacing, and prefer online shopping. Therefore, the investigation of consumers' behavior is of great relevance under COVID-19, as online retailers and relevant stakeholders must expect consumer behavior amid this global crisis to sustain a competitive edge.

## 1. Introduction

The main influence of COVID-19 initially happened in China, then, on the world. On 31 December 2019, China has notified the World Health Organization (WHO) that a series of cases of pneumonia had been explored for an unknown reason in Wuhan City, Hubei Province (Hui et al., 2020; Nueangnong et al., 2020). On 30 January 2020, the WHO announced an international health emergency (World Health Organization (WHO), 2020a); the pathogen has globally become an epidemic (when the humans' infection spreads exponentially beyond the region of origin). International flights from China to regions of the world have been the main factor contributing to its spread to other countries. At this time, the epidemic is out of control (Nueangnong et al., 2020) and becomes a global crisis. In response to the crisis, governments in many countries have taken a series of procedures aimed at reducing the effects of the epidemic such as lockdown and social distancing (Cavallo et al., 2020; Perdana et al., 2020; Verma et al., 2020).

Horribly, the number of reported cases of COVID-19 infected until 21 December 2020 exceeded 75 million globally and more than one and half million deaths. In India alone, more than 10 million confirmed cases of COVID-19 with more than 140 thousand deaths (World Health Organization (WHO), 2020b). Despite the fact that vaccines against COVID-19 have been developed with more than 94% effectiveness, misinformation carries on the spread, raising doubts among people who may be decided not to take the vaccine at all (Silva, 2020).

In fact, this epidemic has suddenly changed our life; from normal to new normal, movement to no movement, and social behavior to social distance (Nueangnong et al., 2020). Under this, new styles and methods such as online teaching and work from home have flourished. Consumer behavior and marketing have also changed significantly (Beaunoyer et al., 2020; Zhao & Bacao, 2020; Mason et al., 2021). A survey conducted by S&P global marketing intelligence firm revealed that while consumers had expressed their intention to cut spending amid the Covid-19 pandemic, they were open to digital offerings. In other words, consumer demand has shifted to "online" (Bitter, 2020).

As uncertainty persists amid the novel COVID-19, consumers have become more cautious about shopping in public. Moreover, the widespread use of today's technology makes consumers' preference for online shopping predictable. According to a survey on about three thousand and seven hundred consumers in nine developing and advanced countries (Brazil, China, Italy, the Republic of Korea, Germany, the Russian Federation, South Africa, Turkey, and Switzerland), more than 50% of the survey's participants now do shopping online frequently (United Nations Conference on Trade and Development (UNCTAD), 2020). That is also in line with a report survey issued by IT firm Capgemini; with lockdown procedures throughout India, the usage of online shopping channels has increased and the tendency will carry on even after the lockdown mechanism has been lifted (PTI, 2020).

It is intuitive that the crisis will not only leave numerous firms struggling for survival, but will also impose some to search for suitable alternative strategic paths (Seetharaman, 2020). While the Covid-19 crisis, on the one hand, has posed many challenges to business firms, on the other hand, the use of today's technology innovations allows such firms chances to determine novel business methods that will allow them to survive the crisis. Online shopping is one of those opportunities, where many manufacture and retail sectors reviewed and adapted their business models online (Herath & Herath, 2020; World Trade Organization (WTO), 2020). Therefore, it is expected that COVID-19 will permanently normalize the usage of online shopping.

Accordingly, the factors that motivate users to continuously utilize online shopping under a pandemic are necessary for related stakeholders to recognize consumers' needs and expectations. Bhattacharjee (2001) indicates that motivating the first adoption is a necessity for the success of IS, while continuous use is vital for long-term sustainability and profitability. Continuous usage is defined

as a decision by the consumer to continue use certain information technology already utilized by him/her (Nabavi et al., 2016). Past studies imply that continuous use is more substantial than the initial use, where the development cost of a fresh consumer may be up to five times higher to retain an existing consumer (Y. Yuan et al., 2019). Thus, understanding the major determinants of intention to continuance use online shopping is important for both online retailers and relevant stakeholders. It is needful to comprehend the customers' perceptions towards online shopping because it will assist in determining the direction and patterns of continuance adoption of online shopping. This could also assist in developing proper strategies aimed at increasing the use of online shopping.

Only few authors have concentrated on the determinants of intention to continuance using online shopping (Al-Maghrabi et al., 2011; Bölen & Özen, 2020; Chopdar & Sivakumar, 2019; Mohamed et al., 2014; Shang & Wu, 2017). The past studies mentioned were conducted in different environments and countries, including India. Moreover, most of these studies examined continuance intention based on the ECM model, but none of them combined the ECM and TTF models. Hence, it is expected that this study will add to the online shopping field by integrating these two established models into one. Also, in Indian context, most studies focused on customers' adoption or acceptance of online shopping rather than continuance usage (e.g., Gupta & Arora, 2017; Khare & Sarkar, 2020; Misra & Vashisht, 2019; Tak & Panwar, 2017). Additionally, as far as our knowledge, there is no prior study on online shopping focusing on continuance intention determinants for using online shopping under COVID-19, especially in India. Consequently, the main study aim is to bridge this research gap by exploring continuance intention determinants towards using online shopping under COVID-19.

This research applied a PLS-SEM to evaluate the empirical power of the correlations in the proposed model. The factors examined here might be important to understand the user's intention for continuance usage of online shopping under COVID-19. For online retailers and relevant stakeholders to increase their online sales, they must understand what factors contribute to consumer intention to continue using online shopping. The results of this study not only assist online retailers and relevant stakeholders to boost consumer retention and attract new and potential ones, but also to evaluate the revised ECM validity for IS researchers under a pandemic such as COVID-19.

## 2. Literature review

### 2.1. Online shopping under COVID-19

Online shopping can be described as a mechanism whereby consumers buy products or services via the Internet using a web browser or mobile app. Online shopping is popular due to the broad set of goods and services it offers to consumers (Kripesh et al., 2020). The consumer is also offered more information and choices to contrast product and price and facilitate finding anything online (Katawetawaraks & Wang, 2011).

Among all emerging nations in the world, the Indian economy is deemed the most prosperous and fastest-growing. India has a variety of strengths in the present global scenario, including increased technical efficiency and digital literacy among others (M. Sharma & Sharma, 2019a). In addition, it is ranked as the world's 2<sup>nd</sup> biggest market in terms of aggregate Internet users (IBEF, 2020a). Indian consumers use the Internet to purchase products and services such as travel tickets, computers, mobile and its accessories, and consumer goods. Online shopping sites such as Flipkart, Amazon, and Snapdeal are very popular with Indian consumers (Sarkar & Khare, 2017). Today, almost every shopping site has an app that can be installed on smartphones easily and for free (Tak & Panwar, 2017). This has been highly boosted by the continuously increasing number of smartphone users (Chung et al., 2016; Groß, 2016). In 2019, it was estimated that one in three Indians shopped on a smartphone. By 2025, Indian Government is aiming to create a 1 USD trillion online economy through its digital campaign in India (IBEF, 2020b).

For COVID-19 pandemic, it had come in favor of online shopping. It is estimated that India's online retail market will surpass sales by around US\$3.19 billion in 2020, a 76% significant jump from the

previous year (IBEF, 2020b). This pandemic has forced consumers to adopt new behaviors concerned with personal and family safety and public health (Mehta et al., 2020). These behaviors, for example, wear face masks, social spacing, avoid shopping in public places, and prefer online shopping. The aforementioned new behaviors have ruled the market dynamics. This in return imposed many dealers and firms to undergo a significant transformation, rethink the key elements of their business operations and use technology, including online shopping (Alalwan et al., 2018). Such technology channels are predicted to play a powerful role in transactions, reaching consumers, and retaining them after COVID-19 (Mehta et al., 2020). Kotler and Keller (2012) state that it is important to have a clear comprehension of consumer life to guarantee that the goods and services most appropriate for the right consumers are being marketed in the most productive way possible. Therefore, it is important to explore the behavior of consumers under COVID-19 while shopping online in order to properly target them and offer information and facilities based on their requirements.

## 2.2. ECM model

ECM is known to be the first model that explains what motivates customers to continue using an IT/IS (Chung et al., 2016). It was suggested by Bhattacherjee (2001). It contains three key factors, namely perceived usefulness, confirmation, and satisfaction to evaluate intention to continue usage of IS. ECM states that expectations and perceived usefulness drive post-use satisfaction and thus affect intention of continuous use (Bhattacherjee, 2001; Hsu & Lin, 2015; Lee, 2010). The decision of IS user continuity is similar to the buyback decision because the initial usage (of the product or IS) affects both decisions (Sreelakshmi & Prathap, 2020). Therefore, Bhattacherjee (2001) adapted the causal chain to predict the post-acceptance of the user (continuous use) of IS. IS user continuity is defined by Bhattacherjee (2001) as a continuous use by adopters, whereby the decision to continue follows the initial adoption decision.

Numerous studies have utilized ECM model to understand users' intention to continue IS/IT usage such as massive open online courses (Alraimi et al., 2015), social networking sites (Y. P. Chang & Zhu, 2012), Internet shopping (Chen, 2012), mobile shopping (Bölen & Özen, 2020), coffee shop online store (Chen & Demirci, 2019), and mobile Internet (Jumaan et al., 2020), which present that ECM model is effective in expecting intention to continuance in different IS/IT contexts. Despite ECM is applied in many IS/IT contexts, many researchers found that extending ECM or integrating it with other relevant models enables to better predict the continued use intentions of users (Chong, 2013). Therefore, the ECM is integrated with TTF model as well as extended by the trust factor to understand consumers' continued intention towards online shopping during COVID-19 in the current study.

## 2.3. Task-technology fit (TTF) model

TTF model supposes that users are rational, as long as the technology better supports their tasks, they will employ it (Tam & Oliveira, 2016). The TTF has no elements of IS/IT continuance like perceived usefulness, confirmation, and satisfaction. For obtaining an inclusive explanation of the technology and related task's characteristics in forecasting and usage of technology, Yen et al. (2010) emphasize that TTF model may expand with other IS elements. Integrating the TTF model with other models can interpret technology adoption better (Tam & Oliveira, 2016; Zhao & Bacao, 2020). Thus, integrating the TTF model with ECM is a proper way to investigate individual behavior toward continuance usage of online shopping.

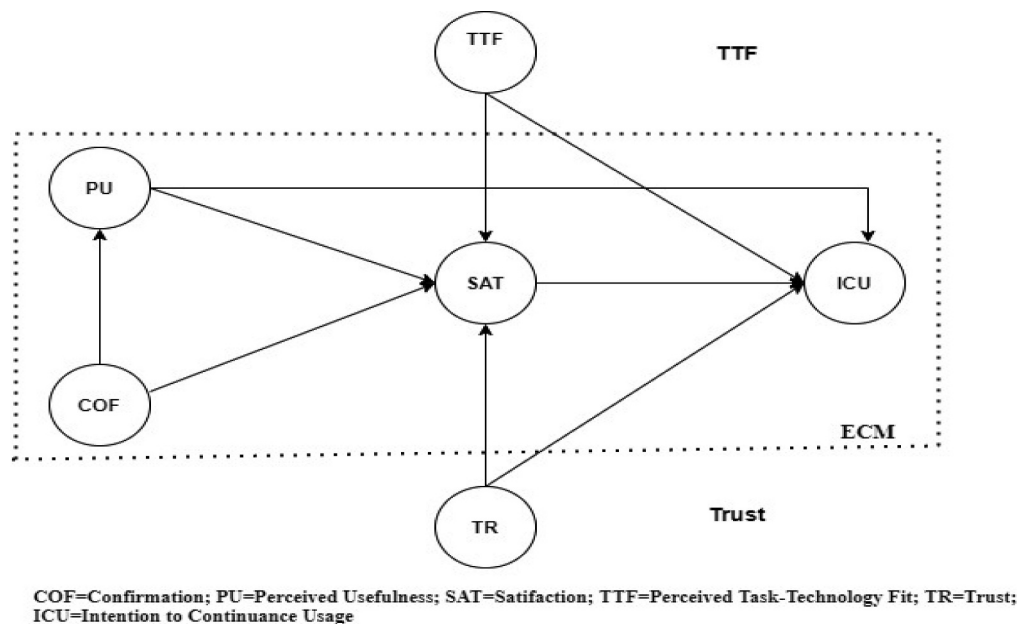
## 2.4. Research model and hypotheses

The paper aim is to explore the determinants of the intention to continue use online shopping under COVID-19. This paper, therefore, suggests a research model combining ECM with TTF and the trust factor (see Figure 1).

### 2.4.1. Confirmation

Confirmation is a cognitive tenet derived from previous IS usage (to what extent users' expectations of using IS are achieved during actual use) (Bhattacherjee, 2001). Bhattacherjee (2001)

Figure 1. Research model.



concluded that confirmation is a significant construct that forecasts satisfaction and perceived usefulness, which in return decide the user's continuance intention of IS use. Chong (2013) confirmed that satisfaction and perceived usefulness are positively impacted by confirmation towards the intention to continuance using mobile commerce. Such results have been confirmed by many other authors (e.g., Alraimi et al., 2015; Chen & Demirci, 2019; Hung et al., 2012; Jumaan et al., 2020). Accordingly, it is proposed:

**H1:** Confirmation positively impacts perceived usefulness towards continuous using online shopping under COVID-19.

**H2:** Confirmation positively impacts satisfaction towards continuous using online shopping under COVID-19.

#### 2.4.2. Perceived usefulness

Perceived usefulness is described as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, p. 320). In online shopping context, it is defined as consumers' perception of how an internet portal adds value and competence to them during online shopping (Kripesh et al., 2020). In the context of IS continuity, perceived usefulness is an appropriate expectation since it is the only perception that has been proven to continuously affect the user's intention over the time phases of using IS (Bhattacharjee, 2001). Several prior studies found that perceived usefulness positively affects continued IS/IT usage intentions and user satisfaction (Bölen & Özen, 2020; Chong, 2013; Foroughi et al., 2019; Lee, 2010). Accordingly, this paper proposes:

**H3:** Perceived usefulness positively impacts satisfaction towards continuous using online shopping under COVID-19.

**H4:** Perceived usefulness positively impacts intention to continue usage of online shopping under COVID-19.

#### 2.4.3. Satisfaction

Satisfaction is a critical factor that assists keep a competitive advantage (Li et al., 2021). Based on ECM, Bhattacharjee (2001) reports that the object of IS continuity could easily be influenced by satisfaction, which usually results from prior use. Numerous studies, in different areas, have proven the positive influence of user satisfaction on use (Al-Hattami, 2021) as well as continuity of use (Al-Hattami et al., 2021; Jumaan et al., 2020; Shang & Wu, 2017; Yang, 2021; S. Yuan et al., 2016). Accordingly, it is suggested:

**H5:** Satisfaction positively impacts intention to continue usage of online shopping under COVID-19.

#### 2.4.4. Perceived TTF

TTF is “the degree to which a technology assists an individual in carrying out his or her tasks” (Yen et al., 2010, p. 908). Thus, users can admit technology only if it is beneficial and helps to increase the efficiency of their tasks (Hidayat-ur-Rehman et al., 2016; Rahi et al., 2020; Tam & Oliveira, 2016). So, perceived TTF is expected to be an important motivation for continuance usage and satisfaction towards online shopping under COVID-19. Accordingly, it is proposed:

**H6:** Perceived TTF positively impacts satisfaction towards continuous using online shopping under COVID-19.

**H7:** Perceived TTF positively impacts intention to continue using online shopping under COVID-19.

#### 2.4.5. Trust

Trust is crucial in Internet environment, particularly when it comes to money. A great deal of trust is needed to successfully operate this computing environment (Alalwan et al., 2018; Vatanasombut et al., 2008). Gefen (Gefen et al., 2003) defines trust as an expectation that others will not act opportunistically by taking benefit of a situation. Lack of trust is a barrier to adopt or continue using Internet-based services (Koç et al., 2016; Lin et al., 2020).

Trust has been determined as a critical factor in related literature. Literature assumes that customers/consumers who trust Internet-based services likely continue to use those services (Ahmed & Ali, 2017; Groß, 2016; Lin et al., 2020; Vatanasombut et al., 2008; Zhao et al., 2019; Zhou, 2013). Trust will have an impact not only on the consumers’ intention to continue using Internet services but also on other factors. Customers will have higher satisfaction with services provided online if they have higher trust in them (Al-Hattami et al., 2021; Bölen & Özen, 2020; S. K. Sharma & Sharma, 2019b; Yoon, 2002). Teo et al. (2008) stated that several researches of online trust have transacted with the intention as the final dependent variable. Relatively few studies have addressed the link between trust and satisfaction. Consequently, the present paper converges consumers’ trust through its effect on satisfaction and intent to continue using online shopping under COVID-19, thus it is suggested:

**H8:** Trust positively impacts satisfaction towards continuous using online shopping under COVID-19.

**H9:** Trust positively impacts intention to continue usage of online shopping under COVID-19.

### 3. Methodology

Since the study’s aim is to explore the continuance intention determinants towards the use of online shopping under COVID-19, a quantitative approach is employed. To attain this, a Web-based questionnaire was utilized for data collection. Saunders et al. (2009) proposed that the



questionnaire approach is adequate for testing the suggested hypotheses. Moreover, questionnaires offer a relatively inexpensive, speed, and effective way to get large information amount from a large sample of people (Thomas, 2004). Besides demographic data, the questionnaire includes six variables, namely confirmation, perceived usefulness, satisfaction, perceived TTF, trust, and intention to continuance usage. Prior research was employed to identified key indicators for each construct/variable (Bhattacharjee, 2001; S. C. Chang & Chou, 2012; Chen, 2012; Chong, 2013; Hsu et al., 2006; Pappas et al., 2014; Zhao & Bacao, 2020) (see Appendix A). To score replies, a Likert scale of 5-points was utilized. Data were gathered from online shopping users with the aid of a Web-based questionnaire via Google docs in October–November 2020. As the present study was conducted under COVID-19 pandemic of 2020 where new behaviors such as social spacing were adopted (Mehta et al., 2020; Nueangnong et al., 2020), the online questionnaire is the most adequate method to be undertaken. This questionnaire has been distributed via various social media networks such as email. In response, 222 online shopping users filled the questionnaire; all of them were complete and valid. A sample size exceeding 200 is adequate to offer enough statistical power for analyzing data (Comrey & Lee, 1992; Hair Jr. et al., 2010; Kelloway, 1998). Hence, the sample size of 222 obtained in this research is large enough for data analysis. Of these participants, 59.5% are male and 40.5% female; most of them are 26–35 years old; over 50% of them are postgraduate; 49.5% of them shop using Amazon, 31.1% Flipkart, 10.4% Snapdeal, and 9% other websites/apps (See Table 1).

This study employs PLS-SEM to analyze and test the study proposed model. PLS-SEM is “a causal-predictive approach to SEM that emphasizes prediction in estimating statistical models, whose structures are designed to provide causal explanations” (Hair et al., 2019, p. 3). It is commonly employed in research of marketing (Hair et al., 2019) and information systems (Urbach & Ahlemann, 2010). There are no assumptions by PLS-SEM about the distribution of the variables and it ensures optimal prediction accuracy. Furthermore, PLS-SEM is very helpful when the study model is comparatively intricate with a large number of variables, indicators, and structural paths (Hair et al., 2019; Urbach & Ahlemann, 2010).

#### 4. Analysis and results

In PLS-SEM, the measurement model characteristics have to first examine and deal with unacceptable ones. Thereafter, if the measurement model satisfies all the needed characteristics, the researcher can move to the structural model assessment (Fornell & Larcker, 1981; Hair et al., 2011). In terms of reliability and validity, the measurement model is usually verified, while the structural model is examined by path coefficients (hypotheses testing), assessing “ $R^2$ , predictive relevance  $Q^2$ , effect size ( $f^2$ ), and model fit”.

**Table 1. Demographic information**

Demographic information	Categories	Freq.	Percentage %
Gender	M	132	59.5
	F	90	40.5
Age group	25 and below	19	8.5
	26–35	136	61.3
	36 and above	67	30.2
Education level	Graduate	28	12.6
	Postgraduate	115	51.8
	Doctorate	79	35.6
Shopping place	Amazon	110	49.5
	Flipkart	69	31.1
	Snapdeal	23	10.4
	Other	20	9

#### 4.1. Measurement model

The measurement reliability is evaluated through Cronbach’s alpha ( $\alpha$ ) and composite reliability (CR). In quantitative research, the use of  $\alpha$  with a value of  $\geq 0.70$  is usually recommended (Hair Jr. et al., 2010). Besides, CR is also required with values of  $\geq 0.70$  (Urbach & Ahlemann, 2010). The validity is examined utilizing convergent validity (CV) and discriminant validity (DV). First, CV is evaluated in two ways: factor loadings (FL) and average variance extracted (AVE). For ensuring an unidimensionality of the measurement model, FL for each indicator should be within the threshold of  $>0.60$  (Urbach & Ahlemann, 2010); any indicator that has low FL should be deleted. According to the literature, the 50% and above AVE score refers to a reasonable degree of convergent validity, meaning that the construct describes at least 50% of the variance of its indicators (Henseler et al., 2016; Hair et al., 2019). Discriminant validity relates to the extent to what the measures of constructs differ from each other (Urbach & Ahlemann, 2010). Cross loading (CL) is the initial method for assessing the discriminant validity of the indicators. The CL of an index on its variable must be above its loads on all other variables (Urbach & Ahlemann, 2010). The Fornell-Larcker standard is the second way to assess the validity of discrimination. It compares AVE scores with the latent variable correlations (Fornell & Larcker, 1981; Hair et al., 2011). Specifically, the correlation scores of each construct have to be lower than AVE’s square root. As exhibited in Tables 2 and 3, all these conditions were achieved “i.e. reliability and validity”, supporting the measurement model.

The assessment of multicollinearity and common method bias (CMB) is recommendable as well (Chin et al., 2012; Hair et al., 2011). A multicollinearity issue is not desirable in any research. This implies that the external variance variables interfere in the internal variable overlap with each other, so that no real variance in the internal variable is clarified (O’Brien, 2007). For CMB, the recent research high pointed the significance of evaluating the impact of CMB on statistical analysis findings (Chin et al., 2012). The existence of a variance inflation factor (VIF)  $>3.3$  is suggested on the basis of Kock (2015) as a mark of the problem of multicollinearity, and as

**Table 2. Cross loadings and factor loadings**

		COF	PU	SAT	TTF	TR	ICU
COF	COF1	<b>0.806</b>	0.442	0.446	0.459	0.430	0.484
	COF2	<b>0.834</b>	0.424	0.468	0.494	0.482	0.500
	COF3	<b>0.820</b>	0.515	0.538	0.450	0.420	0.461
PU	PU1	0.445	<b>0.764</b>	0.446	0.401	0.323	0.449
	PU2	0.331	<b>0.753</b>	0.394	0.431	0.196	0.433
	PU3	0.542	<b>0.858</b>	0.570	0.524	0.407	0.549
SAT	SAT1	0.560	0.557	<b>0.816</b>	0.514	0.559	0.584
	SAT2	0.492	0.505	<b>0.845</b>	0.531	0.476	0.542
	SAT3	0.414	0.448	<b>0.764</b>	0.496	0.402	0.483
	SAT4	0.356	0.338	<b>0.681</b>	0.409	0.421	0.431
TTF	TTF1	0.429	0.463	0.525	<b>0.775</b>	0.624	0.623
	TTF2	0.477	0.454	0.519	<b>0.804</b>	0.416	0.549
	TTF3	0.456	0.455	0.459	<b>0.811</b>	0.543	0.648
TR	TR1	0.421	0.251	0.483	0.509	<b>0.792</b>	0.464
	TR2	0.449	0.386	0.547	0.519	<b>0.873</b>	0.590
	TR3	0.466	0.348	0.456	0.624	<b>0.808</b>	0.580
ICU	ICU1	0.455	0.495	0.565	0.654	0.540	<b>0.855</b>
	ICU2	0.491	0.542	0.526	0.661	0.584	<b>0.875</b>
	ICU3	0.562	0.526	0.609	0.650	0.583	<b>0.845</b>

\*Factor loadings are in italic.

**Table 3. Measurement model and multicollinearity test**

	$\alpha$	CR	AVE	COF	PU	SAT	TTF	TR	ICU	VIF
COF	0.757	0.860	0.672	<b>0.820</b>						1.000
PU	0.707	0.835	0.629	0.566	<b>0.793</b>					1.715
SAT	0.783	0.860	0.607	0.594	0.603	<b>0.779</b>				2.164
TTF	0.713	0.839	0.635	0.569	0.574	0.629	<b>0.797</b>			2.313
TR	0.765	0.865	0.681	0.540	0.402	0.601	0.666	<b>0.825</b>		1.939
ICU	0.822	0.894	0.737	0.586	0.607	0.660	0.763	0.663	<b>0.859</b>	-

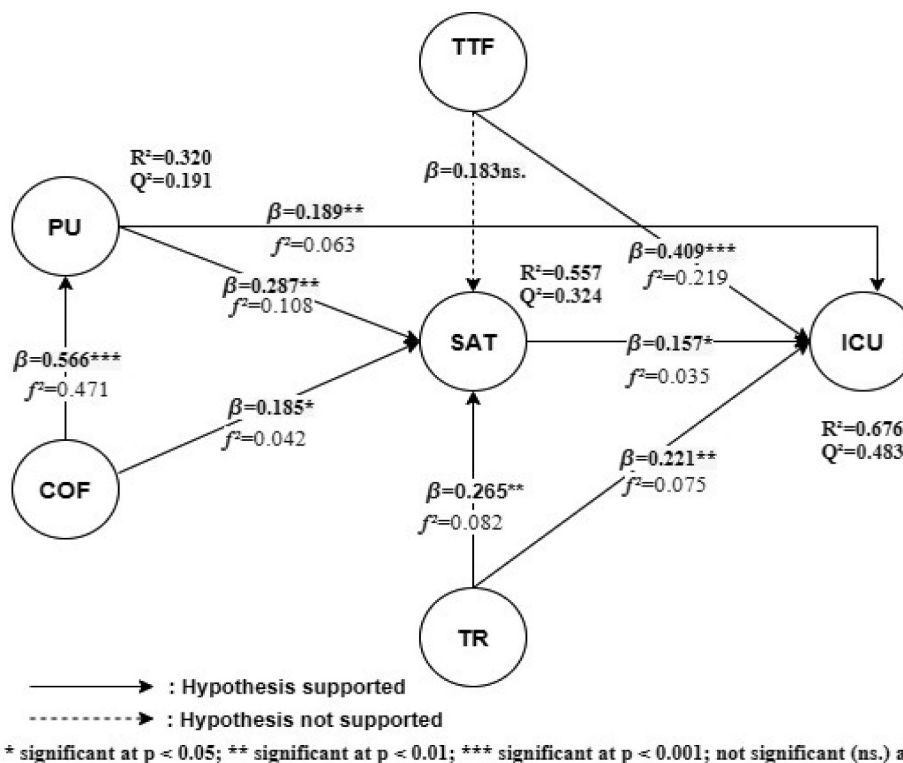
\*AVE's square root is in italic.

a mark that a model might be a CMB. As displayed in Table 3, all VIF scores are lower than 3.3, asserting no multicollinearity issue and CMB.

**4.2. Structural model**

Once the constructs' reliability and validity have been attained, the structural model examination can proceed. The path coefficients ( $\beta$ -scores) of the association between constructs are shown in Figure 2. The t and p values are used to evaluate whether or not  $\beta$ -scores are significant. Path coefficients (hypotheses testing) findings are presented in Figure 2 and Table 4.  $R^2$  implies the percentage of variation in the dependent variable (DV) that independent variable/s (IV) collectively interprets. According to Cohen (1988), the  $R^2$  score higher than 0.26 is deemed substantial. Hair et al. (2011) stated that the  $R^2$  level judgment relies on the research discipline defined. The  $R^2$  score of 0.20, for example, is deemed substantial in disciplines such as consumer behavior. The interpreted variances ( $R^2$ ) of perceived usefulness, satisfaction, and continuance usage intention, as shown in Figure 2, are 0.320, 0.557, and 0.676, respectively, confirming that the dependent variable is significantly interpreted by the structural model.

**Figure 2. Structural model results.**



**Table 4. Hypotheses testing results**

H	Category	Path IV → DV	Analysis results			Supported?
			t	β	p values	
H1	Alternative	COF → PU	10.126	0.566	p < 0.001	Yes
H2	Alternative	COF → SAT	2.304	0.185	p < 0.05	Yes
H3	Alternative	PU → SAT	2.916	0.287	p < 0.01	Yes
H4	Alternative	PU → ICU	3.374	0.189	p < 0.01	Yes
H5	Alternative	SAT → ICU	2.291	0.157	p < 0.05	Yes
H6	Alternative	TTF → SAT	1.934	0.183	p > 0.05	No
H7	Alternative	TTF → ICU	5.015	0.409	p < 0.001	Yes
H8	Alternative	TR → SAT	2.759	0.265	p < 0.01	Yes
H9	Alternative	TR → ICU	3.201	0.221	p < 0.01	Yes

Notes: Recommended t value > 1.96 (Hair et al., 2011); COF = Confirmation; PU = Perceived Usefulness; SAT = Satisfaction; TTF = Perceived Task-Technology Fit; TR = Trust; ICU = Intention to Continuance Usage; A bootstrapping with 5,000 samples was implemented to evaluate β (Hair et al., 2011).

Besides β and R<sup>2</sup>, the predictive relevance and the effect sizes for every path, symbolized by Q<sup>2</sup> and f<sup>2</sup>, are presented in Figure 2 and have been found to be satisfactory (Cohen, 1988; Hair et al., 2011). The researcher can reveal by Cohen’s f<sup>2</sup> the effect size of every direction (path) in PLS-SEM (Urbach & Ahlemann, 2010). Effect sizes of 0.35, 0.15, and 0.02, respectively, imply high, medium, and low impacts, according to Cohen (1988). The predictive relevance Q<sup>2</sup> was evaluated employing the blindfolding procedure. The cutoff value for Q<sup>2</sup> is higher than zero; this shows the predictive relevance of the model (Hair et al., 2011).

The fit of PLS-SEM models can be destined in two ways: 1) fit measures, like SRMR, and 2) by testing overall model fit (Schamberger et al., 2020). SRMR was found to be 0.072, which was below the threshold point of 0.08 (Henseler et al., 2016; Hair et al., 2011). Tenenhaus et al. (2005) propose the goodness-of-fit (GoF) index to test the overall model fit, which can be provided employing this formula: GoF = √ (AVE average \* R<sup>2</sup> average). Such an index is adopted as an overall measure of the model. A GoF score of above 0.25 generally implies a high overall model fit (Wetzels et al., 2009). The GoF is determined to be 0.585 [√ (0.660 \* 0.518)] from the AVE average scores in xTable 3 and the R<sup>2</sup> average scores in Figure 2, suggesting a high overall model fit.

### 5. Discussion and conclusion

To explore determinants predicting the intention to continue the use of online shopping under COVID-19, a model combining the ECM and TTF models with the trust factor has been suggested in this research. Through the process of bootstrapping with 5,000 samples, the study results significantly supported all hypotheses except H6. The findings clarified that confirmation is a powerful determinant of perceived usefulness (H1, β = 0.566, p < 0.001) and satisfaction (H2, β = 0.185, p < 0.05). These results indicate the more confirmation the consumers have toward utilizing online shopping under COVID-19, the higher opportunity for them to satisfy utilizing the tool as well as to attain their perceived usefulness. In normal time, similar findings have been found in past studies (Chen & Demirci, 2019; Hung et al., 2012; Shang & Wu, 2017). Confirmation reflects the expectations of users built by their prior experience. Bhattacharjee (2001) stated that users’ expectations through mediating variables PU and SAT are important to predict intention to continuance IS usage. Thus, online shopping providers should understand the expectations of users for improving the competence of service level provided based on users’ requirements, especially in critical periods such as the COVID-19.

Perceived usefulness is an important predictor of satisfaction (H3, β = 0.287, p < 0.01) and intention to continuance usage of online shopping (H4, β = 0.189, p < 0.01) under COVID-19. These results support Mohamed et al. (2014), Bölen and Özen (2020), S. C. Chang and Chou (2012), and

Hung et al. (2012). These findings mean that the higher the perceived benefit to the users, the greater the incentive for their satisfaction and continued use of online shopping. Therefore, retailers and related stakeholders of online shopping should focus on improving the services or functions to attain the perceived usefulness of users and better satisfy their needs; hence gain their satisfaction as well as motivating their intention to continuance usage. For example, they should focus on (1) ensuring the safety of goods sold online, (2) protecting the carrier and receiver from becoming infected by following prevention measures, and (3) free delivery and facilitating payment procedures.

Next, satisfaction was found to be a factor that boosts continuance usage of online shopping under COVID-19 ( $H5$ ,  $\beta = 0.157$ ,  $p < 0.05$ ). Such a result is in line with (S. C. Chang & Chou, 2012; Chong, 2013; Hsu et al., 2006; Jumaan et al., 2020; Pappas et al., 2014; Yang, 2021). Therefore, it is important that retailers and related stakeholders customize services with effective management in order to achieve consumer satisfaction under COVID-19 which will in return motivate intention to continuance usage of online shopping services.

The convenience of using TTF to interpret the intention of continuity has not attracted considerable attention so far (S. Yuan et al., 2016). In this study, the results indicate strong associations between TTF and ECM's continuance intention do exist. Perceived TTF was found to have a substantial effect on intention to continue using online shopping ( $H7$ ,  $\beta = 0.409$ ,  $p < 0.001$ ) under COVID-19. Similar results from previous researchers were confirmed (S. Yuan et al., 2016; Zhao & Bacao, 2020). If users realize online shopping functions are improper for their tasks under COVID-19, they will realize these functions as low-interest and constitute a low intention for continuous use and vice versa. Thus, retailers and related stakeholders of online shopping should be careful about how characteristic of technology used meets users' requirements under COVID-19. Specifically, good management and strict monitoring of provided services and functions under COVID-19 such as daily needs delivery, contactless delivery, wear face masks, greatly formulates consumers' intention to continuously use online shopping. This study found, contrary to predictions, that the perceived TTF has an insignificant impact on satisfaction ( $H6$ ,  $\beta = 0.183$ ,  $p > 0.05$ ). This finding is not confirmed by Hidayat-ur-Rehman et al. (2016) who have revealed that perceived TTF has an influence on online shopping satisfaction. The probable cause here may be that satisfaction usually comes from the normal situation (not under COVID-19 situation).

Lastly, trust was validated to significantly influence satisfaction ( $H8$ ,  $\beta = 0.265$ ,  $p < 0.01$ ) and intention to continuance usage of online shopping ( $H9$ ,  $\beta = 0.221$ ,  $p < 0.01$ ), which is in with prior findings (S. C. Chang & Chou, 2012; Chong, 2013; Zhao & Bacao, 2020). These results mean that the higher level of trust increases the satisfaction level and continuance usage intention of online shopping under COVID-19. For instance, if the retailers and related stakeholders provide secure online shopping services, this will encourage consumers to develop their satisfaction and continuance usage intention of online shopping.

## 6. Implications

First, this study empirically investigated determinants influencing consumers' continuance intention to use online shopping under COVID-19. The study therefore significantly contributes and adds to the literature of IS/IT continuance usage in the event of a pandemic such as COVID-19. Second, an extended model combining ECM (Bhattacharjee, 2001) and TTF (Yen et al., 2010) with the trust factor (Gefen et al., 2003) has been suggested in this study to explain determinants predicting the intention to continuance usage of online shopping under COVID-19. Many researchers found that extending ECM or integrating it with other relevant models enables to better predict the continued use intentions of users (Chong, 2013). Integrating the TTF model with ECM can interpret technology adoption better (Tam & Oliveira, 2016; Zhao & Bacao, 2020). The study determined and confirmed the significant influence of perceived usefulness, satisfaction, perceived TTF, and trust on the continuance usage intention of online shopping during COVID-19. In other words, the obtained results imply that the higher level of perceived usefulness, satisfaction, perceived TTF, and trust in online shopping

under COVID-19 help continue retaining existing consumers and attract new and potential ones. Thus, online shopping service providers should concentrate on mechanisms to boost such determinants to induce consumers' continuance usage. Third, as a means of social spacing under the growing threat of COVID-19, the number of adopters of online shopping services has increased (Bitter, 2020; United Nations Conference on Trade and Development (UNCTAD), 2020). Thus, for online shopping service providers, the long-term implication is to turn adopters into sincere consumers by boosting satisfaction, usefulness, TTF, and trust. Finally, since the spread of the disease is predicted to continue for a long time (Sreelakshmi & Prathap, 2020), to keep social distancing by avoiding shopping in public, the continuous usage of online shopping has to be guaranteed. The study determined and confirmed the constructs of ECM, TTF, and trust as the motivators of online shopping's continuing use intention under COVID-19. Thus, the confirmation of consumers' expectations (ECM), task-technology fit (TTF), and trust factor (TR) regarding online shopping services may create a better perception of service performance under such a pandemic.

## 7. Limitations and further research

First, it has not taken into consideration the moderate influence of demographic variables; revealing the influence of demographic variables on continued usage would introduce deeper insights (S. K. Sharma & Sharma, 2019b). Second, the study was applied to users of online shopping in India, and thus its results might not be generalizable to other different systems, users, cultures, and countries. Therefore, it would be interesting for future research to pay attention to different types of systems, users, cultures, and countries (Rouibah et al., 2009; Zhao & Bacao, 2020). Third, a larger sample may introduce greater generalizability of the suggested model tested. Fourth, the study used ECM, TTF, and the trust factor, and thus it will be interesting to extend the proposed model with other models such as TAM or UTAUT2 models. Finally, it might also be beneficial for future research to continue assessing online shopping systems in the Indian context and other countries to identify the relationship between the costs and benefits of the success of such systems under such a pandemic.

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