International Journal of Electrical and Computer Engineering (IJECE)
Vol. 12, No. 2, April 2022, pp. 1636~1649
ISSN: 2088-8708, DOI: 10.11591/ijece.v12i2.pp1636-1649

COVID-19 impact on Facebook-based social commerce in Bangladesh

Samsul Alam, Md. Minhajur Rahman
Department of Business Administration, Daffodil International University, Dhaka, Bangladesh

Article Info

Article history:

Received Mar 17, 2021
Revised Aug 11, 2021
Accepted Sep 6, 2021

Keywords:

COVID-19 impact
E-commerce
F-commerce
S-commerce

ABSTRACT

Popular social media Facebook-oriented social commerce (S-commerce), commonly known as Facebook commerce (F-commerce) has progressed towards a bevy business in Bangladesh. Many young people, especially at the age of 20-28, are now in this industry. The pandemic situation due to coronavirus disease 2019 (COVID-19) forces people to buy more from the online market because of the safety issue. People are getting more interested in the new trend of buying from an online store. The current study aims to explore the impact of COVID-19 on F-commerce, particularly in Bangladesh. It uses the non-probability purposive sampling method and collects 181 usable responses through an online questionnaire. A research model is developed following the social commerce acceptance model (SCAM), and structural equation model partial least square (SEM-PLS) using SmartPLS 3.0 is applied to find out and justify the result. Likert five-point scale for determining the independent variables, including COVID-19 awareness (CA), consumer behavior (CB), and purchase intention (PI), is used. The study result confirms that these three variables have a positive impact on F-commerce. The survey covers other measurable items that indicate some assumptions, which reflect F-commerce consumers' behavior. The researchers recommend that F-commerce businesspeople must emphasize on mitigating trust issues and provide enhanced home delivery service.

Corresponding Author:

Samsul Alam
Department of Business Administration, Daffodil International University
Daffodil Smart City, Ashulia, Dhaka
Email: salam.bba@diu.edu.bd

1. INTRODUCTION

The emergence and its enhanced penetration to social networking site Facebook commerce (F-commerce) are seen worldwide due to the increased use of social media, specifically Facebook, after its advent in the online arena [1]–[3]. Facebook is launched by Mark Zuckerberg along with his Harvard College roommates on 4th February 2004. This site has shaped many applications and services for businesspersons in addition to general users [4]. Facebook is the furthermost popular site wide-reaching based on active users. F-commerce is a form of social commerce (S-commerce) that intends to develop a platform for purchasing and selling along with promotional and branding pursuits [5] alike electronic commerce (E-commerce); hence, S-commerce is a subset of E-commerce [6]. Social media websites have been changing the means of relations in today's society and establishing communication between businesses and buyers [7]. Societal associations reconcile buyer behavior [8], where online purchasing is generally accepted as a social exchange relationship for the maximum part.

Day by day, E-commerce is becoming a growing business in developing countries like Bangladesh. Recently, the Bangladesh government has taken policies for online communication and E-commerce operations [9]. Besides the government, organizations like the E-commerce association of Bangladesh (e-CAB) work for Bangladeshi E-commerce development. Thus, the government, private, and non-profit organizations are developing this sector [10]. Consequently, the impact of E-commerce technology accelerates the economy [11] potentially in all segments, including business to business (B2B), business to consumer (B2C), consumer to consumer (C2C), and business to government (B2G). As Bangladesh entrepreneurs have financial and technical problems developing and maintaining an E-commerce website, many pursue an F-commerce business. As a result, F-commerce is going to evolve a new revolution in the business sector. It has a great potential to grow in this country. Because F-commerce can diminish the unemployment rate, people can effortlessly launch a new business online with lower marketing and other business conduction costs [12]. Based on Worldometers and Bangladesh telecommunication regulatory commission (BTRC) data, Table 1 highlights the yearly number of internet users, population, and gross domestic product (GDP) in Bangladesh. It indicates how auspicious the E-commerce sector is.

Table 1. Indicators for internet growth in Bangladesh

Year	Internet users (million)	Population (million)	Percentage	GDP (per capita in USD)
2009	5.6	146	0.4	574
2010	6.2	148	0.4	624
2011	5.5	149	3.5	700
2012	8.1	151	5.0	700
2015	54.0	156	31.9	1 080
2020	100.0	165	60.7	1,698

Exceedingly 100 million internet subscribers is steadily significant for a country like Bangladesh. The popularity of internet usage in this country is amongst ordinary people. According to NapoleonCat's report in 2020, there are more than 30 million Facebook users in Bangladesh. From Socialbakers 2020 data, Table 2 shows the top 10 E-commerce brands' number of fans on Facebook in Bangladesh.

Table 2. Facebook fan pages statistics in Bangladesh

Page name	Total number of fans (million)	Page name	Total numer of fans (million)
Rokomari.com	2.25	Bagdoom.com	1.12
Apex4u.com	1.98	Pickaboo.com	1.05
Evaly.com.bd	1.56	Globalbrand.com.bd	0.96
Othoba.com	1.34	Kiksha (Sindabad.com)	0.96
Banglashoppers.com	1.20	Jadroo.com	0.89

Various types of products are sold on the F-commerce platform in Bangladesh. There are many pages with lots of fans, through which they sell their products. On Facebook, sales can occur anywhere by posting products for sale from a personal profile, business profile, groups, messenger, et cetera. Again, many Facebook sales groups are generating sales for thousands of Bangladeshi entrepreneurs. Surprisingly, women are coming for the F-commerce business. There are thousands of women doing business by various Facebook groups, for example, "women and E-commerce forum" (more than 1 million members). Hossin *et al.* [13] find that females are becoming much more interested than males in their online presence in Bangladesh.

The current world is unable to get out of the COVID-19 crisis without being affected. In major sectors, it has negatively affected almost all aspects of the world, including the economy, health, environment, politics, business, technology, consumer behavior et cetera, though to some extent in some other sectors, it has positively affected. It is shifting and transforming the business model. Nowadays, businesses seek digital replacements or identify safe ways of delivering their products and services with the slightest physical contact [14]. Consequently, in developed countries like Japan, before the pandemic, people using both offline and online markets switch to only online markets because of the COVID-19 [15]. In contrast, developing and least developed countries (LDCs) lag behind as they face many problems in using technology because of poor infrastructure. Still, many village areas are not covered even with a third generation (3G) network [16] due to the lack of network infrastructure besides other reasons where many countries are now deploying fifth generation (5G) network. As a result, for instance, in Bangladesh, most of the state-owned enterprises (SOEs) are not adopting information and communication technology (ICT) [17] to tackle issues arising from COVID-19.

According to the 2020 report of UNICEF Bangladesh and the Daily Star, the COVID-19 situation forces the government to use the virtual court. Alike, university students attend online classes, school and college students attend classes via national television. The entire world is now maintaining social distance. This issue raises the question that despite all problems, will Bangladeshi consumers' adaptation to buy from F-commerce be affected due to this pandemic. Would it be a permanent impact on consumer behavior? How would F-commerce vendors deal with this situation and run their business?.

There are many studies in the information technology (IT) related sectors such as mobile commerce (M-commerce) and technology adoption frameworks [18], electronic waste (E-waste) management, mobile cards (M-cards), E-commerce, Internet, green IT environment, et cetera. Nevertheless, very few studies are seen on F-commerce, especially in the Bangladesh context. As Facebook is the utmost common and popular social media website, it requires further investigation. COVID-19 is an alarming situation throughout the world. In this situation, researchers have vital roles to play. Every researcher needs to participate and look at how it is going in every aspect and bring a viable solution. Realizing the need for research in this field, the authors conduct this study to investigate the impact of COVID-19 on F-commerce based S-commerce in Bangladesh during the pandemic. The study is conducted with the specific objectives; i) to observe and measure the impact of COVID-19 awareness, consumer behavior, and purchase intention on F-commerce; and ii) to find out the problems associated with F-commerce in Bangladesh, suggest further improvement measures, and help F-commerce aspirants move forward.

In line with research objectives, this study is organized in a systematic way. After introduction, the remaining part is organized in the following manner. First, literature review is presented from the related existed studies. Second, proposed research model and hypotheses development are shown. Third, research methods are explained including sample size determination, questionnaire design and measures, data analysis technique, data collection and demographics. Fourth part describes the results and discussions from survey data analysis where measurement model, structural model, consumers' perceptions in different F-commerce dimensions, the arising F-commerce challenges and corresponding solutions, and recommendations are explained. The final part is about conclusion, practical implications, and research limitations.

2. REVIEW OF RELATED LITERATURE

E-commerce starts to be grabbed by small and medium-sized enterprises (SMEs) in South-Asian developing countries in 2004 [19]. Many researchers work in this prominent sector. Rachid *et al.* [20] study the E-commerce customer defection rate. In contrast, Zaim *et al.* [21] investigate how to identify the satisfied electronic customer (E-customer) from social media regarding their clickstream behavior. Again, Guanchen *et al.* [22] study purchasing criteria based on customization and review sentiment. A research paper shows that Bangladesh's top popular online shopping sites are using Facebook [23]. In F-commerce and E-commerce transactions, customers prefer cash on delivery (COD) as a payment method in most cases. Sometimes, they use mobile banking (M-banking) services to pay for products. However, mobile financial services (MFS) users are growing in this country. "MFS users do feel it is easier to use when it comes to paying for online shopping" [24].

In Bangladeshi C2C F-commerce business, argument quality, tie strength, source credibility, and product usefulness evaluation positively affect purchasing decisions [25]. People show their intention to buy from S-commerce via engagement and awareness. It is found through the structural equation modeling-partial least squares (SEM-PLS) approach in a technology acceptance model (TAM) [26]. A study is conducted based on a survey result of 310 samples from university students of Saudi Arabia by following the unified theory of acceptance and usage of technology (UTAUT2) model. It reveals that expected performance, related motivation, lower price, habit, and S-commerce contact and support strongly correlate with behavioral intention to use S-commerce following the PLS-SEM statistical method. Likewise, favorable conditions, intention, and habit have a strong association with user behavior. The favorable cultural dimensions have a powerful influence on behavioral intention [27], [28]. Another study examines the impact of demographic variables, F-commerce usage pattern, trust transferring theory, and site usage theory on actual purchase from F-commerce through Q-sort procedure, expert panel, pretest, and pilot test. The result is found from 808 F-commerce users using the non-compensatory and non-linear artificial neural network (ANN) model [28]. Other studies show that security, everyday situation, familiarity, social presence through online community or forums, and assured structure determine users' trust. It again shapes users' intention to use S-commerce. Perceived ease of use influences perceived usefulness. This result is based on a survey of S-commerce users by following the TAM [1], [29].

The adoption of F-commerce is determined by the factors of the social image, subjective norms, perceived value, and usefulness [6], [7], [30]–[33]. In Facebook, "the more experienced the consumers, the more he or she will purchase" from it [34]. Trust, perceived value, electronic word-of-mouth, return policy,

and repurchase influence usage intentions of F-commerce [31], [35]–[39]. An interesting fact is that in social media like Facebook-Instagram, people shop instantly. The enjoyment has a powerful effect on adopting these media [40], followed by a direct effect of perceived usefulness and an indirect effect of content quality and social presence [41]. A study shows that users' personality traits, psychographic characteristics, and gratifications affect the F-commerce shopping intention. Again, expert market users and social browsers use social shopping to socialize. In contrast, value-conscious users and internet browsers use this platform to seek information and online social shopping [42]. Another study conducted in Thailand on 340 respondents shows that consumers' attitudes and convenient purchasing affect purchasing intention from F-commerce [43].

The world has been undergoing a pandemic from the beginning of 2020 due to coronavirus disease originating from Wuhan, China, on 31st December 2019, affecting approximately 217 countries worldwide [44], [45]. This virus will not disappear and sustain long announced by World Health Organization (WHO) in 2021. COVID-19 seriously affects small businesses where many are closed down, and most of the remaining are at risk [46], [47]. During the pandemic, 39% of SMEs have been strengthening cash balances, 61% might run out of cash, involving 8.6% have no retained earnings mentioning that micro-business companies are at risk [48]. COVID-19 has brought about a dramatic change in the way of doing business. Thus, businesses have pursued an innovative way to achieve success. Surprisingly, it has boomed E-commerce businesses, video conferencing platforms, education technology vendors. It is also making a truly digital world through a concept of a new normal situation [49]. It brings paradigm shifts in the workplace, and businesses need to cope with this change; otherwise, there will be a survival question [50], [51]. Oliver *et al.* say that mobile data are used to deduce human movement and social interaction [52]. Different news publications found that in Bangladesh, people's dependency on technology has increased due to COVID-19. Again, it has changed the nature of shopping, both online and offline. Nevertheless, few studies are seen that show the impact of COVID-19 on F-commerce. Although some studies have been conducted in this area, no studies are conducted in the Bangladesh context.

3. RESEARCH MODEL AND HYPOTHESES FORMULATION

Some studies evaluate the factors of purchasing behavior on E-commerce [53], S-commerce [2], [26], [41], [54], and F-commerce [28], [34]. A widely accepted model, TAM, is used to decide the E-commerce usage intention in Bangladesh [55], supported by Zhang *et al.* [56]. Another researcher Hajli [45], develops a new model named social commerce acceptance model (SCAM) that is useful in predicting customers' intention to buy from S-commerce. Hoque *et al.* [57] propose a conceptual model for evaluating customer behavior in online shopping through Facebook with various variables. A study tests the big five model (BFM) for antecedents of an impulse purchase in F-commerce and urges to purchase [58], [59].

The researchers mainly adopt Hasanat *et al.* [60] conceptual framework following Hajli's [45] SCAM model to develop the conceptual framework in this study. None of the studies uses COVID-19 as a variable or construct in their model, hypothesis, or research framework for identifying its effect on F-commerce. However, a survey of consumer stockpile behavior for online food purchasing during the COVID-19 crisis finds that "the share of confirmed COVID-19 cases increases the possibility of consumers purchasing food online" [61]. Nevertheless, it does not mean to be the same for all online businesses. A model is developed by adding one more independent variable with Hasanat *et al.* [60], called purchase intention. Again, instead of using E-business as the dependent variable, F-commerce is used. Thus, this study consists of three independent variables and one dependent variable. It is anticipated that all the independent variables influence the dependent variable as discussed in 3.1, 3.2, and 3.3. Developed from previous literature, Figure 1 illustrates the proposed research model.

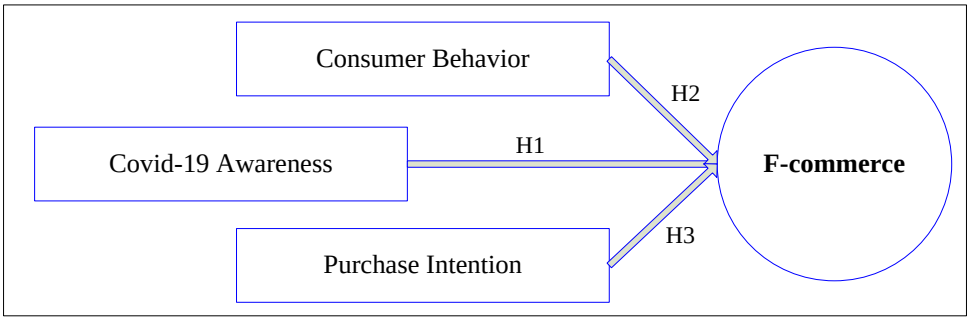

Figure 1. The research model

3.1. COVID-19 awareness

In 2003, bat spreads a severe acute respiratory syndrome coronavirus (SARS-COV) in China that infects more than 8,000 people and causes 776 people to decease. A decade later, in 2012, another virus, Middle East respiratory syndrome coronavirus (MERS-COV), is found in Saudi Arabia that infects about 2.5 thousands of people, causing 838 to die. These are members of the beta-coronavirus subgroup [62]. According to WHO data, COVID-19 creates a colossal outbreak that affects the whole world. Still, it is ongoing; by July 2021, it causes above four million deaths and 200 million infections worldwide. Although about four billion people are vaccinated, the epidemic has not yet been vanished. However, people are now aware of it, hence they are changing their purchasing behavior from physical to digital platform along with their lifestyle. Therefore, COVID-19 awareness (CA) is taken as an independent variable as it influences the F-commerce. From the above discussion, the following hypothesis is developed.

H1: CA has a positive impact on F-commerce.

3.2. Consumer behavior

F-commerce is becoming an exciting platform nowadays and appearing to be a "contemporary research area for an increasing number of researchers to understand this unique nature of online shopping" [63]. In this study, consumer behavior (CB) is used because it influences F-commerce business. CB is considered an independent variable because consumers take necessary precautions and act accordingly [60]. Based on items of variable CB adopting from Gurav and Patil [64], the following hypothesis is formulated.

H2: CB has a positive impact on F-commerce.

3.3. Purchase intention

Purchase intention (PI) means one's intention to buy a product from a shop or anywhere else; in this case, it is Facebook. The intention is defined as the experiences that inspire consumers to purchase products and services [65]. KimDawn and Pysarchik [66] state that PI serves as an alternate for measuring consumer's purchasing behavior. Haque [67] and Azjen [68] also support that intention motivates the buyers and influences the behavior of these buyers. As a result, PI is identified as an independent variable. The questionnaire item for this variable is collected from Shareef *et al.* [53]. From the discussion, the following hypothesis is proposed.

H3: PI has a positive impact on F-commerce.

4. METHOD

4.1. Sampling design

Because of the COVID-19, social distance is needed for collecting survey data. Hence, this study uses Google form as a survey collection tool which is only distributed among the Facebook user of Bangladesh because only those who use Facebook regularly can contribute to this research. This research follows the purposive (or judgmental) technique of the non-probability sampling method. To measure the minimum sample size with a predictive power of 0.95, the researchers adopt Faul *et al.* [69] power analysis as part of the purposive sampling technique. According to G*Power 3, the minimum sample size measured is 119 (effect size 0.15), where 181 responses are collected. All of these usable responses are finally considered for analysis.

4.2. Measures

The questionnaire is divided into three individual sections. The first section is designed to collect the respondents' demographic information. The following section contains respondents' ratings on variables (i.e., CA, CB, and PI) and various items based on these variables. Through the final section, respondents' opinions on different perspectives regarding F-commerce are collected. Table 3 shows the questionnaire items for each variable used in this paper for measurement purposes. It also indicates the sources for these items. The survey data collection starts on 10th October and ends on 9th November 2020. Before distributing the questionnaire, it is tried to maintain the appropriate demographic ratios. Responses are collected from those active Facebook users whether or not they purchase from this platform. Likert five-point scale ranging from "strongly agree" to "strongly disagree" is used in the survey questionnaire to determine the study variables' impact on F-commerce. The questionnaire is provided in both English and local language Bengali to ensure respondents understanding of the items.

Table 3. Variables, items, and their sources

Variable	Item(s)	Source(s)
COVID-19 awareness	CA1: I am aware of the effect of the COVID-19.	[33], [36]
Consumer behavior	CB1: Purchasing from F-commerce is cost saving	[64]
	CB2: Purchasing from F-commerce is time-saving	[64]
	CB3: F-commerce has an easy way of payment	[30], [33], [64]
	CB4: F-commerce gives offers and/or discounts	[64]
Purchase intention	PI1: I would like to purchase from F-commerce.	[1], [30], [53]
	PI2: I am satisfied with the purchase from F-commerce.	[30], [53]
	PI3: I will continue purchasing from F-commerce in the future.	[30], [53]
Facebook commerce	FC1: I am purchasing more from F-commerce considering health issues	[70]
	FC2: I have been using Facebook more since the COVID-19 pandemic	[28]

4.3. Research procedure

The research follows both quantitative and qualitative methods commonly known as the mixed method. Demographic information such as age, gender, occupation is collected along with users' rating on variables' items (i.e., CA1, CB1, CB2, CB3, CB4, PI1, PI2, PI3, FC1, and FC2) and opinions. To evaluate and analyze the structural relationship of the proposed theoretical model, the researchers follow structural equation modeling (SEM), a multivariate technique for statistical analysis. In this regard, a partial least squares (PLS) software analysis is used. Again, SmartPLS 3.0 is applied as an analysis tool. SEM is a path modeling approach to test and validate a conceptual research model. It also assumes the relationships among the theories of that model [71]. It is a broadly accepted technique for measuring the validity of theories with pragmatic data [72] and is widely used in social science and information systems (IS) research [73]. The main reason for approaching the PLS in this research is its demonstrated statistical capacity when testing with small sample size. The researchers further use the bootstrapping technique for checking the significance of the coefficients previously assessed through the PLS analysis software [74]. This research uses the two-stage methodology to perform data analysis [75]. In the first stage, composite reliability (CR) and discriminant validity (DV) are identified to verify the measurement model. In the following parts, the hypotheses and structural models are tested.

4.4. Data screening and demographics

It is better to do data screening before performing data analysis [76]. The raw data is checked for seeing missing data or any partial data before processing. The dataset-associated glitches are revised before statistical analysis because better data preparation leads to a better estimate [77]. Table 4 represents the demographic information of the survey.

Table 4. Demographic information of respondents

Variable	Category	Frequency	Percentage
Gender	Male	112	67.4
	Female	59	32.6
Age	15-19	7	3.9
	20-24	156	86.2
	25-29	17	9.4
	Above 40	1	0.6
Division	Dhaka	81	44.8
	Barishal	3	1.7
	Chattogram	17	9.4
	Rangpur	57	31.5
	Khulna	4	2.2
	Mymensingh	6	3.3
	Rajshahi	13	7.2
Occupation	Not employed	3	1.7
	Student	161	89
	Job holder	13	7.2
	Businessperson	4	2.2
Educational qualification	Secondary	3	1.7
	Higher secondary	95	52.5
	Diploma	4	2.2
	Graduate	72	39.8
	Postgraduate	5	2.8
	Doctoral	1	0.6
	Post-Doctoral	1	0.6

5. RESULTS AND DISCUSSION

5.1. Measurement model

As per the suggestion of Hair Jr. *et al.* [74], a researcher must test the outer model after the research model is formed, which is evaluated by measuring the average variance extracted (AVE). Both reliability and validity of the variables are tested to confirm the correctness of measurement items. Litwin [78] suggests testing the internal reliability of items for consistency of outcomes even if the study uses well-established measurement items of previous studies. In SEM analysis, to measure the variable reliability, CR is utilized. AVE values must be more than the proposed threshold of 0.50 to prove the model acceptable [79]. CR should be greater than 0.70 to confirm acceptable reliability [80], [81]. Table 5 shows values within the acceptable and reliable range.

Table 5. Composite reliability and average variance extracted

Variable	CR	AVE
CA	1.000	1.000
CB	0.824	0.539
FC	0.741	0.593
PI	0.946	0.855

Discriminant validity (DV) is the valuation of the scope to which different hypotheses are suggestively different [81]. Alternatively, we can say that it determines the uniqueness of a theory related to a specific concept. To evaluate DV in PLS, Fornell and Larcker's [82] advice is considered. Table 6 shows that all variables are discriminant as the diagonal values are higher than the insider value.

Table 6. Discriminant validity

Variable	CA	CB	FC	PI
CA	1.000			
CB	0.093	0.734		
FC	0.226	0.459	0.770	
PI	0.140	0.547	0.576	0.924

5.2. Structural model

Satisfying DV is the requirement to develop accuracy in assessing structural models [83]. The structural model contains the relationship among the hypotheses in a research model. It is used to evaluate the degree and level of the relationship between dependent and independent variables. Explicitly, using the PLS technique, the structural model shows the required path coefficient (β), t-statistics of each path, and the P-value of the model to test the relationships which is shown in Table 7. β and t-value are estimated using the bootstrap method [84].

Table 7. Path coefficient and hypotheses testing result

Hypothesis	Relationship	Beta value	T values	P values	Result
H1	CA -> FC	0.145	2.050	0.041	Supported
H2	CB -> FC	0.202	2.262	0.024	Supported
H3	PI -> FC	0.445	5.181	0.000	Supported

Figure 2 shows the structural modeling assessments that displays the findings of the various hypothesis tests. Each hypothesis is confirmed as the T-value is more than 1.6 and the p-value is less than 0.05. Thus, it is confirmed that CA has impact on F-commerce; therefore, H1 is acceptable (β=0.145, t=2.050, p=0.041<0.05). CB also affects F-commerce, and therefore H2 is confirmed (β=0.202, t=2.262, p=0.024<0.05), similarly, PI has also impact on F-commerce, hence H3 is accepted (β=0.445, t=5.1.81, p=0.000<0.05). Overall, since the variables are derived considering the COVID-19 situation, and the hypothesis is accepted; hence, the result unveils that COVID-19 has affirmative impacts on the F-commerce business in Bangladesh.

5.3. Discussion on consumer perceptions

This section summarizes the respondents' opinions. Before COVID-19, which means much time to consider, 102 people (56.4%) in the survey purchased from F-commerce. Nevertheless, after COVID-19,

which is in a short period, 95 people (52.5%) purchased from F-commerce, and among those individuals, many are new buyers. It states that people are buying from F-commerce more than before because of the pandemic as well as it is becoming the Bangladeshi population's favorite marketplace. Thus, it is anticipated that those who did not purchase are considered potential consumers. Those who have a Facebook account might be interested in F-commerce. Table 8 illustrates how many times users buy from F-commerce before and after COVID-19. As the pandemic is not yet ended by the time this paper is writing, the other results can be more apparent.

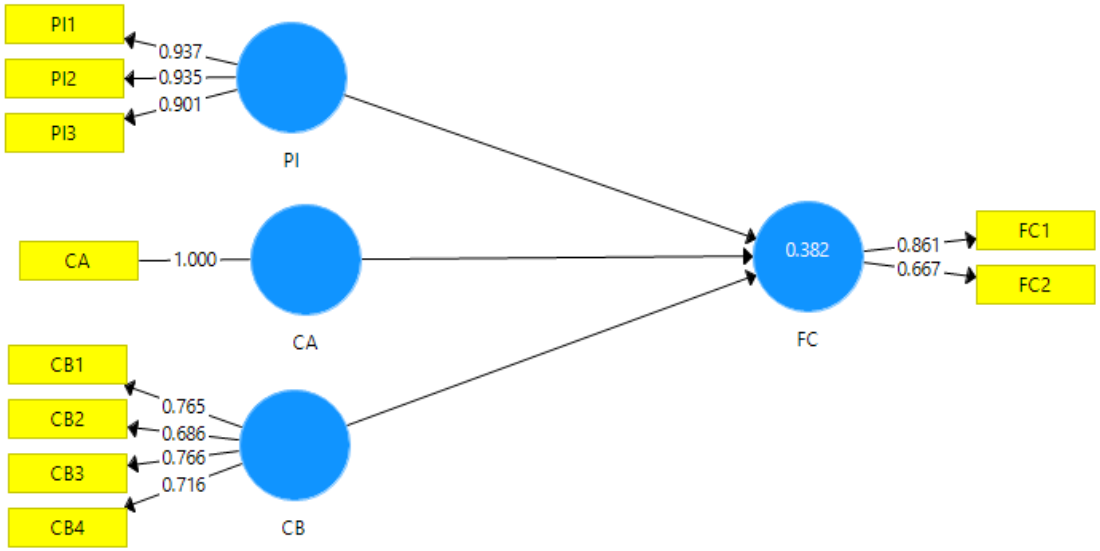

Figure 2. Result of hypotheses testing

Table 8. Consumers' purchasing behavior before and after COVID-19 pandemic

Situational aspect	Purchasing interval	Frequency	Percentage
Before COVID-19	0 time	70	38.7
	1-5 times	74	40.9
	5-10 times	17	9.4
	10-15 times	4	2.2
	15-20 times	4	2.2
	More than 20 times	12	6.6
After COVID-19	0 time	86	47.5
	1-5 times	65	35.9
	5-10 times	14	7.7
	10-15 times	7	3.9
	15-20 times	4	2.2
	More than 20 times	5	2.8

According to the survey, 66.9% of the participants agree that F-commerce is safer than an offline grocery shop during this COVID-19 pandemic, 27.1% respondents remain neutral, and only 6.1% disagree, perhaps because F-commerce in Bangladesh has trust issues as many opine improve this issue. Shareef *et al.* [53] say, "many consumers refrain from online buying only due to absence of trust." 73.5% of the participants prefer to pay COD as a payment method. The F-commerce payment is made almost entirely COD method because of feeling insecurity and mistrust amongst users [63], [85]. Everyone wants to stay safe at their home in this pandemic, which is reflected in this analysis. 90.6% of people want home delivery for their products, 7.2% want to pick the product from a courier service point, and only 2.2% prefer collecting from an individual business point.

People in Bangladesh care about the F-commerce business; thus, they want to improve it in every way. Table 9 shows that the highest opinion in all F-commerce characteristics is given in "improvement needed." It seems that product quality, trustworthiness, security, and availability of information need to be improved, as more than 22% of respondents vote on these F-commerce characteristics. The table also illustrates that a particular group is happy with the payment method, easy to place an order, and more straightforward communication as more than 22% vote on "no improvement needed."

Table 9. Respondents' opinion on F-commerce service dimensions

Service dimension	Level of improvement needed	Frequency	Percentage
Delivery service	No improvement needed	38	21
	Improvement needed	114	63
	Much improvement needed	29	16
Product quality	No improvement needed	19	10
	Improvement needed	108	60
	Much improvement needed	54	30
Trustworthiness	No improvement needed	22	12
	Improvement needed	144	80
	Much improvement needed	45	25
Security	No improvement needed	34	19
	Improvement needed	93	51
	Much improvement needed	54	30
Payment method	No improvement needed	65	36
	Improvement needed	92	51
	Much improvement needed	24	13
Easy to place order	No improvement needed	59	33
	Improvement needed	94	52
	Much improvement needed	28	15
Response to customer	No improvement needed	39	22
	Improvement needed	109	60
	Much improvement needed	33	18
Availability of information	No improvement needed	33	18
	Improvement needed	106	59
	Much improvement needed	42	23
Customer rating and review	No improvement needed	49	27
	Improvement needed	101	56
	Much improvement needed	31	17
Easier communication	No improvement needed	56	31
	Improvement needed	104	57
	Much improvement needed	21	12

Facebook, the largest social networking site, has become more than a mere social sharing platform. It is effortless to visit and choose what one needs. In this pandemic, the public gathering is risky; some people say they would instead purchase from Facebook. Thus, SME businesses use this media to promote, advertise, and sell their products, thus reaching their target customers. According to a Brandwatch report in 2019, over 60 million active business pages can reach above 2 billion people through Facebook advertisements worldwide. Surprisingly, only 6 million of these businesses pay to be 'active advertisers.' It means many do their businesses without paying for Facebook advertisement, despite engaging with customers.

After the advent of COVID-19, the first month of lockdown was too puzzling for online businesses. They were unsure whether the logistics delivery provider is safe. As a result, many of the F-commerce businesses shortened their sales. Some logistics service providers like "E-courier" and "Pathao parcel" gradually initiate a delivery replacement model. The model reduces human contact and ensures the delivery persons are equipped with masks while working for delivery services.

COVID-19 makes F-commerce an essential platform. Some customers mention trustworthiness and security as the most important dimensions to be improved in the F-commerce, whereas some argue for product quality. Some frauds business people deliver the wrong or low-quality products or even do not deliver the products to the customers. After the COVID-19 situation, because of increasing customers of F-commerce, fraud groups are also growing. The government should take responsibility for this kind of event and announce customers' protection protocol.

Few people complain about product images, and some find no match of their expectations when they get the product; it makes them dissatisfied. People suggest improving the seller's loyalty in order to wining customers' satisfaction. Nowadays, people depend on online shopping. If F-commerce sellers provide their product information correctly and respond to customers fast, they will get connected more. It seems interesting that some people say COVID-19 impact on F-commerce will be favorable because it makes their lives easier.

5.4. F-commerce challenges and their solutions

The challenges for F-commerce in Bangladesh are found based on the survey results, literature review [1], [6], [23], [28], [36], [39], [86], and researchers' observations, which are mentioned herein under several points. These challenges are: i) become a trustable business; ii) lack of appropriate shipping policy; iii) lack of knowledge for privacy and security policy among vendors; iv) lack of ICT education and training;

v) flawed online marketing concept among vendors; vi) lack of paid advertisement knowledge on Facebook; vii) limited internet coverage area; viii) high internet cost; ix) lack of law specifically for F-commerce business in Bangladesh; x) cultural tradition; xi) lack of local business interest in moving on; xii) lack of participation of banks in negotiation for online transaction; and xiii) relatively high products or services costs in comparison with the traditional market.

The solutions against these challenges are enumerated based on the survey results, literature review [1], [6], [23], [28], [36], [39], [86], [87], and researchers' observations are highlighted. They include several points involving: i) must build customers' trust; ii) government mandate for F-commerce law and shipping policy; iii) ensure adequate privacy and security policy; iv) arrange proper ICT education and training; v) ensure training on modern online marketing strategies; vi) deploy fast and secure internet connection by reducing digital divide; vii) BTRC and mobile operator companies should rethink lowering the internet cost viii) commercial banks should participate with a safe online transaction system; ix) set reasonable and competitive price compared with local market; x) Facebook should introduce advertising guidelines in native language; xi) existed F-commerce should be merged with local business; xii) upload high-quality product images avoiding too much editing; xiii) arrange some physical events to convey customers better about the business; ivx) consider E-signature that can be a game-changer; and xv) consider air cargo industry to include in this industry as it has interest that could be a way to earn foreign currencies too.

5.5. Recommendations

Social media websites have changed the means of relations established in today's society [7], [88]. The future of F-commerce is bright in Bangladesh. Young people are coming towards this industry and making lots of money. However, everyone has to take responsibility for this industry. Some problems like "lack of basic automation in place, poor management skill, lack of E-commerce integration" [89] must be addressed. Especially, entrepreneurs need to achieve the trustworthiness of consumers. If they focus on price, the demand of products and experience of consumers can be used to gain trust for online business [28], [29], [36], [86], [90], [91]. In addition, the "third-party guarantee" strategy can be considered, which is well efficient in promoting consumer's trust in China [92]. The government should support rural areas for E-commerce businesses to grow. For instance, in China, E-commerce helps increase rural villagers' income to develop their economy [93]. The government can also initiate E-signatures for E-commerce like other countries in South Asia, namely Singapore, Thailand, Malaysia, and Vietnam [94]. A country profile along with development prospects can be helpful to other developing countries and global E-commerce players [10]. Being an agricultural country, Bangladesh is mainly dependent on agriculture that plays a vital role in enhancing economic growth. E-commerce capability, particularly S-commerce like F-commerce, can be utilized to capitalize on market agility and operational adjustment like China [95]. For this purpose, simplified and friendly E-commerce policies should be initiated and practiced [96].

6. CONCLUSION, IMPLICATIONS, AND LIMITATIONS

From the authors' analysis, it is apparent that consumers' purchase intention has a substantially and significantly positive impact on F-commerce. At the same time, consumer behavior also has a positive impact on F-commerce. Similarly, COVID-19 awareness positively affects F-commerce. This study reveals that the COVID-19 situation is accelerating the F-commerce business in Bangladesh *vis-à-vis* earlier times as consumers are now more accustomed to purchasing from online businesses. Most Bangladeshi people who use the internet are Facebook users, which creates an opportunity for entrepreneurs to reach a large number of customers and sell their goods or services. During the COVID-19 pandemic, people use more social media platforms than before, as they cannot go outside frequently. As a result, F-commerce business is creating more business opportunities. Thus, it is becoming a significant market for any product.

However, COVID-19 confines peoples' lives due to their dependency on online platforms to remove their stagnation. As human beings' basic needs and wants are fulfilled by shopping, it is impossible to stop it. Where lockdown phenomena hinder their shopping activity by going to market, this situation paves the way for online shopping, resulting in growing E-commerce business. In line with purchasing from E-commerce, people's purchasing behavior also affects F-commerce. Thus, although COVID-19 has reduced buying ability, their intention to buy from online platforms increased; consequently, impacting F-commerce.

The current study has direct implications on F-commerce in the contemporary business structure in Bangladesh. It influences the E-commerce sector in this horizon primarily and other developing countries secondarily. Alternatively, the findings can contribute to the E-commerce sector knowledge base. The associated stakeholders, including E-commerce business owners, new entrants, government, and customers, will be benefited from the outcome and suggestions. The study might be helpful for other relevant stakeholders in this sector, especially those who already have a business in F-commerce at the national level primarily and international level secondarily, especially in the developing nations. Again, it will add a

theoretical contribution to the field of S-commerce. Moreover, it will work as a basis for future research in this field.

This study has some limitations that no scholarly work can avoid. Mainly, the time frame binds up the scope of this study. More responses could make the result more significant. Although the survey gets feedbacks from all major country areas, it still does not cover all the regions. Further research can collect survey responses from all over the country, which can be replicated in other countries, specifically in developing countries. Again, a new study can better break down coronavirus construct. As the pandemic has not ended, additional measurements and research might clarify this issue.

REFERENCES

[1] A. S. Al-Adwan, "Revealing the influential factors driving social commerce adoption," *Interdisciplinary Journal of Information, Knowledge, and Management*, vol. 14, pp. 295–324, 2019, doi: 10.28945/4438.

[2] E. Turban, N. Bolloju, and T. P. Liang, "Social commerce: an e-commerce perspective," in *ACM International Conference Proceeding Series*, 2010, pp. 33–42, doi: 10.1145/2389376.2389382.

[3] S. Sukrat and B. Papasratorn, "A maturity model for C2C social commerce business model," *International Journal of Electronic Commerce Studies*, vol. 9, no. 1, pp. 27–54, Jun. 2018, doi: 10.7903/ijecs.1545.

[4] L. S. L. Lai and E. Turban, "Groups formation and operations in the web 2.0 environment and social networks," *Group Decision and Negotiation*, vol. 17, no. 5, pp. 387–402, Jun. 2008, doi: 10.1007/s10726-008-9113-2.

[5] M. Zabeen, "F-commerce in Bangladesh: 'venit, vidit, vicit,'" *IOSR Journal Of Humanities And Social Science*, vol. 17, no. 5, pp. 1–8, 2013, doi: 10.9790/0837-1750108.

[6] F. Liébana-Cabanillas and M. Alonso-Dos-Santos, "Factors that determine the adoption of Facebook commerce: the moderating effect of age," *Journal of Engineering and Technology Management - JET-M*, vol. 44, pp. 1–18, Apr. 2017, doi: 10.1016/j.jengtecman.2017.03.001.

[7] K. Z. K. Zhang and M. Benyoucef, "Consumer behavior in social commerce: A literature review," *Decision Support Systems*, vol. 86, pp. 95–108, Jun. 2016, doi: 10.1016/j.dss.2016.04.001.

[8] T.-P. Liang, Y.-T. Ho, Y.-W. Li, and E. Turban, "What drives social commerce: the role of social support and relationship quality," *International Journal of Electronic Commerce*, vol. 16, no. 2, pp. 69–90, Dec. 2011, doi: 10.2753/JEC1086-4415160204.

[9] M. S. Azam, "Diffusion of ICT and SME performance," in *Advances in Business Marketing and Purchasing*, vol. 23A, Emerald Group Publishing Limited, 2015, pp. 7–290.

[10] B. Travica, B. Josanov, E. Kajan, M. Vidas-Bubanja, and E. Vuksanovic, "E-commerce in serbia: where roads cross electrons will flow," *Journal of Global Information Technology Management*, vol. 10, no. 2, pp. 34–56, Apr. 2007, doi: 10.1080/1097198X.2007.10856443.

[11] O. Ohidujjaman, M. Hasan, and M. Nurul Huda, "E-commerce challenges, solutions and effectiveness perspective Bangladesh," *International Journal of Computer Applications*, vol. 70, no. 9, pp. 9–17, May 2013, doi: 10.5120/11989-7867.

[12] M. A. Ashraf and R. K. Datta, "Determinants of entrepreneurial willingness to participate in f-commerce: a case study in Bangladesh." UIU Institutional Repository, 2020.

[13] M. A. Hossin, M. N. I. Sarker, Y. Xiaohua, and A. N. K. Frimpong, "Development dimensions of e-commerce in Bangladesh: scope, challenges and threats," in *ACM International Conference Proceeding Series*, 2018, pp. 42–47, doi: 10.1145/3277139.3277152.

[14] P. Seetharaman, "Business models shifts: impact of Covid-19," *International Journal of Information Management*, vol. 54, p. 102173, Oct. 2020, doi: 10.1016/j.ijinfomgt.2020.102173.

[15] T. Watanabe and Y. Omori, "Online consumption during and after the COVID 19 pandemic: evidence from Japan," in *The Impact of COVID-19 on E-Commerce*, Proud Pen, 2020.

[16] S. Chaklader, J. Alam, M. Islam, and A. S. Sabbir, "Bridging digital divide: 'village wireless LAN', a low cost network infrastructure solution for digital communication, information dissemination and education in rural Bangladesh," in *Proceedings of 2013 2nd International Conference on Advances in Electrical Engineering, ICAEE 2013*, Dec. 2013, pp. 227–231, doi: 10.1109/ICAEE.2013.6750347.

[17] A. M. Dewan, S. M. Dewan, and S. A. Nazmin, "The opportunities and challenges of using ICT by state owned enterprises in Bangladesh: case of SOEs under privatization commission," in *Proceedings of 11th International Conference on Computer and Information Technology, ICCIT 2008*, Dec. 2008, pp. 611–616, doi: 10.1109/ICCITECHN.2008.4803007.

[18] M. S. Chhonker, D. Verma, and A. K. Kar, "Review of technology adoption frameworks in mobile commerce," *Procedia Computer Science*, vol. 122, pp. 888–895, 2017, doi: 10.1016/j.procs.2017.11.451.

[19] A. Seyal, M. M. Awais, S. Shamail, and A. Abbas, "Determinants of electronic commerce in Pakistan: preliminary evidence from small and medium enterprises," *Electronic Markets*, vol. 14, no. 4, pp. 372–387, Dec. 2004, doi: 10.1080/10196780412331311801.

[20] A. D. Rachid, A. Abdellah, B. Belaid, and L. Rachid, "Clustering prediction techniques in defining and predicting customers defection: the case of e-commerce context," *International Journal of Electrical and Computer Engineering (IJECE)*, vol. 8, no. 4, pp. 2367–2383, Aug. 2018, doi: 10.11591/ijece.v8i4.pp2367-2383.

[21] H. Zaim, A. Haddi, and M. Ramdani, "A novel approach to dynamic profiling of e-customers considering click stream data and online reviews," *International Journal of Electrical and Computer Engineering (IJECE)*, vol. 9, no. 1, pp. 602–612, Feb. 2019, doi: 10.11591/ijece.v9i1.pp602-612.

[22] W. Guanchen, M. Kim, and H. Jung, "Personal customized recommendation system reflecting purchase criteria and product reviews sentiment analysis," *International Journal of Electrical and Computer Engineering (IJECE)*, vol. 11, no. 3, pp. 2399–2406, Jun. 2021, doi: 10.11591/ijece.v11i3.pp2399-2406.

[23] S. M. Rahman, "Consumer expectation from online retailers in developing e-commerce market: an investigation of generation Y in Bangladesh," *International Business Research*, vol. 8, no. 7, Jun. 2015, doi: 10.5539/ibr.v8n7p121.

[24] A. Y. Chowdhury, A. K. M. A. Hossain, M. M. Habib, and X.-G. Yue, "Role of mobile financial service in promoting online small business in Bangladesh," *IETI Transactions on Social Sciences and Humanities*, pp. 140–148, 2019, doi: 10.6896/IETITSSH.201911_5.0015.

[25] R. Haque *et al.*, "Modeling the role of C2C information quality on purchase decision in Facebook," in *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, vol. 11195, Springer International Publishing, 2018, pp. 244–254.
[26] N. Hajli and X. Lin, "Consumer adoption of social commerce," in *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, vol. 9191, Springer International Publishing, 2015, pp. 279–287.
[27] Z. Sheikh, T. Islam, S. Rana, Z. Hameed, and U. Saeed, "Acceptance of social commerce framework in Saudi Arabia," *Telematics and Informatics*, vol. 34, no. 8, pp. 1693–1708, Dec. 2017, doi: 10.1016/j.tele.2017.08.003.
[28] L. Y. Leong, N. I. Jaafar, and S. Ainin, "Understanding Facebook commerce (f-commerce) actual purchase from an artificial neural network perspective," *Journal of Electronic Commerce Research*, vol. 19, no. 1, pp. 75–103, 2018.
[29] P. L. Teh and P. K. Ahmed, "Understanding social commerce adoption: an extension of the technology acceptance model," in *2012 IEEE 6th International Conference on Management of Innovation and Technology, ICMIT 2012*, Jun. 2012, pp. 359–364, doi: 10.1109/ICMIT.2012.6225832.
[30] S. M. M. Anari, R. Ibrahim, and A. Bakri, "Understanding factors on the customer intention behavior through Facebook commerce: a conceptual model," in *ISTMET 2014 - 1st International Symposium on Technology Management and Emerging Technologies, Proceedings*, May 2014, pp. 107–112, doi: 10.1109/ISTMET.2014.6936488.
[31] C. Herrando, J. Jiménez-Martínez, and M. J. Martín-De Hoyos, "Social commerce users' optimal experience: stimuli, response and culture," *Journal of Electronic Commerce Research*, vol. 20, no. 4, 2019.
[32] F. Liébana-Cabanillas, J. A. Corral-Hermoso, Á. F. Villarejo-Ramos, and E. Higueras-Castillo, "New social consumer? determining factors of Facebook commerce," *Journal of Decision Systems*, vol. 27, no. 4, pp. 213–237, Oct. 2018, doi: 10.1080/12460125.2019.1592990.
[33] I. Akman and A. Mishra, "Factors influencing consumer intention in social commerce adoption," *Information Technology and People*, vol. 30, no. 2, pp. 356–370, Jun. 2017, doi: 10.1108/ITP-01-2016-0006.
[34] L. Y. Leong, N. I. Jaafar, and S. Ainin, "The effects of Facebook browsing and usage intensity on impulse purchase in f-commerce," *Computers in Human Behavior*, vol. 78, pp. 160–173, Jan. 2018, doi: 10.1016/j.chb.2017.09.033.
[35] M. Alonso-Dos-Santos, M. Alguacil Jiménez, and E. Carvajal-Trujillo, "Facebook commerce usage intention: a symmetric and asymmetric approach," *Information Technology and Management*, vol. 21, no. 3, pp. 145–156, Dec. 2020, doi: 10.1007/s10799-019-00311-2.
[36] M. Aljaafari, "A holistic social commerce framework," in *International Conferences ICT, Society, and Human Beings*, 2020, pp. 241–246.
[37] Y. S. Ali, A. R. C. Hussin, and H. M. Dahlan, "Electronic word of mouth engagement in social commerce platforms: an empirical study," *Information Development*, vol. 36, no. 3, pp. 438–456, Aug. 2020, doi: 10.1177/0266666919867488.
[38] A. S. Yusuf, A. R. Che Hussin, and A. H. Busalim, "Influence of e-WOM engagement on consumer purchase intention in social commerce," *Journal of Services Marketing*, vol. 32, no. 4, pp. 493–504, Jun. 2018, doi: 10.1108/JSM-01-2017-0031.
[39] A. S. Al-Adwan and H. Kokash, "The driving forces of Facebook social commerce," *Journal of Theoretical and Applied Electronic Commerce Research*, vol. 14, no. 2, pp. 15–32, May 2019, doi: 10.4067/S0718-18762019000200103.
[40] I. Brusch and N. Rappel, "Exploring the acceptance of instant shopping – an empirical analysis of the determinants of user intention," *Journal of Retailing and Consumer Services*, vol. 54, p. 101936, May 2020, doi: 10.1016/j.jretconser.2019.101936.
[41] Y. D. Handarkho, "Social experience vs. social technology in enhancing the intention to use social commerce: a case study of Indonesia," *Journal of Enterprise Information Management*, vol. 34, no. 3, pp. 860–883, Apr. 2021, doi: 10.1108/JEIM-01-2020-0013.
[42] J. Y. M. Kang and K. K. P. Johnson, "F-Commerce platform for apparel online social shopping: testing a mowen's 3M model," *International Journal of Information Management*, vol. 35, no. 6, pp. 691–701, Dec. 2015, doi: 10.1016/j.ijinfomgt.2015.07.004.
[43] W. Suraworachet, S. Premsiri, and N. Cooharojananone, "The study on the effect of Facebook's social network features toward intention to buy on f-Commerce in Thailand," in *Proceedings - 2012 IEEE/IPSJ 12th International Symposium on Applications and the Internet, SAINT 2012*, Jul. 2012, pp. 245–250, doi: 10.1109/SAINT.2012.46.
[44] M. Usman, Y. Ali, A. Riaz, A. Riaz, and A. Zubair, "Economic perspective of coronavirus (COVID-19)," *Journal of Public Affairs*, vol. 20, no. 4, Aug. 2020, doi: 10.1002/pa.2252.
[45] H. Hajli, "An integrated model for e-commerce adoption at the customer level with the impact of social commerce," *International Journal of Information Science and Management (IJISM)*, pp. 77–97, 2012.
[46] A. W. Bartik, M. Bertrand, Z. Cullen, E. L. Glaeser, M. Luca, and C. Stanton, "The impact of COVID-19 on small business outcomes and expectations," *Proceedings of the National Academy of Sciences*, vol. 117, no. 30, pp. 17656–17666, Jul. 2020, doi: 10.1073/pnas.2006991117.
[47] I. Vidaurreta, C. de la Fe, J. Orengo, Á. Gómez-Martín, and B. Benito, "Short-term economic impact of COVID-19 on Spanish small ruminant flocks," *Animals*, vol. 10, no. 8, p. 1357, Aug. 2020, doi: 10.3390/ani10081357.
[48] M. Cowling, R. Brown, and A. Rocha, "Did you save some cash for a rainy COVID-19 day? The crisis and SMEs," *International Small Business Journal: Researching Entrepreneurship*, vol. 38, no. 7, pp. 593–604, Nov. 2020, doi: 10.1177/0266242620945102.
[49] N. Kaur, S. L. Sahdev, V. Chaturvedi, and D. Rajawat, "Fighting COVID-19 with technology and innovation, evolving and advancing with technological possibilities," *International Journal of Advanced Research In Engineering and Technology*, vol. 11, no. 7, pp. 395–405, Jul. 2020, doi: 10.34218/IJARET.11.7.2020.039.
[50] M. Kaushik, "Pandemic COVID-19 and its implications on human life," in *Impact of COVID-19 and Pandemic Lockdown in India*, Balewadi: Eureka Publications, 2020, pp. 231–243.
[51] M. Shammi, M. Bodrud-Doza, A. R. M. Towfiqul Islam, and M. M. Rahman, "COVID-19 pandemic, socioeconomic crisis and human stress in resource-limited settings: a case from Bangladesh," *Heliyon*, vol. 6, no. 5, p. e04063, May 2020, doi: 10.1016/j.heliyon.2020.e04063.
[52] N. Oliver *et al.*, "Mobile phone data for informing public health actions across the COVID-19 pandemic life cycle," *Science Advances*, vol. 6, no. 23, Jun. 2020, doi: 10.1126/sciadv.abc0764.
[53] M. A. Shareef, Y. K. Dwivedi, V. Kumar, G. Davies, N. Rana, and A. Baabdullah, "Purchase intention in an electronic commerce environment: a trade-off between controlling measures and operational performance," *Information Technology and People*, vol. 32, no. 6, pp. 1345–1375, Dec. 2019, doi: 10.1108/ITP-05-2018-0241.
[54] Y. Bai, Z. Yao, and Y. F. Dou, "Effect of social commerce factors on user purchase behavior: an empirical investigation from renren.com," *International Journal of Information Management*, vol. 35, no. 5, pp. 538–550, Oct. 2015, doi: 10.1016/j.ijinfomgt.2015.04.011.
[55] M. T. Islam, M. R. Hoque, and G. Sorwar, "Understanding customers' intention to use ecommerce in Bangladesh: an application

of the technology acceptance model (TAM)," in *19th International Conference on Computer and Information Technology, ICCIT 2016*, Dec. 2017, pp. 512–516, doi: 10.1109/ICCITECHN.2016.7860251.
[56] L. Zhang, J. Zhu, and Q. Liu, "A meta-analysis of mobile commerce adoption and the moderating effect of culture," *Computers in Human Behavior*, vol. 28, no. 5, pp. 1902–1911, Sep. 2012, doi: 10.1016/j.chb.2012.05.008.
[57] F. Hoque, T. A. Joya, A. Akter, T. Afrina, T. H. Beg, and A. Z. A. Mukul, "Customer perception on purchasing through Facebook in Bangladesh: An empirical study on Dhaka City," *Academy of Marketing Studies Journal*, vol. 24, no. 2, pp. 1–14, 2020.
[58] S. S. and Shawon, M. A. Hasan, A. R. Nayeem, and M. B. Uddin, "Online purchasing behavior among bangladeshi young generation: influencing factors and impact," *Asian Business Review*, vol. 8, no. 3, pp. 125–130, 2018, doi: 10.18034/abr.v8i3.163.
[59] L. Y. Leong, N. I. Jaafar, and A. Sulaiman, "Understanding impulse purchase in Facebook commerce: does big five matter?," *Internet Research*, vol. 27, no. 4, pp. 786–818, Aug. 2017, doi: 10.1108/IntR-04-2016-0107.
[60] M. W. Hasanat, A. Hoque, F. Afrin, and M. Anwar, "The impact of coronavirus (COVID-19) on e-business in Malaysia," *Asian Journal of Multidisciplinary Studies*, vol. 3, no. 1, 2020.
[61] X. Gao, X. Shi, H. Guo, and Y. Liu, "To buy or not buy food online: The impact of the COVID-19 epidemic on the adoption of e-commerce in China," *PLOS ONE*, vol. 15, no. 8, Aug. 2020, doi: 10.1371/journal.pone.0237900.
[62] M. A. Shereen, S. Khan, A. Kazmi, N. Bashir, and R. Siddique, "COVID-19 infection: origin, transmission, and characteristics of human coronaviruses," *Journal of Advanced Research*, vol. 24, pp. 91–98, Jul. 2020, doi: 10.1016/j.jare.2020.03.005.
[63] M. A. Rahman, M. A. Islam, B. H. Esha, N. Sultana, and S. Chakravorty, "Consumer buying behavior towards online shopping: an empirical study on Dhaka city, Bangladesh," *Cogent Business and Management*, vol. 5, no. 1, pp. 1–22, Jan. 2018, doi: 10.1080/23311975.2018.1514940.
[64] V. S. Gurav and V. R. Patil, "A study of consumer behavior towards online buying with reference to Ichalkaranji City," *International Journal of Commerce and Management Research*, vol. 2, no. 9, pp. 97–103, 2016.
[65] D. I. Hawkins and D. L. Motherbaugh, *Consumer behavior building marketing strategy*, 11th ed. New York, New York, USA: McGraw-Hill/Irwin, 2010.
[66] S. Kim and D. Thorndike Pysarchik, "Predicting purchase intentions for uni-national and bi-national products," *International Journal of Retail & Distribution Management*, vol. 28, no. 6, pp. 280–291, Jul. 2000, doi: 10.1108/09590550010328544.
[67] A. Haque, N. Anwar, F. Yasmin, A. Sarwar, Z. Ibrahim, and A. Momen, "Purchase intention of foreign products: a study on Bangladeshi consumer perspective," *SAGE Open*, vol. 5, no. 2, pp. 1–12, Apr. 2015, doi: 10.1177/2158244015592680.
[68] I. Ajzen, "The theory of planned behavior," *Organizational Behavior and Human Decision Processes*, vol. 50, no. 2, pp. 179–211, Dec. 1991, doi: 10.1016/0749-5978(91)90020-T.
[69] F. Faul, E. Erdfelder, A. G. Lang, and A. Buchner, "G*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences," *Behavior Research Methods*, vol. 39, no. 2, pp. 175–191, May 2007, doi: 10.3758/BF03193146.
[70] N. Hao, H. H. Wang, and Q. Zhou, "The impact of online grocery shopping on stockpile behavior in Covid-19," *China Agricultural Economic Review*, vol. 12, no. 3, pp. 459–470, Aug. 2020, doi: 10.1108/CAER-04-2020-0064.
[71] C. H. Weiß, "StatSoft, Inc., Tulsa, OK.: STATISTICA, version 8," *AStA Advances in Statistical Analysis*, vol. 91, no. 3, pp. 339–341, Sep. 2007, doi: 10.1007/s10182-007-0038-x.
[72] O. Götz, K. Liehr-Gobbers, and M. Krafft, "Evaluation of structural equation models using the partial least squares (PLS) approach," in *Handbook of Partial Least Squares*, Springer Berlin Heidelberg, 2010, pp. 691–711.
[73] M. D. Williams, N. P. Rana, and Y. K. Dwivedi, "The unified theory of acceptance and use of technology (UTAUT): a literature review," *Journal of Enterprise Information Management*, vol. 28, no. 3, pp. 443–448, Apr. 2015, doi: 10.1108/JEIM-09-2014-0088.
[74] J. F. Hair, M. Sarstedt, L. Hopkins, and V. G. Kuppelwieser, "Partial least squares structural equation modeling (PLS-SEM): an emerging tool in business research," *European Business Review*, vol. 26, no. 2, pp. 106–121, Mar. 2014, doi: 10.1108/EBR-10-2013-0128.
[75] J. C. Anderson and D. W. Gerbing, "Structural equation modeling in practice: a review and recommended two-step approach," *Psychological Bulletin*, vol. 103, no. 3, pp. 411–423, May 1988, doi: 10.1037/0033-2909.103.3.411.
[76] J. Pallant, *SPSS survival manual: a step by step guide to data analysis using IBM SPSS*. Open University Press, 2005.
[77] B. Tabachnick and L. S. Fidell, "Profile analysis: the multivariate approach to repeated measures," *Using Multivariate Statistics*, pp. 314–376, 2013.
[78] M. Litwin, *How to measure survey reliability and validity*. California: SAGE Publications, Inc., 1995.
[79] C. M. Chiu, E. T. G. Wang, Y. H. Fang, and H. Y. Huang, "Understanding customers' repeat purchase intentions in B2C e-commerce: The roles of utilitarian value, hedonic value and perceived risk," *Information Systems Journal*, vol. 24, no. 1, pp. 85–114, Jul. 2014, doi: 10.1111/j.1365-2575.2012.00407.x.
[80] J. Hair, G. T. M. Hult, C. Ringle, and M. Sarstedt, *A primer on partial least squares structural equation modeling*. SAGE Publications, Inc., 2014.
[81] D. Barclay, R. Thompson, and C. Higgins, "The partial least squares (PLS) approach to causal modeling: personal computer use as an illustration," *Technology Studies*, vol. 2, no. 2, pp. 285–309, 1995.
[82] C. Fornell and D. F. Larcker, "Evaluating structural equation models with unobservable variables and measurement error," *Journal of Marketing Research*, vol. 18, no. 1, pp. 39–50, Feb. 1981, doi: 10.1177/002224378101800104.
[83] P. I. Santosa, K. K. Wei, and H. C. Chan, "User involvement and user satisfaction with information-seeking activity," *European Journal of Information Systems*, vol. 14, no. 4, pp. 361–370, Dec. 2005, doi: 10.1057/palgrave.ejis.3000545.
[84] W. W. Chin, "Commentary: issues and opinion on structural equation modeling," *MIS Quarterly*, vol. 22, no. 1, pp. 7–16, 1998.
[85] A. S. Ishtiaque and A. Sarwar, "E-commerce in Bangladesh," Center for Enterprise and Society, 2016.
[86] C. Moser, P. Resnick, and S. Schoenebeck, "Community commerce: facilitating trust in mom-to-mom sale groups on Facebook," in *Conference on Human Factors in Computing Systems - Proceedings*, May 2017, vol. 2017, pp. 4344–4357, doi: 10.1145/3025453.3025550.
[87] T. Van Asch, W. Dewulf, F. Kupfer, I. Cárdenas, and E. Van de Voorde, "Cross-border e-commerce logistics – Strategic success factors for airports," *Research in Transportation Economics*, vol. 79, p. 100761, Mar. 2020, doi: 10.1016/j.retrec.2019.100761.
[88] H. Zhang, Y. Lu, S. Gupta, and L. Zhao, "What motivates customers to participate in social commerce? the impact of technological environments and virtual customer experiences," *Information and Management*, vol. 51, no. 8, pp. 1017–1030, Dec. 2014, doi: 10.1016/j.im.2014.07.005.
[89] A. Salman, "Elusive challenges of e-change management in developing countries," *Business Process Management Journal*, vol. 10, no. 2, pp. 140–157, Apr. 2004, doi: 10.1108/14637150410530226.
[90] K. W. Nafi, T. S. Kar, M. A. Hossain, and M. M. A. Hashem, "A fuzzy logic based certain trust model for e-commerce," in *2013*

International Conference on Informatics, Electronics and Vision (ICIEV), May 2013, pp. 1–6, doi: 10.1109/ICIEV.2013.6572693.
[91] E. Siregar, "Young attitudes towards f-commerce advertising," in *2018 7th International Conference on Industrial Technology and Management (ICITM)*, Mar. 2018, vol. 2018, pp. 218–223, doi: 10.1109/ICITM.2018.8333950.
[92] X. Kaihong, "An empirical study of e-commerce trust promotion strategies efficiency based on Chinese samples," in *International Asia Symposium on Intelligent Interaction and Affective Computing, ASIA 2009*, Dec. 2009, pp. 124–127, doi: 10.1109/ASIA.2009.28.
[93] W. Tang and J. Zhu, "Informality and rural industry: rethinking the impacts of e-commerce on rural development in China," *Journal of Rural Studies*, vol. 75, pp. 20–29, Apr. 2020, doi: 10.1016/j.jrurstud.2020.02.010.
[94] H. Kim, "Globalization and regulatory change: the interplay of laws and technologies in e-commerce in Southeast Asia," *Computer Law & Security Review*, vol. 35, no. 5, p. 105315, Oct. 2019, doi: 10.1016/j.clsr.2019.03.009.
[95] J. Lin, L. Li, X. (Robert) Luo, and J. Benitez, "How do agribusinesses thrive through complexity? the pivotal role of e-commerce capability and business agility," *Decision Support Systems*, vol. 135, p. 113342, Aug. 2020, doi: 10.1016/j.dss.2020.113342.
[96] N. Moon, S. Sultana, F. Nur, and M. Saifuzzaman, "Literature review of the trend of electronic commerce in bangladesh perspective," *Global Journal of Management and Business Research*, vol. 17, no. 3, 2017.

BIOGRAPHIES OF AUTHORS

Samsul Alam was born in Madaripur, Bangladesh. He is an Erasmus Scholar who received an M.Sc. (Master's by Research) degree from Universidad de Extremadura, Spain, through a fully funded scholarship in 2016. Again, Mr. Alam completed his MBA & BBA in Management Information Systems from University of Dhaka. Currently, he is working as a faculty member in the MIS discipline at Daffodil International University. His research interests include fintech, e-Commerce, Social e-Business, digital education, digital Islamic finance, HRIS, smart city, IoT, HIS, 4IR, AI, strategy, ethics, and contemporary issues and thoughts. He can be contacted at salamdu.bd@outlook.com.

Md. Minhajur Rahman was born in Rangpur, Bangladesh. He completed a Bachelor of Business Administration degree in Management Information Systems from Daffodil International University. He has a tremendous interest in IT and wants to build his career in this related field. Presently, Mr. Minhaj is serving a privately owned company in the IT industry. He is an independent researcher whose primary research interest is ICT related applications in the society. He can be contacted at minhajur.rahman.sakkhor@gmail.com.