"The role of Fintech in predicting the spread of COVID-19"

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BUSINESS PERSPECTIVES

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THE ROLE OF FINTECH IN PREDICTING THE SPREAD OF COVID-19

Abstract

This study aims to investigate the role of Fintech in predicting the spread of COVID-19 based on consumers' Fintech perceptions and behavior before and after the outbreak of COVID-19. The study used a questionnaire-based survey distributed in different countries of the world using the LinkedIn platform for this purpose to reach the targeted population. The snowball sampling technique was used. The study targeted consumers with Fintech experience, especially in digital payments services. 507 samples were retrieved. For the analysis, the Structural Equation Modeling (SEM) was used. The study revealed novel results in predicting COVID-19 spread; these three variables (Fintech Behavior before COVID-19, Fintech Behavior after COVID-19, and Fintech Perception after COVID-19) could predict 52.5% of the variance in the dependent variable (COVID-19 Spread) ($R^2 = 0.525$, $p < 0.05$). The findings show that Higher Fintech perception and behavior among Fintech users will help in reducing the spread of COVID-19 by avoiding the use of contact payment methods. Contactless payment methods are the main tools in Fintech that might help in avoiding the probability of COVID-19 spread. Consumers' Fintech perceptions and behavior are the most influencing factors that could predict the spread of COVID-19 in this study, where digital payments are the main concern. It is recommended that consumers adopt digital payment methods and tools, especially contactless payment methods, to fulfill their financial services. Other researchers are also encouraged to use the same model to predict the spread of this virus in the Fintech context.

INTRODUCTION

There is no doubt that COVID-19 tops the news in the world. This virus is paralyzing all the sectors globally, one can witness its severe negative impact on all life aspects, especially health and economy. COVID-19 has infected millions of cases, there are hundreds of thousands of deaths all over the world (WHO, 2020a). COVID-19 is the "infectious disease caused by the most recently discovered coronavirus. This new virus and disease were unknown before the outbreak began in Wuhan, China, in December 2019" (WHO, 2020b). In March 2020, the World Health Organization declared that COVID-19 was a pandemic. This virus is spreading panic and fear all over the world; the virus behavior is still not predicted, and many ongoing studies are conducted to find a vaccine and medical treatments to reduce its severity and to provide a piece of hope for people to overcome this pandemic situation.

After the outbreak of COVID-19 and how it transmitted to people, transmission to humans mainly happened through contact with respiratory droplets, mouth, or nose droplets by a COVID-19 infected person through his cough, sneeze, or exhales droplets (ECDC, 2020).

As long as this virus transmitted in this way, health organizations and governments imposed safety rules to decrease the possibilities and probabilities of infection, such as social distancing, wearing masks and gloves, and avoiding touching the surfaces that may be contaminated by an infected person. Bhargava's (2020) study published at WebMD shows that COVID-19 can live on different surfaces such as metal, wood, plastics, stainless steel, cardboard, aluminum, glass, etc. and it is affected by cold, heat and sunlight that have an impact on how long it lives on these surfaces. The human could touch these surfaces daily so there is a risk if these surfaces are contaminated with the virus.

People have fear to touch any surface as it can be one of the sources that can spread and transmit COVID-19; the most common surfaces used daily among people are banknotes, payment cards and all associated machines such as ATMs and CCDMs (Cash and Cheque Deposit Machines) or any other self-service terminals that have physical contact with a human. Banknotes and Machines became unsafe surfaces to deal with, especially in this pandemic situation of COVID-19. Consumers are altering their payment methods into contactless payment methods; e-payment channels, contactless cards, and e-wallets are safe methods that help avoid physical contact with surfaces (AP, 2020).

Consumers' direction toward cashless and contactless payments pushed by the business calls to avoid the possibility of COVID-19 spread through using physical banknotes and payment methods. Central banks in different counties around the globe put banknotes for quarantine procedures to reduce the possibilities for COVID-19 infection (AP, 2020). After the outbreak of COVID-19, the policymakers call for a major change in the current payment ecosystem toward cashless payments methods, KSA put a strategy for non-cash transactions to be achieved by the end of this decade; 70% of the payments must be cashless ones, which is up from 36% compared to 2019 (Atalayar, 2020).

Being a cashless user, it needs technology to push and facilitates this mission; the financial technology (Fintech) intervenes to provide a solid base for promoting cashless services such as digital payments, electronic money transfers, e-wallet services. Banks, businesses, and the e-commerce industry required to adopt and implement the financial technologies to provide the technological solutions for consumers to use these innovative services and to ensure safe usage for financial services with real-time services base.

This study highlights the significant role of Fintech in predicting the spread of COVID-19; a measurement scale to achieve the objective of this study has been designed. This research work has a novel instrument that is capable of predicting the spread of COVID-19 through adopting the Fintech concept in consumers' financial behavior.

1. LITERATURE REVIEW

1.1. Overview

The COVID-19 pandemic has a significant impact on accelerating the process toward a cashless society all over the world. The trend toward financial technology transactions has been increased in this pandemic situation, consumers are looking to decrease the usage of cash in their financial transactions and activities, especially in the pandemic time. They are looking for alternative contactless payment methods to perform these transactions electronically without any physical intervention.

It is an opportunity to push the consumers' behavior toward cashless, banks, and Fintech companies looking to cooperate with each other to handle and facilitate the mission in front of consumers (William Fry, 2020). Banks need to digitize their financial services with the last cutting-edge technologies that are handled by the Fintech industry. It is a clear collaborative relationship between banks and Fintech companies that will put aside the competition to achieve one of the most trended market needs for contactless payments. Moreover, COVID-19 opens the M&A opportunities for banks and Fintech companies for such deals to fulfill any gap related to market needs and

offers that are aligned with consumers' needs and expectations.

According to GlobalData (2020, April 6), China's cash transactions will witness a significant decline in cash growth up to 2023 due to the outbreak of COVID-19. The WHO is calling for the use of contactless cards for payment transactions because they are safer than cash during this pandemic time. This trend toward contactless payment become a trended behavior in the world due to different calls to use e-payments to fulfill the financial transactions requests (GlobalData, 2020, April 6). The importance of this shift toward cashless transactions is a key indicator of predicting the future of cash transactions; this will lead to a gradual decline in cash either in volume and value based on the consumers' usage behavior toward digital payments instead of the traditional methods. Furthermore, the growth in online shopping is also a key driver to push consumers toward digital payments (Velychko, 2020).

The global panic of COVID-19 transmission into humans makes people avoid touching surfaces due to possible contamination, and they are alerted and committed to hygienic procedures to reduce the probability of any infection from contaminated surfaces. People advised to wash their hands after using cash, dirty banknotes could be a tool to spread the virus among people. Whereas the virologists were dismissive about the idea that cash could spread disease among humans, they are insisting that the disease is spreading through airborne water droplets (Clark, 2020). During the COVID-19 pandemic, people are watching and following all updates regarding the spread of this virus, the idea is any method that may help the spread of COVID-19 among people will raise their fear and make them avert using or dealing with, cash is one of those methods that have not yet been scientifically proven to transmit the virus to a human; however, people have fear to deal with cash, especially during this period of the COVID-19 outbreak. Another indicator raised people's interest in altering their payment behavior towards cashless methods, due to the procedures according to which in some countries, such as China and South Korea, cash is quarantined for 7-14 days after subjecting it to heat and ultraviolet light (Cocheo, 2020). China also has de-

stroyed thousands of banknotes and disinfect it to eliminate the spread of COVID-19. Whereas in the US, the federal reserve started a procedure to store the banknotes that come from Asia before circulating them back into the economy (Saigal, 2020).

1.2. Banknotes/coins and diseases

This section links possible studies that contribute to the investigation of the role of banknotes in spreading, carrying, and transmitting diseases.

The US currency fibrous surfaces provide holes that bacteria can make themselves even at home (Maron, 2017). So, the human may be vulnerable to some of these bacteria, and it can be transmitted into humans and cause diseases. A study conducted by New York University found that over 3,000 kinds of bacteria could live on the American money (Cocheo, 2020). Angelakis et al. (2014) found that coins and paper money could be potential vectors for transmissible diseases. These currencies might be a risk factor for public health, especially when handling food, it could spread the nosocomial infections. The researchers emphasize in their study that the riskiest banknotes recovered from hospitals have a high potential for Staphylococcus aureus infection, and as a result, banknotes and coins can be causes of pathogenic agents.

Many ways facilitate the spread of COVID-19 among people through droplets, which is the main way that COVID-19 is transmitted to humans, contaminates surfaces, and hands also contribute to the spread of this virus. Kampf et al. (2020) investigated the persistence of coronaviruses on the inanimate surfaces; they found that these types of viruses could persist up to 9 days on the inanimate surfaces such as glass, plastic, and metal. This indicates that these contaminated surfaces may threaten human health. Maritz et al. (2017) investigate the microbes found on the currency that is circulated among people in New York City; they found that these currencies were vulnerable with different types of microbes like "eukaryotes as the most abundant sequences on money, followed by bacteria, viruses, and archaea". Van Doremalen et al. (2020) show in their study the survival periods

of SARS-CoV-2 in hours on various surfaces: plastic and stainless steel scored the highest survival time (72 hours), compared to cardboard (24 hours) and copper (4 hours).

Based on these different works, a model was built in this study to investigate the role of financial technology in reducing the spread of diseases like the newly emerged virus COVID-19. Since banknotes and coins are vulnerable surfaces that can be contaminated by a variety of microbes, this can be a tool that helps these microbes spread.

1.3. Fintech and cashless

Sweden is considered to be one of the top cashless countries in the world, only 2% of transactions are processed in cash (Weller, 2016). Many other countries, such as Finland, the UK, Australia, China, and South Korea top the cashless countries in the world (GlobalData, 2020, January 13). Through this experience and practice, the countries adopted the usage of financial technology in their financial transactions to avoid cash payments in different aspects of business. Contactless payments are one of the top cashless methods that people use to fulfill their financial payments.

COVID-19 pushed Australia to cashless shopping and card payments, especially in this pandemic situation; there are many surprising numbers regarding the usage of card payments and cashless transactions through different types of businesses. In March 2020, USD 1 billion transactions in e-wallets have been recorded. The credit card spends grew into 21% up over February, whereas debit card transactions raised by 16% as month-on-month (Farr, 2020). Moreover, the most important thing in this regard is that many shops in the country and other countries refused to take cash; it forced consumers to use digital payment methods. The payments were fulfilled without the usage of PIN to fulfill payment transactions. All these methods have been used to prevent the spread of COVID-19.

South Korea is considered to be one of the top countries in the world with the highest phone ownership rate. South Korea is also character-

ized by the highest proportion of cashless transactions in the world in terms of credit and debit cards (Sonn, 2020). These two factors (phone penetration and debit and credit card ownership) are the main triggers and drivers to push financial technology into consumers.

In this COVID-19 pandemic situation, there are calls from the authorities in the world to change the paying behavior, especially in this period of the COVID-19 outbreak. In March 2020, the vice president of the European Commission for financial services has written on his own Twitter account that "Time to swap your coins for payment cards – safer for containing coronavirus." The vice president also supported the banking authorities in Europe for their initiatives to facilitate the usage of the contactless payment methods (Valero, 2020). The Belgian authorities induced people to use e-payments as it is a supporting factor that helps the social distancing, especially in these hard moments of the COVID-19 outbreak. Since the end of February, e-commerce transactions raised by 81% in Italy during this pandemic.

Notably, the European Commission is working on a strategy that will be revealed this autumn; this strategy is one of the strategies after COVID-19 that will be presented. It talks about establishing a national EU payments platform and it will be an integrated payment in the EU. The reason behind this strategy is to facilitate the payment mission for all the EU countries and to decrease the dependency on international card payments providers like Mastercard or Visa. This initiative will create a national e-payment platform that helps and push societies toward the financial technology in the payments industry, to avoid any future obstacles such as the COVID-19 pandemic (Valero, 2020).

1.4. Fintech perception and usage behavior

This study will provide the latest statistics on the Fintech perception and usage behavior in different parts of the world; These statistics are key indicators studying consumer behavior regarding the usage of financial technology after the COVID-19 outbreak.

Clement (2019) represents in her research the percentage of global contactless payment users through mobile devices in the period 2018–2020; In 2018, this percentage was 440 million users (as of the end of the first half of 2018), while it is expected that in 2020, the number will reach 760 million users.

A study by Mordor Intelligence (2019) indicates the market growth in mobile payments, it was a surprising result; The mobile payments will surpass cash and credit card payments. The growth rate in mobile payment is 26.39% in the period 2020–2025, there are many platforms to handle and fulfill these payments, such as Samsung Pay, Google Pay, Apple Pay, WeChat, Ali Pay, and PayPal.

When talking about Fintech, it is mandatory to mention the mobile payment adoption percentage around globally in order to clearly define the Fintech adoption intention in the world and how it drives the digital payments industry. The data presented on the MerchantSavvy website (50+ Global Mobile Payment Stats, Data & Trends, 2020, February), which is retrieved from eMarketer and Kantar TNS "Global Mobile Payment Users (2019) report" (Enberg, 2019), shows the global mobile payment adoption by users in different countries of the world (2019): China reserved the first place in the world (81.1%), Denmark ranks second (40.9%), followed by India (37.6%), South Korea (36.7%), Sweden (36.2%), the USA (29%), and Canada (26%).

This study also focuses on the value of digital payment transactions in the world, especially in 2020. Statista shows on their website that the value of the total transactions in digital payments is expected to reach USD 4,406,431 mln in 2020, while users are expected to reach 3,471.9 mln in the same year (Statista Market Forecast, n.d.).

No doubt that consumers shifted their financial behavior toward e-banking and financial technology transactions, especially in the COVID-19 pandemic situation. This shift has been translated and implemented in most countries around the world to avoid dealing with cash and coins. COVID-19 has a significant impact on accelerating the financial technology adoption to perform and fulfill the most demanding category – payments. Digital payments have been drastically increased global-

ly. Moreover, e-banking transactions have been also increased in this pandemic period. Channel News Asia (CAN, 2020) indicated that local banks of Singapore witnessed that customers switched to use e-banking during COVID-19. They mentioned there was a notable growth in e-payments transactions. For example, DBS bank said that there were 100 million transactions recorded this year compared to 2019. Moreover, digital payments have been doubled. Another study was conducted in India as part of an online survey conducted by Keelery (2020) at Statista; 33% of respondents said they were using digital payments more than before, while 9% said there was no cash, only digital payments.

Fintech opened the space and the required infrastructure for the digital financial transactions, it will help banks and other financial institutions to move toward digital transformation in their financial services. It is a great opportunity for Fintech to promote their technology and create new collaborations with banks to help them digitize their financial services after this pandemic. Contactless payments have been grown rapidly during the COVID-19 outbreak as there is a perception that it is a more hygienic payment method than other traditional payment methods (McKinsey, 2020). In Germany, the number of contactless payment transactions has been increased from 35% to 50%, these percentages have been recorded since the beginning of 2020. Verisk's 2020 financial report, "Coronavirus concerns drive contactless card use", shows the number of contactless transactions performed by adults in different countries in the world starting from 2013 till 2020F. The report highlights the numbers in nine countries in the world (Australia, Denmark, the UK, Norway, Poland, New Zealand, Spain, Germany, and the US). Australia recorded the highest transactions per adult from 50 (in 2013) to more than 350 in (2020F), followed by Denmark and the UK, while Norway witnessed rapid growth from 2017 till 2020F.

1.5. COVID-19 and the future of Fintech

There is no doubt that COVID-19 has a significant impact on accelerating the digital transformation in many industries and services globally. One of the most important industries is the finan-

cial services. As mentioned earlier, there are many Fintech adoptions among people in the world that use digital financial services and avoid the physical contact with cash or any service terminal that may be infected with the virus. People's perception of Fintech has changed towards using more Fintech services, and their financial behavior has also changed to digital services.

The main Fintech trends were briefly investigated that would shape the financial industry in the world, especially after this outbreak of COVID-19. Below are the main directions for the future development of the Fintech industry (Maddyness, 2020).

- Fintech accelerated and disrupted the financial digital transformation in the market to become the new standard in the financial services.

- E-commerce transactions have seen notable growth and high demand around the world, so a winner can facilitate the consumers' engagement in these transactions, especially in payment solutions.

- For sure, Fintech companies steal the light to accelerate the financial institutions' services towards e-services, instead of doing in-house developments.

- This situation has opened the door in the market for increased opportunities for mergers and acquisitions between Fintech companies and traditional financial institutions.

- Fintech has experience of using the last cutting-edge technologies employed in financial services, such as AI and intelligent software, to meet the needs of customers.

Based on different knowledge, literature, and new scientific results, this study has developed a new model that can predict the spread of COVID-19. Unfortunately, there are no journal articles or recent studies that can measure this function or have any model to test, so the researchers took this initiative to test the proposed model in different countries, and it creates new novel results that will be added to the Fintech and COVID-19 literature.

2. STUDY HYPOTHESES

New hypotheses have been developed that are involved in predicting the spread of COVID-19.

H1:   Fintech could predict the spread of COVID-19.

3. RESEARCH METHODOLOGY

3.1. Data collection

For this study, data were obtained from two different sources. Secondary data were obtained from various scientific journal articles, internet resources, and online reports, while primary data were collected through a structured questionnaire survey distributed to different countries in the world. The questionnaire consisted of seven dimensions: six dimensions for the independent variable (COVID-19 Spread Predictors), and one for the dependent variable (COVID-19 Spread).

3.2. Reliability and validity

3.2.1. Reliability

The study used Cronbach's alpha equation to examine the internal consistency of the seven dimensions. Based on the calculation, Cronbach's alpha is above 0.70 for all study variables, this indicates that the values of variables' reliability are accepted (Travakol, 2011). Table 1 shows the reliability test for the study instrument.

Table 1. Study reliability test

Source: Authors.

Variables	Items	Cronbach's alpha	Result/ Pass
Independent variables			
Banking Behavior Before COVID-19	9	0.715	Yes
Fintech Behavior Before COVID-19	3	0.746	Yes
Fintech Behavior After COVID-19	3	0.704	Yes
Fintech Perception After COVID-19	5	0.813	Yes
Banking Crisis Management after COVID-19	3	0.861	Yes
Government Financial Crisis Strategy after COVID-19	10	0.707	Yes
Dependent variable			
COVID-19 Spread	4	0.808	Yes

3.2.2. *Validity*

Confirmatory factor analysis is used to test and check the study variables; convergent validity test is also used for this purpose. Questionnaire validity means the degree to which the study model fits well with the data that have been surveyed, including the convergent validity test. The convergent validity reflects the correlation degree of multiple indicators for a variable, which is measured by the average variance extracted AVE of the latent variable, the CR, and the loading of corresponding measurable variables (Ruvio et al., 2008; Bagozzi et al., 1991; Chin, 1998). The AVE of the study sample has to be greater than 0.5, whereas the variable loading has to be greater than 0.7. Table 2 shows the convergent validity for all variables. AVE is larger than 0.5 for all variables. Furthermore, CR is larger than 0.7, so the study instrument is valid.

Table 2. Study validity test

Variables	Items	AVE	CR	Result/Pass
Independent variables				
Banking Behavior Before COVID-19	9	0.537	0.840	Yes
Fintech Behavior Before COVID-19	3	0.673	0.860	Yes
Fintech Behavior After COVID-19	3	0.671	0.858	Yes
Fintech Perception After COVID-19	5	0.575	0.868	Yes
Banking Crisis Management after COVID-19	3	0.783	0.915	Yes
Government Financial Crisis Strategy after COVID-19	10	0.509	0.910	Yes
Dependent variable				
COVID-19 Spread	4	0.641	0.877	Yes

3.3. Population and sampling method

The targeted population is people with Fintech experience and using e-banking services in their financial transactions. Different respondents from different countries of the world have been chosen intentionally to reflect their opinion in the study instrument. Respondents from different continents participated in this study: Europe, Asia, South America, North America and Africa. The snowball sampling method was used to avoid bias in responses; friends and professionals were recruited to participate to ensure the equitable representation for all countries and professions, the main channel used for distributing questionnaires is the LinkedIn platform. 507 samples

have been retrieved for the study; the instrument has been constructed in an e-form.

3.4. The study model

The study used seven dimensions to represent the study instrument: six dimensions were used for the independent variable, which is COVID-19 Spread Predictors, while one dimension is the dependent variable, which is COVID-19 Spread (Table 3). This model was developed based on the authors' deep investigation about the consumers' Fintech and e-banking behavior and perception. The model was tested in the first place in a pilot study distributed among 100 respondents in different countries of the world. The model was adopted after the initial results through its reliability and validity tests. Besides, a deep research work was done to find a similar instrument scale, especially for the independent variable in the literature, since there were no predefined scales to measure the intended objective of this study. Researchers have taken this initiative to explore different scales based on their own experiences and previous research works. This section will explain the scale used for each dimension along with the study model. 5-Likert scales were applied for all dimensions with the following responses – Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree.

Table 3. Study variables

Source: Authors.

Study variables		
Variable	**Sub-dimensions**	**Symbol**
Independent variable		
COVID-19 Spread Predictors	Banking Behavior Before COVID-19	A
	Fintech Behavior Before COVID-19	B
	Fintech Behavior After COVID-19	C
	Fintech Perception After COVID-19	D
	Banking Crisis Management after COVID-19	E
	Government Financial Crisis Strategy after COVID-19	F
Dependent variable		
COVID-19 Spread	–	Y

Table 4 shows the independent variable scale developed for this study.

Table 5 shows the dependent variable scale in this study.

Table 4. COVID-19 spread predictors scale

Dimension	Items
Banking Behavior Before COVID-19	I feel more comfortable when executing my financial services at the bank branch
	The bank is the main trust party in carrying out my financial services
	The Bank is motivating customers to use e-banking services
	Banks are pushing customers to use e-services
	E-banking services cover the majority of requested services by customers
	The Banks' systems are capable to effectively provide e-services
	E-banking services are available 24/7 without interruption
	E-banking services are easy to use
	Cash at home makes me feel safe in crisis moments
Fintech Behavior Before COVID-19	I prefer using my digital identity to access my financial services
	I prefer using Fintech services rather than traditional financial services
	I use e-payments methods rather than cash methods
Fintech Behavior After COVID-19	I use Fintech more than before after the outbreak of COVID-19
	I am convinced with Fintech services
	Fintech replaced some of the Bank's services
Fintech Perception After COVID-19	It is a must to change the cheque policy after COVID-19
	I see that the Fintech companies have the opportunity to compete with banks after COVID-19
	I see it is necessary to use e-wallet services for payments and money transfers
	All shops must have e-payments and money transfer methods
	Using Fintech services and avoiding cash prevent the spread of diseases
Banking Crisis Management after COVID-19	The banks' safety procedures during COVID-19 are satisfactory and prevent the spread of COVID-19
	Banks financial crisis management policies can provide immediate and efficient solutions during crisis
	Central Banks' Financial Crisis Management policies can provide sufficient alternatives during the crisis
Government Financial Crisis Strategy after COVID-19	It is a must to apply e-payments services in all vital centers such as Education, Food, Transportation, Health and Telecommunication
	Schools and universities must apply for e-payments and electronic money transfer services
	It is necessary to authorize FinTech companies to open virtual banking accounts
	From now on, customers need to change their financial behavior towards Fintech
	Financial promotions are required to encourage customers to use Fintech
	The cost of internet services/e-payments machines/taxes/commissions are obstacles for shops to adopt Fintech
	The government must provide the required infrastructure to facilitate the mission of banks and Fintech e-services
	E-signature and 3D security must be adopted by banks and Fintech companies in all financial services
	Banks must stop providing some services at branches that have an alternative e-services
	Central Bank must prohibit providing services at bank branches that have an alternative e-services

Table 5. COVID-19 spread scale

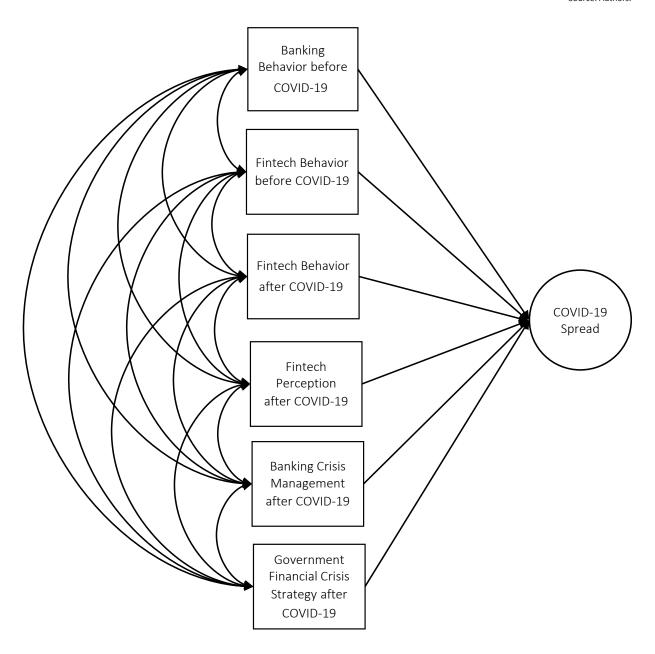| Dimension	Items
COVID-19 Spread	The Bank has become an unsafe place that can contribute to the spread of COVID-19
	Bank ATMs and CCDMs became unsafe to use during the outbreak of COVID-19
	I avoid touching paper money/coins/cards/cheques/payment terminals (with PIN) after COVID-19
	I believe that paper money/coins/cards/cheques/ payment terminals (with PIN) are tools that contribute to the spread of COVID-19

Figure 1. The study model

4. RESULTS

4.1. Descriptive statistics of respondents

Table 6 shows the respondents' characteristics. 66% of respondents are males, the majority are between 26-35 years old, 45% of all respondents. 49% are married, and work in the private sector, except for banks with 36%; 44% have a bachelor's degree and 31% have a master's degree. Based on their career positions, 27% are administrative employees and 19% hold management or senior management positions at their firms. 89% of respondents have a bank account, whereas 98% have a smartphone. The majority (58%) have internet access both at home and from a mobile phone, while 28% have access to the Internet only form a mobile phone.

Table 6. Respondents' characteristics

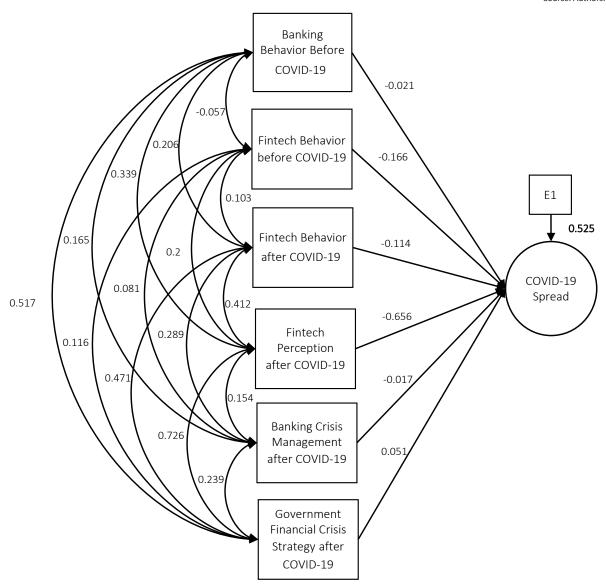| Demographic variables	Items	Frequency	Percentage
Sex	Male	335	66%
	Female	172	34%
Age	18-25	118	23%
	26-35	228	45%
	36-45	133	26%
	> 45	28	6%
Marital status	Single	240	47%
	Married	246	49%
	Divorced	21	4%
Occupation	University Student	109	21%
	Private sector employee (except banks)	184	36%
	Government Sector Employee	52	10%
	Bank Employee	73	14%
	Unemployed	12	2%
	Self-employed	77	15%
Qualification	No Degree	5	1%
	Less than High School Diploma	8	2%
	High School Diploma or Equivalent Degree	32	6%
	Bachelor	222	44%
	Master	159	31%
	Ph.D. or Higher	81	16%
Career position	Not Applicable	140	28%
	Administrative Employee	138	27%
	Section Head	69	14%
	Manager/Senior Manager	97	19%
	Director/GM	10	2%
	Other	53	10%
Do you have bank account?	Yes	451	89%
	No	44	9%
	It has been closed based on my request	12	2%
Do you have a smart phone?	Yes	499	98%
	No	8	2%
Internet access	I only have an Internet Subscription on my mobile phone	142	28%
	I only have Internet at Home	70	14%
	I have an Internet subscription both at home and on my mobile phone	295	58%

4.2. Hypotheses testing

Structural Equation Modeling (SEM) has been used as a main analysis tool using SPSS AMOS v.24. SEM test is used to discover the relationship between the study independent variables and the dependent variable by using the covariance matrix. Furthermore, the key issue in using SEM is to find correlations between the study instrument variables; it is used to measure the influence of the independent variables on the dependent variable. SEM will assist to assess the weight for the independent variables on the dependent variable; it is used to predict the influence of the predictor variables on the dependent variable. Estimate calculations are used to explain the econometric equation in the study through the study variables.

Figure 2 shows the study model using the SEM analysis.

Tables 7-11 are used to interpret the study hypotheses.

Source: Authors.

Note: 0.525 from Table 8; −0.021, −0.166, −0.114, −0.656, −0.017, 0.051 from Table 11; 0.517, −0.057, 0.206, 0.339, 0.165, 0.103, 0.2, 0.081, 0.116, 0.412, 0.289, 0.471, 0.154, 0.726, 0.239 from Table 10.

Figure 2. SEM model

Table 7. Regression weight

Source: Authors.

Path coefficients			Estimate	S.E.	C.R.	P
Y	←	A	−0.027	0.047	−0.566	0.571
Y	←	B	−0.167	0.032	−5.247	***
Y	←	C	−0.131	0.041	−3.187	0.001
Y	←	D	−0.767	0.053	−14.369	***
Y	←	E	−0.013	0.026	−0.516	0.606
Y	←	F	0.077	0.077	1	0.317

Note: *** − significantly different from zero at the 0.001 level (two-tailed).

Table 8. Squared multiple correlations

Source: Authors.

Variable	Estimate
COVID-19 Spread	0.525

Table 9. Covariances

Source: Authors.

Path coefficients			Estimate	S.E.	C.R.	P
A	↔	F	0.124	0.012	10.329	***
A	↔	B	−0.02	0.016	−1.289	0.198
A	↔	C	0.065	0.014	4.542	***
A	↔	D	0.104	0.014	7.224	***
A	↔	E	0.075	0.021	3.651	***
B	↔	C	0.042	0.018	2.298	0.022
B	↔	D	0.079	0.018	4.412	***
B	↔	E	0.048	0.026	1.822	0.069
F	↔	B	0.036	0.014	2.594	0.009
C	↔	D	0.144	0.017	8.576	***
C	↔	E	0.15	0.024	6.242	***
F	↔	C	0.128	0.013	9.592	***
D	↔	E	0.078	0.023	3.429	***
F	↔	D	0.193	0.015	13.221	***
F	↔	E	0.094	0.018	5.219	***

Note: *** – significantly different from zero at the 0.001 level (two-tailed).

Table 10. Correlations

Source: Authors.

Path coefficients			Estimate
A	↔	F	0.517
A	↔	B	−0.057
A	↔	C	0.206
A	↔	D	0.339
A	↔	E	0.165
B	↔	C	0.103
B	↔	D	0.2
B	↔	E	0.081
F	↔	B	0.116
C	↔	D	0.412
C	↔	E	0.289
F	↔	C	0.471
D	↔	E	0.154
F	↔	D	0.726
F	↔	E	0.239

Table 11. Standardized regression weights

Source: Authors.

Path coefficients			Estimate
Y	←	A	−0.021
Y	←	B	−0.166
Y	←	C	−0.114
Y	←	D	−0.656
Y	←	E	−0.017
Y	←	F	0.051

4.3. Study main hypotheses

H1:   Fintech could predict the spread of COVID-19.

To answer the hypothesis in this research work, the study will assess if the independent variables can predict the variances in the dependent variable. Referring to Table 8, the squared multiple correlations is 0.525. This means that the independent variables could predict 52.5% of the variance in the dependent variable (COVID-19 Spread). The results support that COVID-19 Spread predictors could predict the COVID-19 Spread.

Table 10 (Correlations) shows that the relationship was explored between the independent variables, notably the strongest relationship between these two variables – Fintech Perception after COVID-19 and Government Financial Crisis Strategy after COVID-19, where $R = 0.726$, $p < 0.01$. The second strongest relationship exists between Banking Behavior before COVID-19 and Government Financial Crisis Strategy after COVID-19, where $R = 0.517$, $p < 0.01$. Furthermore, there are similar relationships between these variables – Fintech Behavior after COVID-19 and Fintech Perception after COVID-19; Fintech Behavior after COVID-19 and Government Financial Crisis Strategy after COVID-19, where $R = 0.412$, $p < 0.01$ and $R = 0.471$, $p < 0.01$, respectively.

4.3.1. The econometric equation of the study model

Based on Table 7 (Regression weight), the following equation based on these predictors' values has been constructed: Fintech Behavior before COVID-19 denoted by B symbol, $\beta = -0.167$, p = 0.000; Fintech Behavior after COVID-19 denoted by C symbol, $\beta = -0.131$, p = 0.000; Fintech Perception after COVID-19 denoted by D symbol, $\beta = -0.767$, p = 0.000.

$$Y = -0.167 \cdot B - 0.131 \cdot C - 0.767 \cdot D.$$

4.3.2. Interpreting COVID-19 predictors

1. There is a direct relationship between the predictors B, C, and D and Y, and:

- if B increases by 10 units, it may decrease Y by 1.67 units;

- if C increases by 10 units, it may decrease Y by 1.31 units; and

- if D increases by 10 units, it may decrease Y by 7.67 units.

2. There is no significant impact of A, E, and F on Y.

5. DISCUSSION

The study has found that the proposed variables that are intentionally designed to assess the variance in the spread of COVID-19 are based on many criteria concerning consumers' behavior and perception toward Fintech before and after the outbreak of COVID-19. The results show that these three predictors (Fintech Behavior before COVID, Fintech Behavior after COVID-19, Fintech Perception after COVID-19) could predict 52.5% of the variance in the COVID-19 Spread. This means that consumers' behavior and perception toward Fintech both before and after the outbreak of the virus could be an indicator to predict the virus spread. Higher Fintech perception and behavior will help reduce the spread of COVID-19. The study emphasizes the impact and the importance of using Fintech and electronic financial services, especially in payment methods. Contactless payments are the most important pillar in Fintech services that can help avoid the probability of the COVID-19 spread among people. The study findings show that people have a special perception toward cash, physical credit/debit cards, coins, cheques, and payment terminals, that these payment methods are factors contributing to the spread of COVID-19.

CONCLUSION

This study reveals new findings that will guide authorities, banks and the Fintech industry to point out the importance of using digital financial services instead of traditional methods. The study also revealed the most important finding, which is the following: Fintech perception and behavior (Fintech

Behavior before COVID-19, Fintech Behavior after COVID-19, and Fintech Perception after COVID-19) have the greatest impact on and association with predicting the spread of COVID-19 among people (52.5%). People think that avoiding physical contact with cash and any payment tools or methods helps reduce the spread of COVID-19 by changing their financial behavior, especially during the pandemic, toward using electronic and contactless payment methods. This study focuses on payment tools and methods. The results support the researchers' argument that digital and contactless payment methods help predict the spread of COVID-19.

This study was a risky mission to find the most accurate dimensions that could predict the spread of COVID-19. The researchers took this initiative to succeed by conducting this research work as a pilot study before releasing the study model into consideration, based on the consistency of the research variables used for this purpose.

There are concerns that more research is needed to investigate the role of consumers' banking behavior, banks, and government crisis management strategies in predicting the spreading behavior of COVID-19 related to financial services. In this study consumers, banking behavior, and government and banking crisis strategies do not influence predicting the spread of the virus.

RECOMMENDATIONS

It is highly recommended that other researchers in this field of Fintech check the same model of this study to measure the influence of study predictors on predicting the spread of the virus. Besides, consumers are encouraged to change their financial behavior, especially regarding payments in favor of digital payments. Businesses are encouraged to implement all the latest digital payment technologies to help consumers make their online purchases effectively without any obstacles to payment methods. Businesses are also required to push people toward using these e-payment methods by providing promotions and decreasing the commission margin for the intermediaries. Researchers seek to establish an international classification criterion for banks in relation to their adoption of financial technologies in their services, and how the digital transformation of banking financial services takes place.

LIMITATIONS

The main obstacle in this research work was the lack of literature that links the Fintech usage and the COVID-19 spread. In fact, there is no quantitative research that could predict the spread of this virus among people by examining the role of Fintech and digital payment methods. Most of the data sources used in this study were internet sources and reports showing the direction and use of Fintech services, especially payment transactions. Besides, no previous studies were found that validated scales for measuring study dimensions.

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