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**A Study on Consumers' Behavioral Intention towards
Mobile Payment during the Covid 19 Pandemic**

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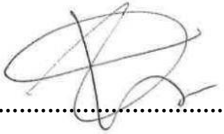
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Declaration/Statements page

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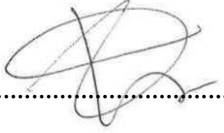
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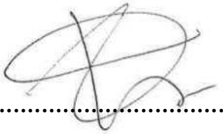
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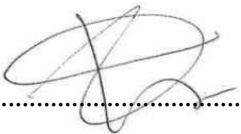
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Abstract

Purpose – This study aims to identify the factors that influence the consumers' intention in the use of mobile payment under the period of Covid 19 Pandemic.

Design/methodology/approach – Essential factors (Perceived Susceptibility, Perceived Severity, Government Support, Perceived Usefulness, Perceived Ease of Use, Social Influence, Facilitating Condition, Perceived Trust) in this study is constructed by reference to three conceptual models namely, Health Belief Model (HBM), Technology Acceptance Model (TAM) and Unified Theory of Acceptance & Use of Technology (UTAUT) and other prior empirical studies to investigate consumers' Behavioral Intention in the use of mobile payment. An online questionnaire is distributed to 290 respondents through social networking platforms together with a focus group discussion to verify the appropriateness of these factors in the Hong Kong market. Qualitative and quantitative research is performed on the obtained data to develop adequate and reliable results for analyzing the key elements that impact the use of mobile payment.

Findings – Factors analysis confirmed Perceived Ease of Use as the most significant factor that represents the consumers' Behavioral Intention. Regression test further affirmed dependent variables in this study are predictable, with Government Support having the strongest relationship towards Perceived Usefulness whereas Perceived Usefulness followed by Perceived Trust is most influential towards Behavioral Intention, in which these independent variables recorded a significance level at 0.1%.

Originality/value – This study investigated the key elements under Covid 19 Pandemic together with other critical factors that are most influential to the users' intention towards mobile payment, to provide more focused and effective promoting strategies for stakeholders to further develop the payment tool in Hong Kong.

Limitation and Future Research – This study was conducted at a rather low infection rate amidst the pandemic with a limited number of respondents toward users' behavioral intention. Further studies can expand the research with a larger sample size at different stages of the pandemic for a more comprehensive review of the impact on mobile payment. The relationship between different independent variables as stated in this study can be further discussed in future research.

Keywords – Mobile Payment, Behavioral Intentions, Covid 19 Pandemic

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List of Abbreviations

BI	Behavioral Intention
C&SD	Census and Statistics Department, The Government of the Hong Kong Special Administrative Region
FC	Facilitating Condition
GS	Government Support
HBM	Health Belief Model
KMO	Kaiser-Meyer-Olkin
PEOU	Perceived Ease of Use
P-SEV	Perceived Severity
P-SUS	Perceived Susceptibility
PT	Perceived Trust
PU	Perceived Usefulness
SI	Social Influence
TAM	Technology Acceptance Model
UTAUT	Unified Theory of Acceptance & Use of Technology

Chapter 1. Introduction

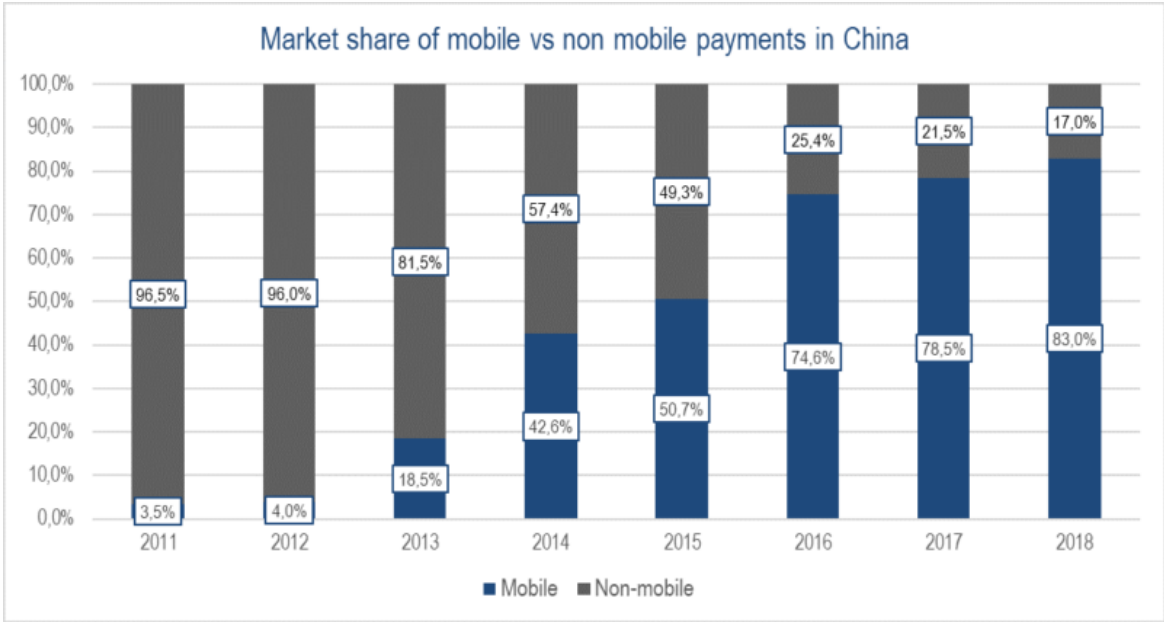
In this section, a brief overview of the expansion of mobile payment in recent years and the impact on the use of digitized payment methods during the Covid 19 Pandemic era, together with how research motivation is being developed under such circumstances. The research aim and objectives are further introduced to understand the purpose of this study.

1.1 Research Background

Mobile payment is an advanced payment method where transactions and money transferal are completed instantly by using portable electronic devices (Huang, 2017). For decades, commercial activities have been relying on cash, credit/debit cards, etc. for small amount transactions. Yet, the increase in the popularity of portable devices such as smartphones and tablets, and the rise in the general acceptance of technology provided a favorable circumstance to the development of mobile payment which established an alternative payment tool for transactions. The evolution progress in the payment methods has been different in every region, in which four out of five countries ranked top in the number of real time transactions in 2020 are located in the Asia-Pacific region (ACI Worldwide, 2021).

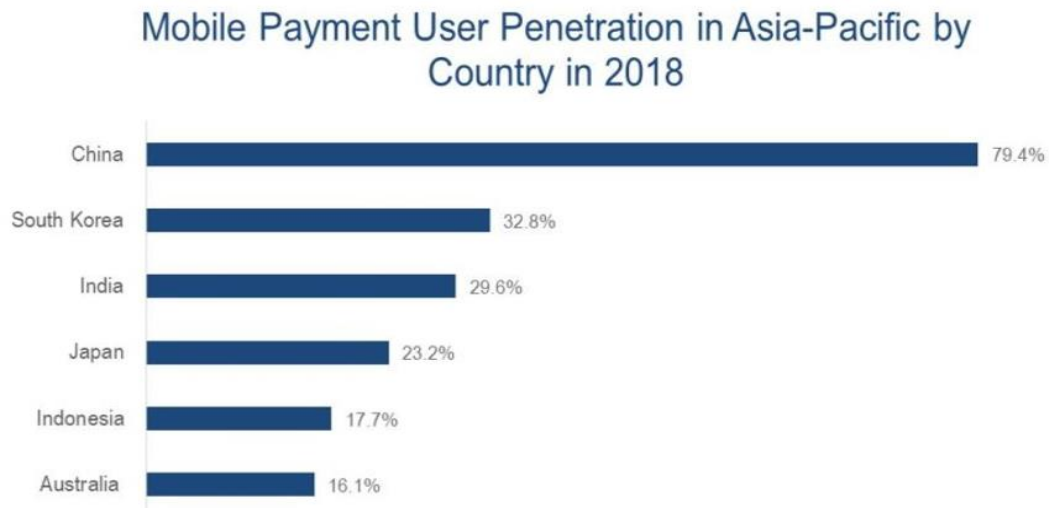
Among the Asia-Pacific region, the penetration of mobile payment in China has been leading other areas with its early establishment in such payment system. The country’s payment evolution has skipped the credit card stage and transferred directly from cash to mobile payment, alongside a high bank account and smartphone ownership rate, providing the fintech giants advantageous conditions to promote digital transactions ahead of time (CGAP, 2019). Figures 1.1a and 1.1b demonstrated the high penetration in mobile payment let the country’s mobile payment development race ahead of the region at an early stage, with market share and users of mobile payment already attributing 83% and 79.4% respectively back in 2018.

Figure 1.1a Market Share of Mobile versus Non-Mobile Payments in China



Source: Daxue Consulting, 2021

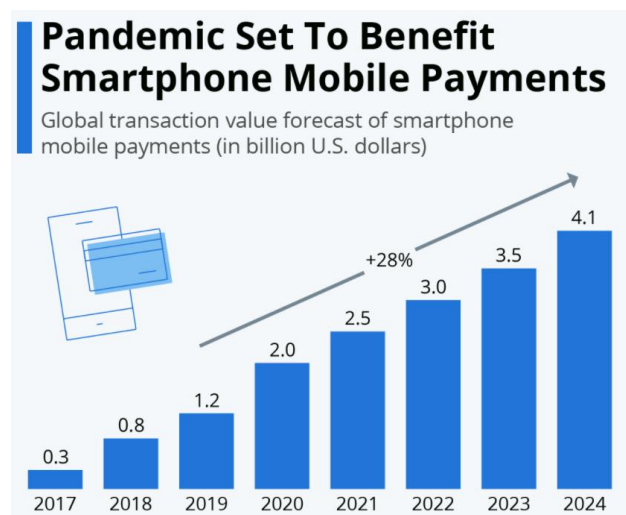
Figure 1.1b Mobile Payment User Penetration in Asia-Pacific by Country in 2018



Source: Daxue Consulting, 2021

Mobile payment is facing another turning point amidst the Covid 19 outbreak, where consumers' payment behavior has changed to cashless transactions due to a shift in shopping practices and fear of physical contact (Wisniewski *et al.*, 2021). The use of contactless form of transactions has been recognized as a precautionary measure in virus transmission and is encouraged by different official organizations in various regions (Huang, 2020). As such, the volume of digital payments has significantly increase in many countries especially in Asia and Europe (SCMP, 2021; Caswell *et al.*, 2020) which marked an uplift of 6% in the number of non-cash transactions globally from 2019 to 2020 (McKinsey, 2021). The transformation in payment behavior is expected to have a prolonged effect which the dependence on cashless payment could sustain even the Covid 19 Pandemic is contained (Wisniewski *et al.*, 2021). The alter in the usage of cash has motivated central banks in different regions to investigate the potential of digital currencies by replacing physical banknotes and coins in the coming future (BIS, 2021), which provides additional favorable conditions for the adoption of mobile payment.

Figure 1.1c Forecast on Global Transaction Value of Mobile Payment



Source: Statista, 2020

The booming condition in mobile payment is considered to be sustainable in the foreseeable period. By reference to Figure 1.1c, the global mobile payment has been benefited from the pandemic situation and is forecasted to increase by 28% within 5 years in the transaction value. It is expected that the development of cashless transactions would be largely driven by the Asia-Pacific area and the number of transactions would increase by 109% from 2020 to 2025 and by 76% from 2025 to 2030, in which the region would achieve 1.8 trillion transactions by 2030, attributing 60% of the total cashless transactions around the world (PwC, 2021).

Even though there is a significant upward trend in the use of mobile payment during the epidemic period and is estimated can be continuing in the post pandemic era, the payment evolution is yet to be welcomed by everyone. Consumers weight heavily on cash payment tends to continue their daily practices despite the health crisis (Kotkowski & Polasik, 2021), and the criteria to use mobile payment, i.e. smartphones and bank accounts owners, have restricted some of the consumers, in particular the elderlies and poverties, to adopt the technology in different regions (Buchwald, 2020).

1.2 Research Motivation

Despite being situated in the Asia-Pacific region, the extension of cashless transactions has been facing obstacles as compared with other countries within the region due to the citizens' immunity to the use of digital payment resulting from security concerns and contentment with the traditional payment methods such as cash and credit cards in Hong Kong (Sendingan, 2018). Citizens are not new to cashless transactions by using Octopus Cards with a penetration rate of 99% for daily transactions, but other digital payment options such as mobile payment are growing very slowly in the market (Fintech News Hong Kong, 2018). The success of Octopus Cards has become a major resistance for many consumers and retailers to discover alternative approaches for cashless payment, including mobile payment, which is a popular way for settlements in many other regional commercial markets.

Even though many chain stores have established different cashless transaction facilities, the cash-based culture is rooted in the city where some commercial activities including self-employed businesses and small retails resist in accepting cashless transactions as a payment option because of the underlying set up fees and administration charges (Singh, 2018). Due to both consumers' and retailers' transaction habits and concerns arising in the use of mobile payment, the penetration progress of the payment tool is largely restricted and yet to establish a sophisticated digital payment ecosystem within the local market. Thus, mobile commerce in Hong Kong has been far behind the rest of China in the past, with record attributing 36% of all e-commerce transactions together with a low utilization rate of 14% in the use of mobile app transactions in 2018 (JPMorgan, 2019).

Yet, the sudden attack of the Covid 19 Pandemic in 2020 has provided a turning point for the development of cashless payment due to the increase in awareness of contactless approaches engaged in daily living. A shift in consumers' spending behavior from offline to online due to precautionary measures employed and the government further encouraged digital payment by the rollout of HK\$5,000 Consumption Scheme in 2021, has provided advantageous conditions for mobile payment in Hong Kong to expand (HKGCC, 2021). Amidst the pandemic period, the penetration rate of mobile wallets in Hong Kong achieved the world's highest penetration rate at 85% in 2020 (Yahoo Finance, 2021), with nearly 50% of the total population aged over 15 has adopted mobile payment within 12 months in the same year as illustrated in Table 1.2a, in which users aged between 25 – 44 have a higher usage rate of over 70% among all age groups.

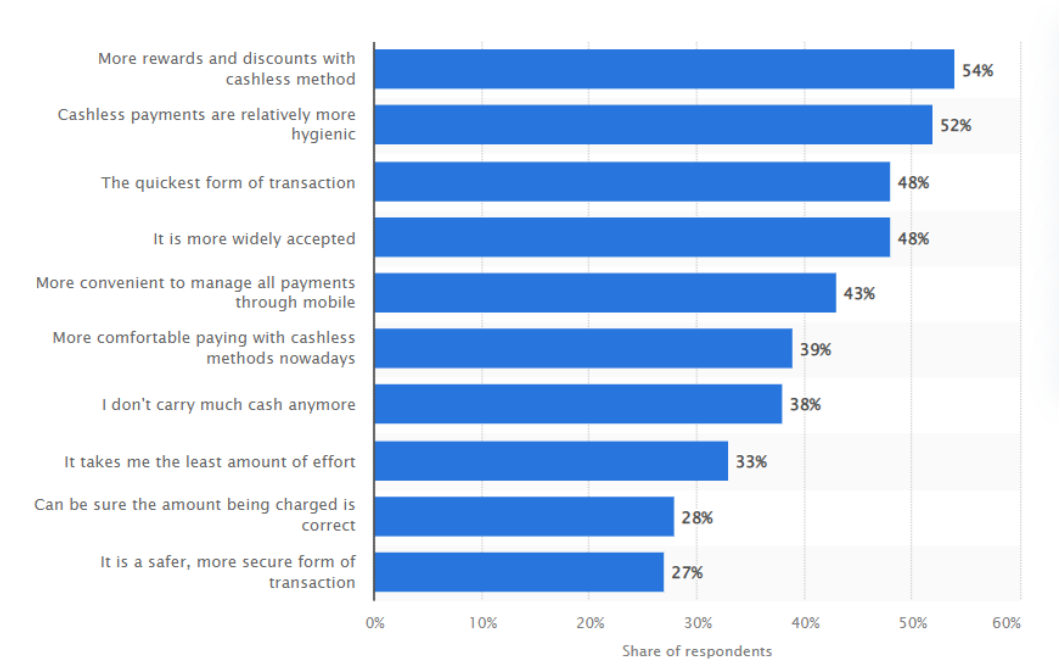
Table 1.2a Persons aged 15 and over who had used Mobile Payment during the 12 months before enumeration in Hong Kong

年齡組別／性別 Age group / Sex	人數 No. of persons (‘000)	百分比 %	比率* Rate*
年齡組別 Age group			
15 - 24	401.3	13.1	62.7
25 - 34	730.5	23.8	78.8
35 - 44	753.0	24.6	73.4
45 - 54	625.6	20.4	58.3
55 - 64	429.5	14.0	35.4
≥ 65	123.6	4.0	9.4
性別 Sex			
男 Male	1 441.9	47.1	49.3
女 Female	1 621.6	52.9	49.5
合計 Overall	3 063.5	100.0	49.4

Source: C&SD, 2021(a)

The transformation in shopping and payment behavior has provided opportunities for consumers to explore different cashless payment methods. The concern for hygiene might be the initial reason to adopt cashless payment, yet the payment experiences bring new insights into contactless transactions that provide a breakthrough chance towards traditional transaction methods. As demonstrated in Figure 1.2b, the reasons for consumers adopting cashless payment during the pandemic have extended beyond hygienic issues where rewards and offers, efficient and effective transactions, as well as increase in acceptance have been other driving engines in the boost of cashless payment. The affirmative experiences in mobile payment can strengthen users’ continuous intention in using the payment tool.

Figure 1.2b Reasons for an expected increase in Cashless Payment in Hong Kong as of July 2021

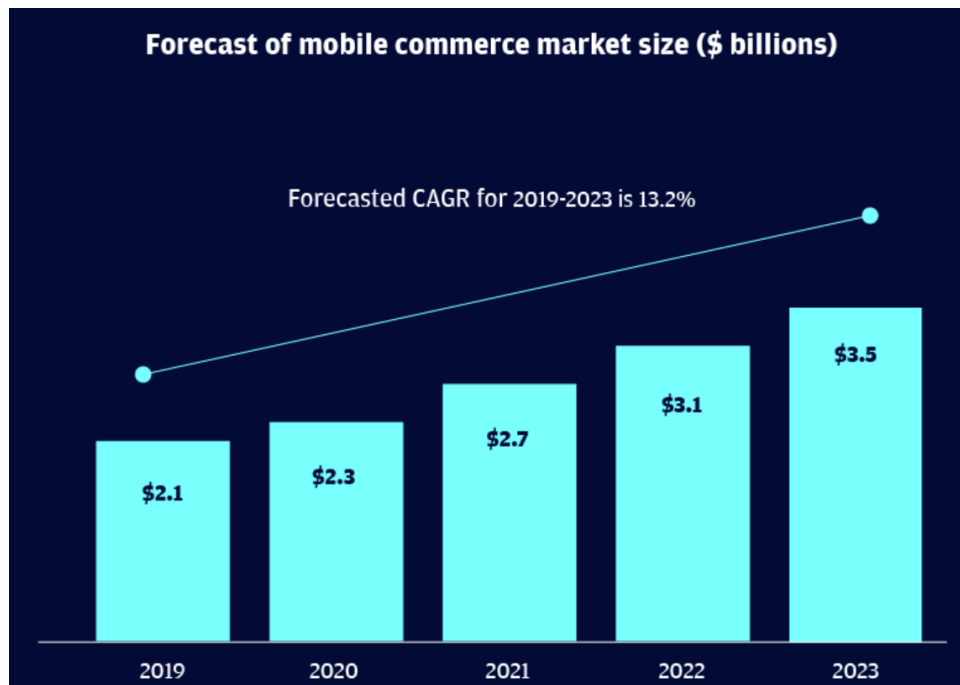


Source: Statista, 2022(a)

The Consumption Voucher Scheme in 2021 has further encouraged the service providers and retailers to capture mobile transactions for business opportunities. Retailers are motivated to set up mobile payment facilities to get ready for the sales stimulated by e-vouchers (Lam, 2021), together with tremendous sales discounts offered by service providers and retailers during the period, have accelerated the building up of the digital payment ecosystem that enhances mobile payment activities. The establishment not only can serve the retail boom generated from the scheme but also facilitate subsequent mobile payment for future commercial activities and have constructed a foundation for the rolling out of the second-wave Consumption Voucher Scheme in 2022 (Yau, 2022). The higher participation in retailers for mobile payment activities, together with greater acceptance of digital payment by consumers, pave a better commercial environment for the development of mobile payment as compared with the pre-pandemic period.

The future development of mobile payment in Hong Kong has considered to be optimistic. Digital wallets are expected to take over credit cards, accounting for 37% of transactions and become the most popular online payment in the economy by 2024 (InsideRetail, 2021), whereas at the same time cash transactions will face a reduction of less than 1.6% at point-of-sales which ranks the lowest in the Asia-Pacific region (Forbes, 2021). The increase in adoption of digital payment has provided room for mobile payment to expand in the local market, in which the market share of mobile commerce is expected to expand constantly at 13.2% compounded annual growth rate from 2019 – 2023 as illustrated in Figure 1.2c which allows digital wallets to become the dominant payment tool attributing 47% in 2023 in the Hong Kong market as illustrated in Figure 1.2d.

Figure 1.2c Forecast of Mobile Commerce Market Size



Source: JPMorgan, 2020

Figure 1.2d Forecasted Payment Split 2023



Source: JPMorgan, 2020

Mobile payment is seen as the upcoming payment trend in the near future. Even though mobile payment provided prompt and boundary-free transactions services for users, such services are limited to portable electronic devices owners alongside the underlying privacy issues during payment (Yakean, 2020). The users' intention in adopting mobile payment is influenced by favorable or adverse factors that impact their payment experiences. The Covid 19 Pandemic has acted as an accelerator in the acceptance of digital payment which allows the penetration of mobile payment can catch up within the region, yet it is also important to understand the factors that impact such a turnaround in the use of contactless payment. To further expand the digital payment tool in Hong Kong, it is essential to identify the key elements that affect mobile payment development to enhance and sustain the users' acceptance of the digital payment. This study would focus on the factors that affect the consumers' behavioral intention in Hong Kong that generate such a turnaround in the use of mobile payment under the Covid 19 Pandemic.

1.3 Project Aim

The aim is to capture the factors, including perceived susceptibility ("P-SUS"), perceived severity ("P-SEV"), government support ("GS"), perceived usefulness ("PU"), perceived ease of use ("PEOU"), social influence ("SI"), facilitating condition ("FC") and perceived trust ("PT"), that positively influence the consumers' behavioral intention ("BI") in the use of mobile payment in Hong Kong by implementing the Health Belief Model ("HBM"), the Technology Acceptance Model ("TAM") and the Unified Theory of Acceptance & Use of Technology ("UTAUT") model under the Covid 19 Pandemic condition.

1.4 Project Objectives

The accelerating popularity in the use of mobile payment under the Covid 19 Pandemic in Hong Kong has given a ground in this study to identify the factors affecting the citizens' intention in such cashless transactions. By modifying and merging various conceptual models, i.e., HBM, TAM and UTAUT, factors such as P-SUS, P-SEV, GS, PU, PEOU, SI, FC and PT which applied in the previous literature are selected in this study to ingratiate the existing market condition.

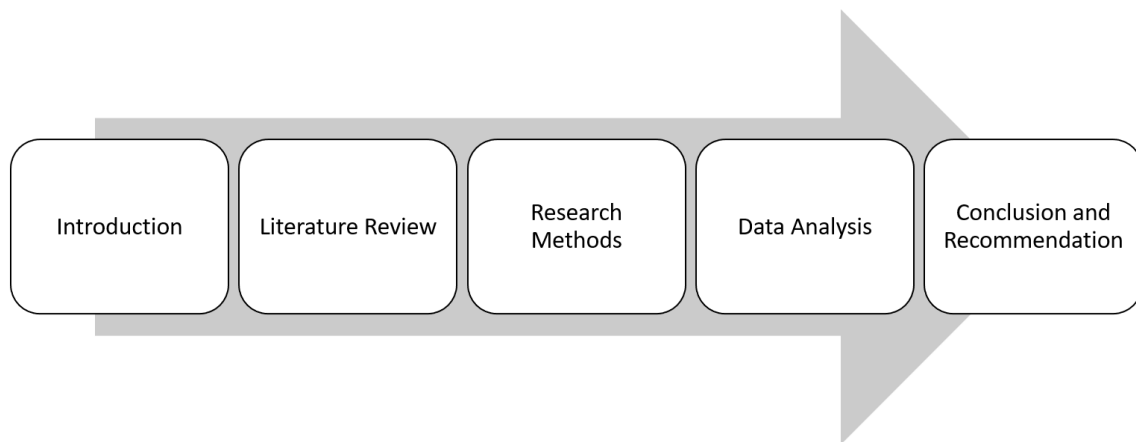
This study focused on behavioral intention on the use of mobile payment in the pandemic era, in which the project objectives are developed as follow:

- i) To verify the eight factors: P-SUS, P-SEV, GS, PU, PEOU, SI, FC and PT that have positive influence on behavioral intention of mobile payment users;
- ii) To identify three factors relationship with perceived usefulness and five factors relationship with behavioral intention on the use of mobile payment which impacting cashless transactions through interview with focus group and conducting questionnaire; and
- iii) To analyze the existing development of mobile payment and provide adequate recommendations based on the findings for mobile payment service providers, retailers and regulators for evolving the capacity in the use of such advanced transaction method.

1.5 Research Direction

The research kicked off in October 2021 and was completed at the end of April 2022 by following the flowchart as illustrated in Figure 1.5. A detailed timetable is further disclosed in Appendix A.

Figure 1.5 Flowchart of the Research



Source: this report

1.6 Limitation of Research Background

The research focused on the elements impacting the consumers' intention in the use of mobile payment during the Covid 19 Pandemic, yet the pandemic situation at different stages could directly impact the anxiousness of the citizens which influences their precautions actions adopted. As such, the data collected at different stages of the epidemic might vary, since the consumption behavior is subject to change during the ups and downs of the health crisis which could affect the users' perceived beliefs towards the use of digital payment tools.

1.7 Summary

The use of mobile payment is seen as a global trend and the Asia Pacific region is predicted to be the driving engine for such development. The development of mobile payment in Hong Kong has been leaving behind other regional markets in the past and the adoption of digital payment in the local market is yet to take the lead position among the surrounding nations. However, the Covid 19 Pandemic has provided a turning point in the expansion of digital payment due to the change in shopping and payment behavior during the period. The greater acceptance of contactless transactions by consumers and the increase in motivation in setting up mobile payment facilities by retailers during the epidemic have offered advantageous conditions for further expansion in digital payment. Thus, it is expected that the city is turning into a near-cashless society in the foreseeable future where digital wallets will become the dominant payment tool for transactions. This study captures the positive factors that influence consumers' behavioral intention on mobile payment in Hong Kong and make recommendations to accelerate such a trend within the economy.

Chapter 2. Literature Review

The factors correlated to the use of mobile payment under the Covid 19 Pandemic are introduced in this section. The definition and measurement of these factors are also identified to understand the relevance to the research topic. This study has referred to three conceptual models that have been previously developed under academic research to assess and select essential factors that are relevant to the development of contactless transactions under the existing commercial condition.

Health Belief Model (HBM) is a theoretical model that identify the beliefs towards the prevention of disease and the attempts adopted to avoid such health threat by implementing perceived susceptibility (P-SUS), perceived seriousness (P-SEV), perceived benefits, perceived barriers and cues to action as core independent factors to measure the perceived threat of the disease (Rosenstock, 1974). HBM is further considered as an effective and suitable model to evaluate the prevention of health challenges (Chao, Chen & Wang, 2014). As such, it is relevant to apply HBM as the conceptual framework to identify the validation of various precautionary measures under the Covid 19 Pandemic (Carico, Sheppard & Thomas, 2021; Tong *et al.*, 2020). Since the adaptation of precautionary measures has increased the reliance on technology, the concept in HBM has been integrated into various studies on the use of technology under such unprecedented health crisis (Daragmeh, Sági & Zéman, 2021; C.C. & Prathap, 2020).

The use of technology depends on various factors that affecting the users' willingness in integrating new innovative techniques into their living (Yi *et al.*, 2006). Many conceptual models have been developed to measure the core variables that affecting the use of technology, in which the Technology Acceptance Model (TAM) developed by Davis (1985) is one of the most established and fundamental conceptual frameworks to evaluate the users' intention and attitude by implementing perceived usefulness (PU) and perceived ease of use (PEOU) as the core elements to the acceptance of technology. TAM is an extension of Theory of Reasoned Action that was firstly introduced by Fishbein (1967) and is a behavioral theory identifying the behavior and attitude towards an objective. By modifying the behavioral theory with applying PU and PEOU as the technology acceptance measures, TAM has been employed by various studies to assess the users' intention in multiple technological application (Kamal, Shafiq & Karia, 2020; Cho, Chi & Chiu, 2020; Koul & Eydgahi, 2018; Daragmeh, Lentner & Sági, 2021). As such, TAM is a relevant theoretical model to evaluate the use of contactless payment which is a new transaction method being developed in the recent years.

The Unified Theory of Acceptance and Use of Technology (UTAUT) is an extension of TAM introduced by Venkatesh *et al.* (2003) and is another influential conceptual model measuring the use of technology. The theory is constructed with core variables such as performance expectancy, effort expectancy, social influence (SI) and facilitating conditions (FC) to determine the users' intention and behavior on the use of technology. UTAUT is considered as a more comprehensive model with higher explanatory power since the model is developed by comparing and consolidating eight acceptance theories namely TAM, Theory of Reasoned Action, combined TAM and Theory of Planned Behavior, Theory of Planned Behavior, Model of Personal Computer Utilization, Diffusion of Innovation, Motivational Model and Social Cognitive Theory (Taherdoost, 2018). The popularity of applying UTAUT as a tool for evaluating different technology contexts can be illustrated from numerous academic studies (Almaiah, Alamri & Al-Rahmi, 2019; Joo *et al.*, 2014; Slade *et al.*, 2015; Alam *et al.*, 2020a; Sharma, Singh & Sharma, 2020). Thus, certain core variables under UTAUT are engaged in this research model to construct a more comprehensive and solid view in the study of the use of mobile payment in Hong Kong.

Therefore, the development of the research model in this study has referred to the core variables as illustrated in HBM, TAM and UTAUT, together with other important elements that are influential to the intention of mobile payment users, are listed and explained in the following.

2.1 Perceived Susceptibility

Under the Covid 19 Pandemic, factors relating to health concern is considered as part of the reasons that influencing the use of mobile payment. Thus, factors associated to HBM are adopted to study the impact of users' perceived behavior under the existing health crisis. P-SUS is one of the fundamental factors that formulate HBM to measure the acceptance of susceptibility when facing a health issue (Rosenstock, 1974).

2.1.1 Definition

P-SUS refers to the level of vulnerability to a health crisis by different individuals which can identify one's subjective perception of preventive health behavior (Janz & Becker, 1984). It is believed that individuals' behavior is affected by their belief in the exposure of health risk (Shahnazi *et al.*, 2020). Under the pandemic situation, P-SUS would stimulate individuals to take possible precautionary measures to prevent being infected by Covid 19 (Tong *et al.*, 2020).

Factors relating to health issue might not directly related to the use of technology in the previous decades. Yet amidst Covid 19 pandemic, individuals with high perceived susceptibility would increase the likelihood to take more measures to reduce the risk of infection (Kim & Kim, 2020), in which the use of contactless payment could provide sense of hygiene and comfort to the consumers (Sahinaslan, Sahinaslan & Gunes, 2021). Therefore, variable related to health concerns is considered as relevant to the use of technology under the recent health attack incident.

2.1.2 Measurement

P-SUS is one of the common associated factors to measure the effect on Covid 19 in the Hong Kong society (Li, Lau & Chan, 2022). The factor is measuring to what extent an individual is susceptible to the infection of Covid 19 (Eichenberg *et al.*, 2021). The level of possibility, chances and feelings of being infected by Covid 19 due to physical contact during payment is determined in this survey to assess the impact of such factor on contactless payment (Daragmeh, Sági & Zéman, 2021).

2.2 Perceived Severity

Similar to P-SUS as mentioned in Section 2.1, P-SEV is another perceived health threat that modifies individuals' behavior who believe such would contribute an adverse outcome alongside serious problems (Carico, Sheppard & Thomas, 2021). P-SEV is another variable that constructs HBM which assesses an individual's psychological readiness in relation to a health condition (Maiman & Becker, 1974). Thus, P-SEV is adopted in this study to provide a comprehensive assessment under the pandemic conditions.

2.2.1 Definition

P-SEV is the feelings about the seriousness of facing a health threat or the consequences of leaving the illness untreated (Champion & Skinner, 2008). The increase in awareness of Covid 19 would enhance P-SEV at the same time reduce the barriers in adopting preventive actions in facing the disease (Elgzar *et al.*, 2020). The fear of any serious outcome caused by the disease would motivate individuals to take possible self-protection measures to avoid adverse consequences (Tong *et al.*, 2020).

Applying to the recent health crisis, individuals with high perceived severity are more engaged in adopting non-pharmaceutical interventions in preventing the virus (Fragkaki *et al.*, 2021), in which is expected that the use of electronic transactions would increase since payment without physical intervention is seen as an alternative measure to contain the pandemic (Abu Daqar *et al.*, 2021).

2.2.2 Measurement

P-SEV is another commonly used associate factor to assess the reaction of Hong Kong citizens toward Covid 19 (Li, Lau & Chan, 2022). The factor identifies how severe would the consequences of an individual if the patient got infected with the virus (Gaube, Lerner & Fischer, 2019). This study captures the respondents' degree of seriousness in the mental and physical feelings of being infected by the virus when having to conduct physical contact during payment (Daragmeh, Sági & Zéman, 2021).

2.3 Government Support

The usefulness of mobile payment might sound like a commercial activity led by different service providers in the market, but the GS is also impactful in the development of such payment practices. Yet, GS is seldom considered as the one of the essential variables in the acceptance of technology in academic research models (Chen, Chen & Chen, 2019).

As mentioned in Section 1.2, the positive attitude of the government towards the use of mobile payment under the pandemic era would have a direct influence on the adoption of such payment practices in the public and therefore is considered to be a significant element to the development of mobile payment in this study. GS in the use of mobile payment could add creditability to potential users for the acceptance on the use of technology (Tan & Teo, 2000).

2.3.1 Definition

The development of a business could make differences according to the government's attitude towards the industry in which supportive policies and infrastructure impose could enhance the incentive (Appiah *et al.*, 2019) in the use of mobile payment. It is expected the greater the GS perceived by an individual could enhance the willingness in adopting the promoted technology (Nasri & Charfeddine, 2012). GS of mobile payment could be in a way of the construction of IT facilities and the adoption of related laws and regulations (Dawi, 2019).

Due to the economic recession caused by the Covid 19 Pandemic, the Hong Kong government has imposed the distribution of consumption vouchers to enhance the weakening economic activities. The use of consumption vouchers has restricted the citizens to largely make use of mobile payment which could have a positive impact on the users' acceptance of the technology (Hasani, Bojei & Dehghantanha, 2017). Winata & Permana (2020) has also proven that various kind of electronic coupon has significant positive influence on PU towards electronic money.

2.3.2 Measurement

It is important for the government to take a major role in the development of mobile payment (Moghavvemi *et al.*, 2021). GS refers to the degree of understanding in the importance of mobile payment and the level of involvement in such development (Al Haderi, 2014). The active and promotion level towards mobile payment by the local government is measured in this study to assess its degree of participation in the development of the payment tool (Chen, Chen & Chen, 2019).

2.4 Perceived Usefulness

The use of mobile payment is referring to the acceptance of the new payment practices through the adoption of advanced technology, therefore, factors associated with the TAM which measuring the variables to the acceptance of technology are essential to assess the research topic. PU is one of the core variables developed under the TAM to assess the user motivation on the use of technology (Davis, 1985).

2.4.1 Definition

The empirical results of TAM have determined PU as a common and significant element in the acceptance of technology (Kamal, Shafiq & Kakria, 2020). PU has been first defined as an individual's believes in the use of a particular system that could enhance job performances (Davis, 1989). The expansion in the adoption of technology in decades does not limit to the on-job performance but also brought PU in the discussion relating to the public's daily application (Cho, Chi & Chiu, 2020), which further apply to the use of mobile payment during the Covid 19 pandemic (Yan *et al.*, 2021).

By applying the factor to mobile payment, it is expected that the adoption of such payment practices would enhance payment experiences for Hong Kong consumers. The higher ranking in PU on mobile payment should indicate that such advanced technological payment method could improve personal experiences and uplift efficiency in daily transactions. It may also provide a favorable condition for PU amidst Covid 19 Pandemic as contactless payment could be regarded as an additional precautionary measure to prevent the virus by minimizing physical contact during transactions (Daragmeh, Sági & Zéman, 2021; Puriwat & Tripopsakul, 2021; C.C. & Prathap, 2020).

2.4.2 Measurement

PU is a critical element to measure mobile applications related technology (Tam, Santos & Oliveira, 2018) which assesses the beliefs of users to adopt mobile payment could enhance values during transactions such as efficiency, effortless and time-saving (Daragmeh, Lentner & Sági, 2021). The level of overall performance, productivity, effectiveness and usefulness in daily living through adopting the payment tool is assessed in this study to determine such factor's impact on mobile payment (Franque, Oliverira & Tam, 2021).

2.5 Perceived Ease of Use

The application of TAM on the research topic would involve another essential factor, PEOU, on mobile payment since it is another initial variable in the TAM that influences the use of technology (Davis, 1985). Thus, the application of PEOU in measuring the acceptance of mobile payment is important and relevant by reference to the previous academic research model.

2.5.1 Definition

Davis (1989) originally defined PEOU as the degree of free of effort that an individual believes in the adoption of a system. Such theory could still apply to measure the acceptance of technology in the recent years, but additional definition is adopted to explain the factor. The ability of users to make use of mobile payment is also considered in recent studies since it would affect the level of PEOU when employing the same kind of technology (Al Kurdi, Alshurideh & Salloum, 2020).

Thus, consumers with higher ability to understand latest technology tend to have a greater PEOU that enhance the intention to use advanced payment method because the adaptation will lead to a better payment experience (Kamal, Shafiq & Kakria, 2020; Wong, 2018). Therefore, there are studies evaluated that PEOU towards mobile payment in the older generation is lower than the younger generation due to their lower capacity to adapt to new technology (Li, Hanna & Kim, 2019; Liébana-Cabanillas, Sánchez-Fernández & Muñoz-Leiva, 2014).

2.5.2 Measurement

PEOU is a measurement of both mentally and physically feeling free from effort to use mobile payment (Rafique *et al.*, 2018). To achieve such criteria, contactless payment users need to obtain a smartphone with appropriate knowledge to use the mobile payment application (Al Kurdi, Alshurideh & Salloum, 2020). Thus, this study determines the respondents' belief in the user-friendliness of the mobile payment whether these applications are clear, understandable, simple to use and easy to handle (Wu *et al.*, 2019).

2.6 Social Influence

To discuss the use of mobile payment, another empirical model regarding the acceptance of technology, UTAUT, is engaged in this study to conduct a more comprehensive assessment of the factors that influence the adaptation of the advanced payment method. SI is a variable further developed under UTAUT, which is an extension of TAM, to identify the correlation with the behavioral intention on the use of technology (Venkatesh *et al.*, 2003).

2.6.1 Definition

SI relates to an individual's change of behavior due to the effect from another, and such influence could be varied according to the relations among individuals, network distances, time effect and characteristics of networks and individuals (Chen, Mao & Liu, 2014). As such, it can be simplified as an individual influencing others by performing certain actions (Peng *et al.*, 2017) and is believed would affect the individual's attitude (Dwivedi *et al.*, 2019).

SI could be in different forms including socialization, persuasion, peer pressure, obedience, marketing, etc. through interaction, specific action or request. Yet the influence level of the element on users' intention concluded in various empirical results might see variance (Kaliisa, Palmer & Miller, 2019; Joo *et al.*, 2014). Such varies might be due to the differences in cultural background, age group and users' experiences in various regions that affect the degree of influence in different research areas (Almaiah, Alamri & Al-Rahmi, 2019; Handarkha, 2020).

2.6.2 Measurement

SI measures such influence would change an individual's perceptions of the use of mobile payment (Jung, Kwon & Kim, 2020) and the impact can be executed through different channels such as close family and friends, peers and various social media platforms (Yu *et al.*, 2021). This study assesses whether the respondents' use of mobile payment is impacted by social media or people who are important or close to the respondents (Cao & Niu, 2019).

2.7 Facilitating Condition

The application of UTAUT in this study would involve other important factors, in which FC is another variable developed under UTAUT that has a significant influence on the acceptance of technology (Venkatesh *et al.*, 2003). The level of influence on the use of mobile payment by FC in the Hong Kong market is being tested in this research topic.

2.7.1 Definition

FC refers to consumers' perceptions of the resources and support available when performing a task (Venkatesh, Thong & Xu, 2012). By implementing the element into the use of technology, it is the degree of technological infrastructure that can help an individual to adapt a new technology. For recent development in the contactless transactions, the variable could be defined as the support of mobile payment such as infrastructure, internet connection and mobile devices (Dhiman & Arora, 2018).

Lack of assistance and resources could limit an individual to make use of new technology (Kamaghe, Luhanga & Kisangiri, 2020). Empirical study has evaluated that the development of FC needs to be supported by financing, construction, human resource capacity and educational content (Paul, Musa & Nansubuga, 2015). Other study believes that particular user groups like elderly, women and individuals with less technological experiences are more dependent on external support from FC (Ambarwati, Harja & Thamrin, 2020).

2.7.2 Measurement

FC measures the availableness of resources and support services to perform mobile payment (Sharma, Singh & Sharma, 2020), including facilities such as adequate skills, electronic devices and available networks to make mobile payment functional (Alfanzi & Daulay, 2021). This study determines the users' accessibility to the required resources, knowledge, technical and introduction support when adopting mobile payment in the Hong Kong market (Patil *et al.*, 2020).

2.8 Perceived Trust

PT is not a core element under conceptual models such as HBM, TAM and UTAUT but it is believed to be an important element to test against the use of technology which builds the relationship between consumers and services provider (Reichheld & Schefter, 2000). As such, PT is elected in this research model to establish a more comprehensive review on the use of mobile payment in Hong Kong.

2.8.1 Definition

PT refers to an emotion that can encourage an individual to place trust based on the satisfaction level on other's behavior (Singh & Sinha, 2020), and it is examined to be one of the critical factors in the adaptation of mobile technology (Alalwan, Dwivedi & Rana, 2017). Due to the nature of mobile payment, the concern of users on the confidentiality and security of data storage would significantly influence the level of PT in such a payment method (Sharma & Sharma, 2019).

PT is considered as security-based variable which consumers are more motivated to use the payment method if the provider perceived the service to be reliable given that the transactions are secured and private (Liébana-Cabanillas *et al*, 2018). Previous study has indicated that youngsters will place greater trust on new technology that accelerates their acceptance in mobile payment (Liébana-Cabanillas, Sánchez-Fernández & Muñoz-Leiva, 2014). Under the Covid 19 Pandemic, it is believed that a trusted service platform could encourage the users to increase the number of contactless transactions due to the uncertainty and social pressure brought by the virus (Zhao & Bacao, 2021).

2.8.2 Measurement

PT measures the level of worry-free and the secured feeling to making use of mobile payment (To & Trinh, 2021) where the level of integrity and safeguard measures supported by service providers is accountable for such factor (Oliveira *et al.*, 2017). This study assesses the users' belief in the trustworthiness and reliability of payment system alongside the degree of confidential and security alerts received during transactions (Al-Saedi *et al.*, 2020)

2.9 Behavioral Intention

The purpose of this study is to locate various factors that are positively affecting the users' behavioral intention (BI) on mobile payment amidst Covid 19 Pandemic, where BI is a common dependent variable developed under TAM and UTAUT which identify consumers' attitude in the use of technology (Davis, 1985; Venkatesh *et al.*, 2003).

2.9.1 Definition

Ajzen & Fishbein (1980) has determined that BI is a subjective probability that a person will demonstrate a behavior. Yet, BI as defined under TAM and UTAUT is more content-specific on the acceptance of technology rather than a more general and content-free measurement on any behavior of interest used in other theories like Theory of Planned Behavior (Ajzen, 2020). By implementing various core variables in the research model could evaluate the behavioral mechanism in the use of technology (Ye, Zheng & Yi, 2020).

The impact on the use of mobile payment under the Covid 19 Pandemic has been performed by various studies to understand whether the change in daily practices could sustain or even encourage the consumers' intention to adopt the technology (Manoharan, M.P. & Paneerselvam, 2021; Zhao & Bacao, 2021; Sunarjo, Nurhayati & Muhardono, 2021; Fan *et al.*, 2021). Yet, BI might vary towards different technologies and cultural backgrounds through engaging various conceptual factors and variables (Addo, 2014). Thus, to understand the development of such digital transactions in Hong Kong, this study makes an investigation on the consumers' intention on mobile payment based on the technology development and consumption practices in the Hong Kong market under the pandemic era.

2.9.2 Measurement

It is to measure the level of tendency behavior to keep using mobile payment (Rachmawati *et al.*, 2020). This study would further review the users' intention toward the adoption of the payment tool amidst a health crisis (Manoharan, M.P. & Paneerselvam, 2021; Zhao & Bacao, 2021; Sunarjo, Nurhayati & Muhardono, 2021). As such, the intention of Hong Kong users on the use of mobile payment, including the willingness in adopting the payment tool during and after the pandemic era as well as replacing the payment application as their main payment method is determined in this study (Zhao & Bacao, 2021).

2.10 Formulation of Hypotheses

Since the critical factors P-SUS, P-SEV, GS, PU, PEOU, SI, FC, PT and BI that are proven to be significant to the adaption of technology under the current health crisis by previous studies as evaluated in this Section, it is necessary to build different hypotheses to connect these important factors together to build a new conceptual model that is applicable to this research.

Perceived Susceptibility

The attitude towards the infection by virus could make difference in the reaction to precautions actions (Li, Lau & Chan, 2022). Since the use of contactless payment might provide certain degree of hygiene protection to the consumers, it is expected that P-SUS has a positive influence on the use of mobile payment during a health crisis (Daragmeh, Sági & Zéman, 2021; Puriwat & Tripopsakul, 2021). As such, the survey conducted in this study is to identify the participants' level of suspicion of infecting the disease during the pandemic period that impacts PU of mobile payment.

H1 P-SUS of Covid 19 will have a positive impact on PU of mobile payment

Perceived Severity

Different level of understanding on the virus could impact the beliefs in the consequences arise after being infected (Li, Lau & Chan, 2022). The fear of adverse consequences by individuals is believed to bring positive influence on the adoption of contactless payment to minimize direct physical contact (Daragmeh, Sági & Zéman, 2021; C.C. & Prathap, 2020). Thus, this study measures the Hong Kong users' degree of P-SEV under the pandemic period that could influence PU of mobile payment.

H2 P-SEV of Covid 19 will have a positive impact on PU of mobile payment

Government Support

The further promotion of mobile payment due to the distribution of consumption vouchers by the Hong Kong government could push the development of such payment services forward during the pandemic era, indicating a positive impact on PU of such technological service (Aji, Berakon & Husin, 2020; Hasani, Bojei & Dehghantanha, 2017; Winata & Permana, 2020). This study measures the impact on PU of mobile payment with the participation in the government during the Covid 19 Pandemic.

H3 GS for mobile payment will have a positive impact on PU of mobile payment

Perceived Usefulness

PU is considered as impactful in particular in the adoption of mobile applications (Tam, Santos & Oliveira, 2018). Previous studies have demonstrated that PU has a positive impact on BI to the acceptance of technology (Koul & Eydgahi, 2018; Scherer, Siddiq & Tondeur, 2019). This study measures the level of efficiency and effectiveness on payment experiences in Hong Kong by adopting mobile payment in daily transactions that could influence the users' intention in such payment practices.

H4 PU will have a positive effect on BI

Perceived Ease of Use

Users with stronger technical skills tends to have higher PEOU towards the use of mobile payment (Kamal, Shafiq & Kakria, 2020). The higher of PEOU would have a positive impact on BI towards the use of technology (Koul & Eydgahi, 2018; Rafique *et al.*, 2020). This study would evaluate the level of ease to adopt mobile payment in daily consumption that could impact the intention in continuous adaptation of the new technology.

H5 PEOU will have a positive effect on BI

Social Influence

Previous study has believed that SI is impactful to the adaptation of advanced technology (Kaliisa, Palmer & Miller, 2019), yet other empirical result fail to find the element has a strong relationship on the acceptance by users (Joo *et al.*, 2014). Applying the variable to mobile payment, many studies have been identified SI has a positive influence on the consumers' BI (Slade *et al.*, 2015; Wang *et al.*, 2020). SI in this study indicates the degree of influence that directly determines an individual's intention of using mobile payment (Abrahão, Moriguchi & Andrade, 2016).

H6 SI will have a positive effect on BI

Facilitating Condition

Different mobile user groups have certain degree of reliance on various forms of facilities when adopting technology (Liébana-Cabanillas, Sánchez-Fernández & Muñoz-Leiva, 2014). Empirical results have found that FC has positive influence on the consumer's BI on technology (Alam *et al.*, 2020(b); Alfanzi & Daulay, 2021). This study identifies the availability and accessibility of FC during the use of mobile payment in the Hong Kong consumption activities that influence the users' intention on such payment method.

H7 FC will have a positive effect on BI

Perceived Trust

The alert in security and privacy issues arising from mobile payment transactions has been increasingly enforced in the local market (Wong, 2018; Wong & Mo, 2019). It is believed the higher level of users' PT would have a positive influence on the BI on the use of mobile payment (Chao, 2019). This study measures the level of trust users can place on the payment platform in adopting mobile payment when performing daily transactions in the Hong Kong market.

H8 PT will have a positive effect on BI

The relationship of the factors as established in this study is mainly based on empirical studies as listed below:

Table 2.10 List of Hypotheses

Hypothesis	Relationship	Reference
H1	P-SUS of Covid 19 will have a positive impact on PU of mobile payment	Puriwat & Tripopsakul, 2021
H2	P-SEV of Covid 19 will have a positive impact on PU of mobile payment	C.C. & Prathap, 2020
H3	GS for mobile payment will have a positive impact on PU of mobile payment	Aji, Berakon & Husin, 2020
H4	PU will have a positive effect on BI	Scherer, Siddiq & Tondeur, 2019
H5	PEOU will have a positive effect on BI	Rafique <i>et al.</i> , 2020
H6	SI will have a positive effect on BI	Wang <i>et al.</i> , 2020
H7	FC will have a positive effect on BI	Alam <i>et al.</i> , 2020(b)
H8	PT will have a positive effect on BI	Chao, 2019

Source: this report

By reference to Table 2.10, Hypotheses 1 and 2 are constructed by modifying HBM to assess the impact on PU of contactless payment due to users' beliefs in the threat from Covid 19, whereas Hypothesis 3 measures the influence on government's approaches during the pandemic era that affects PU of such payment method. Thus, three independent variables, i.e. P-SUS, P-SEV and GS, are stated to locate the correlation and the degree of impact to the dependent variable PU in relation to the use of mobile payment.

In addition, Hypotheses 4 and 5 are developed mainly based on TAM by using PU and PEOU as a measurement to BI on mobile payment. The research model is further established with Hypotheses 6 and 7 by taking into account the concept from UTAUT where the core variables such as SI and FC under the conceptual model are integrated into this study to form a more comprehensive discussion on the use of contactless transactions. Another influential element PT is engaged to build Hypothesis 8 for assessing the impact of such factor on the consumers' intention. Therefore, five independent variables, i.e. PU, PEOU, SI, FC, PT, are created under Hypotheses 4 to 8 to evaluate its influence on the dependent variable BI towards the research topic.

2.11 Summary

By reference to three conceptual models HBM, TAM and UTAUT, together with other empirical studies on the acceptance of technology, nine factors namely P-SUS, P-SEV, GS, PU, PEOU, SI, FC, PT and BI are chosen in this study to form in-depth discussion on the research topic. Eight hypotheses are established with the support of various literature as performed by different researchers in the past to evaluate the impact and relationship between the selected factors for the development of the mobile payment in Hong Kong.

Chapter 3. Research Methods

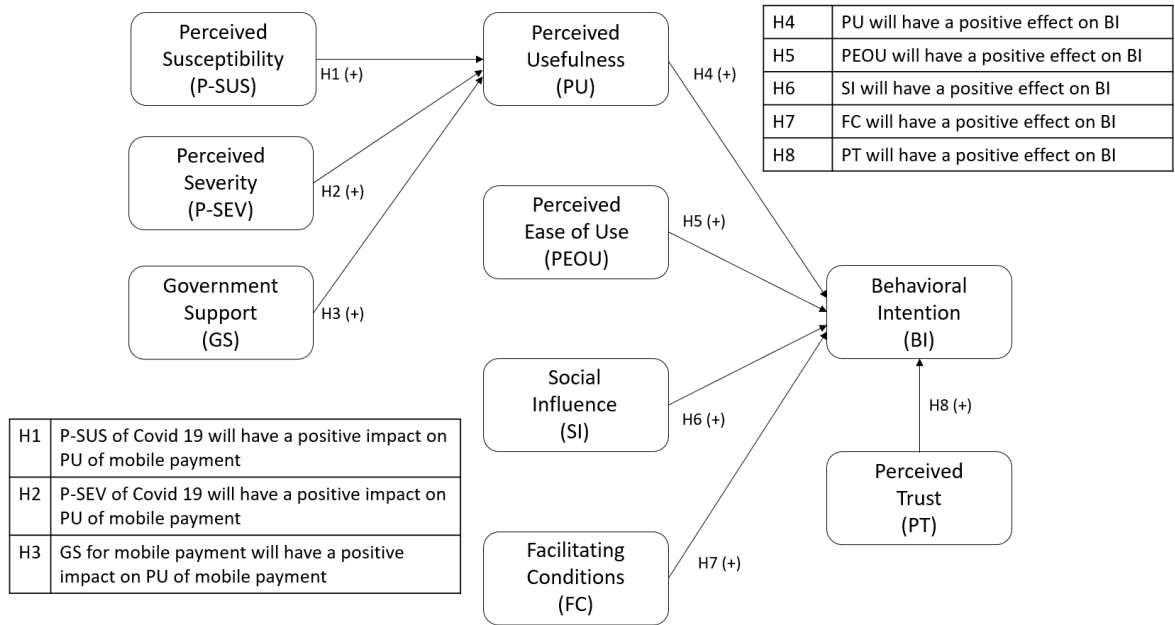
The research model in this report is constructed by adopting the concept under HBM (Rosenstock, 1974), TAM (Davis, 1985) and UTAUT (Venkatesh *et al.*, 2003) together with factors appropriate to the development of mobile payment in the existing conditions.

3.1 Research Model

To establish a study on the development of mobile payment amidst Covid 19 Pandemic, the impact from P-SUS and P-SEV relating to the consequences brought by the vital disease and GS imposed by the Hong Kong government to boost the shrinking economy during the period towards PU on the use of mobile payment is examined.

The model (Figure 3.1) is further constructed by reference to two fundamental research models namely TAM and UTAUT where essential factors such as PU, PEOU, SI and FC, together with another critical factor PT that are influential to the adoption of technology is elected to discuss the effect on BI of the interviewees' attitude towards the use of mobile payment.

Figure 3.1 Research Model of this study



Source: this report

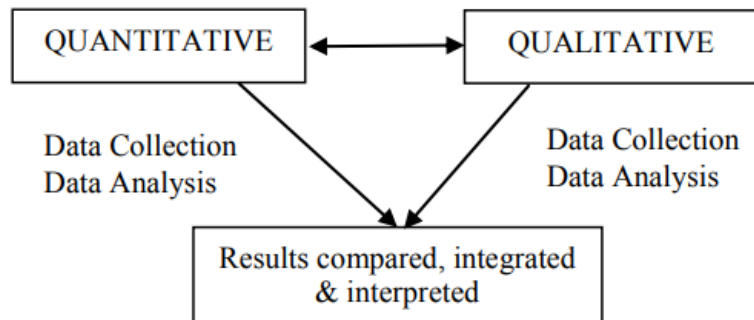
3.2 Research Approaches

Triangulation strategy is implemented in this study in which research result is being analyzed by adopting quantitative research method and qualitative research methods.

3.2.1 Triangulation Strategy

A triangulation strategy is adopted to use more than one approach to discuss the research topic. Two different ways of data collection, qualitative and quantitative (Figure 3.2.1), are engaged for investigating the use of mobile payment under Covid 19 Pandemic to prevent the underlying biases arising under a single methodology (Heale & Forbes, 2013). Qualitative data is obtained by interviews and quantitative data is collected through survey. Data analysis on both sets of data is separately performed using statistics, data / text mining and content analysis in which the results is compared and interpreted to identity research outcome (Atif, Richards & Bilgin, 2013).

Figure 3.2.1 Triangulation Strategy



Source: Atif, Richards & Bilgin, 2013

3.2.2 Qualitative Research

Non-numerical data in relation to the use of mobile payment is collected and analyzed under qualitative research to obtain information on a different dimension that goes beyond numbers and get a better understanding on the research topic through personal experiences (Castleberry & Nolen, 2018).

A focus group discussion is performed to illustrate their mobile payment experience for an in-depth analysis to support the research result. The sharing of personal experiences by the participants is consolidated and interpreted into the factors established in this study to support the relevance of elements that affect the acceptance of mobile payment.

3.2.3 Quantitative Research

Such research method is performed by collecting and analyzing numerical data on the use of mobile payment to establish accurate and reliable measurements for statistical analysis (Goertzen, 2017), in which descriptive statistics, reliability test, factor analysis, correlation test and regression test are performed to analyze the obtained data and demonstrate an evaluation on the research result.

A survey is conducted to collect different individuals' experiences and impressions on the use of mobile payment. Data obtained from the questionnaire is converted into numerical data for performing quantitative research to assess the level of reliability, suitability and correlation of the variables established in this research model to the use of mobile payment under the Covid 19 Pandemic.

3.3 Structure of Data Collection

The research result rely on obtaining relevant information to the research topic, in which data collection in this report mainly comprises primary and secondary data source on the use of mobile payment.

3.3.1 Primary Data Source

Primary data is information obtained directly and original without going through any sources that are already published (Mazhar *et al.*, 2021). Primary data in this report is collected from individuals and a focus group through performing questionnaires and interviews to gather first handed opinions on the research topic for evaluating the research result. Information including participants' personal basic info, experiences in mobile payment and elements affecting their choice of preference in payment is obtained during the collection of data.

Table 3.3.1 Primary Data Collection Methods

Research Method	Approaches
Qualitative	Focus Group
Quantitative	Design Questionnaire
	Pilot Test
	Final Questionnaire

Source: this report

3.3.2 Secondary Data Source

Secondary data is information that has been made available by individuals and researchers through different published media, such as academic research models, empirical studies and results, market data and information, etc. for learning and investigating materials that have been previously conducted (Johnston, 2014). The use of secondary data in this report could bring new insights to support the ordinary data obtained only through questionnaire and interview from a limited amount of interviewees of 285 and 6 respectively. Academic concepts, research models namely HBM, TAM and UTAUT, factors including P-SUS, P-SEV, GS, PU, PEOU, SI, FC, PT and BI, and analyses that are relevant to the research topic performed by other scholars and researchers are made reference to increase the reliability and reasonableness of this study.

3.4 Sampling Design

The research work in this study (Figure 3.1) comprises interview and questionnaire and the content of the work are constructed through performing focus group discussion, designing questionnaire, running pilot test and delivering formal questionnaire as mentioned in this section.

3.4.1 Focus Group

Focus group discussion is a constantly used qualitative method to obtain an in-depth understanding of a particular research topic through conversation (Nyumba *et al.*, 2018). Interview on focus group is conducted to obtain qualitative data for this study, in which a group of individuals was invited to form a group discussion on their experience in the use of the mobile payment, to collect different elements influencing perceived intention on adopting this advanced payment method through interacting with each other (Jung & Ro, 2019).

This study employed a digital conversation analysis by conducting the discussion on a web location to construct a face-to-face situation with technological support (Jucker, 2021). Besides, it is considered six to eight participants are sufficient to carry on a discussion (Krueger & Casey, 2000), thus, a group of six respondents, with three respondents from each gender, were invited to share their personal experience and motivation in the use of mobile payment in Hong Kong with an hour discussion section mainly communicated in Cantonese through an online platform was held on 9 January 2022 (Appendix B and C). The discussed questions are set on an open-ended basis which allows the participants to respond to the research topic with their own perspective (Dorer, 2021). The listed questions in the following were discussed during the focus group conversation:

Table 3.4.1 List of Questions in Focus Group Discussion

Question	Content
Q1	Which payment method will you prefer the most, and why?
Q2	What are the factors that encourage/discourage you to use mobile payment, and why?
Q3	In what circumstances you will/ will not choose to use mobile payment, and why?
Q4	What are your concerns about using mobile payment?
Q5	Does the Covid-19 situation impact your use of mobile payment, and why?
Q6	Does the impose of Consumption Voucher Scheme change your payment behavior, and why?
Q7	Will you consider/continue to use mobile payment after the Covid 19 Pandemic, and why?

Source: this report

3.4.2 Design Questionnaire

A set of pre-designed questionnaire is formulated to access the sample data relating to the research topic. The collected information is transformed into numerical data to perform qualitative research. Questionnaire based on each research variable are constructed based on published journals to support the relevancy of the designed questions to the corresponding factors.

Independent and dependent variables are developed when constructing a research model, in which independent variable is an element that will not impact by other factors whereas dependent variable will change according to any alter from the underlying depending variable. Under the research model as shown in Figure 3.1, eight independent variables and two dependent variables as listed in Figure 3.4.2a are established to test the relationship between different factors that have influenced the use of mobile payment. The correlation and relationship between different independent and dependent variables are tested against quantitative research through correlation and regression tests.

Table 3.4.2a Independent and Dependent Variables in this study

Independent Variable	Dependent Variable	Reference
Perceived Susceptibility (P-SUS)		Puriwat & Tripopsakul, 2021
Perceived Severity (P-SEV)		C.C. & Prathap, 2020
Government Support (GS)		Aji, Berakon & Husin, 2020
Perceived Usefulness (PU)	Perceived Usefulness (PU)	Scherer, Siddiq & Tondeur, 2019; Puriwat & Tripopsakul, 2021; C.C. & Prathap, 2020; Aji, Berakon & Husin, 2020
Perceived Ease of Use (PEOU)		Rafique <i>et al.</i> , 2020
Social Influence (SI)		Wang <i>et al.</i> , 2020
Facilitating Conditions (FC)		Alam <i>et al.</i> , 2020(b)
Perceived Trust (PT)		Chao, 2019
	Behavioral Intention (BI)	Scherer, Siddiq & Tondeur, 2019; Rafique <i>et al.</i> , 2020; Wang <i>et al.</i> , 2020; Alam <i>et al.</i> , 2020(b); Chao, 2019

Source: this report

Table 3.4.2b Research Reference on Questionnaire for Each Factor

Variable	Factors	Questions	Reference
Independent	P-SUS	P-SUS1a: There is a possibility to get infected by Covid-19 due to using cash or making payments with physical contact.	Daragmeh, Sági & Zéman, 2021
		P-SUS1b: My chances of being infected by Covid-19 if I use cash or making payments with physical contact are high.	
		P-SUS1c: I feel that Covid-19 will develop health problems for me in the future.	
Independent	P-SEV	P-SEV2a: Thinking about getting infected by Covid-19 due to using cash or making payments with physical contact makes me nervous.	
		P-SEV2b: I am afraid to think about the health problems of getting infected by Covid-19 if I use cash or making payments with physical contact.	
		P-SEV2c: If I get infected by Covid-19 due to using cash or making payments with physical contact, my whole life would change.	
Independent	GS	GS3a: The Hong Kong government is active in setting up the facilities to enable mobile payment.	Chen, Chen & Chen, 2019
		GS3b: For me, the Hong Kong government supporting mobile payment is important.	
		GS3c: The Hong Kong government promotes the use of the mobile payment.	
		GS3d: For me, the Hong Kong government promoting the use of the mobile payment is important.	
		GS3e: The Hong Kong government has good laws and regulations for mobile payment.	
Dependent / Independent	PU	PU4a: Using mobile payment improves my overall performance.	Franque, Oliveira & Tam, 2021
		PU4b: Using mobile payment increases my productivity.	
		PU4c: Using mobile payment enhances my effectiveness.	
		PU4d: I find mobile payment to be useful for my daily living.	
Independent	PEOU	PEOU5a: The mobile payment app is clear to use.	Wu et al., 2019
		PEOU5b: The mobile payment app is understandable.	
		PEOU5c: The mobile payment app makes it easy to become skillful.	
		PEOU5d: The mobile payment is simple to use.	
Independent	SI	SI6a: People who are important to me think I should use mobile payment.	Cao & Niu, 2019
		SI6b: Many people around me are using mobile payment.	
		SI6c: People who affect my behavior think I should use mobile payment.	
		SI6d: The mass media makes me use mobile payment.	
Independent	FC	FC7a: I have the resources necessary to use mobile payment systems.	Patil et al., 2020
		FC7b: I have the knowledge necessary to use mobile payment systems.	
		FC7c: I can get help from others when I have difficulties using mobile payment systems.	
		FC7d: Specialized instructions concerning the use of mobile payment systems are available to me.	
Independent	PT	PT8a: Mobile payment system is trustworthy.	Al-Saedi et al., 2020
		PT8b: I believe that all the transactions data are confidential.	
		PT8c: I believe that I would get an immediate confirmation message when the transaction is completed.	
		PT8d: I would expect that the mobile payment system to be reliable.	
Dependent	BI	BI9a: Given the opportunity, I will use mobile payments during Covid-19 pandemic.	Zhao & Bacao, 2021
		BI9b: I am willing to continuously use mobile payments in the near future during Covid-19 pandemic.	
		BI9c: I am open to using mobile payments as my main payment method in different transaction processes.	
		BI9d: I intend to continuously use mobile payments in the future.	

Source: this report

The Likert scale is adopted in the survey to measure the attitude of the participants upon these factors (Likert, 1932). A commonly used six-point Likert scale (Harland, Dawkin & Martin, 2015) is applied in this study to better understand the positive and negative preferences of the respondents on these factors since no neutral option is available in the selected Likert scale.

3.4.3 Pilot Test

A pilot test on a small pilot study was first performed before constructing a full-scale distribution of questionnaire to the targeted population for ensuring the feasibility of the set of questions to obtain relevant results for the selected variables (Gani, Rathakrishuan & Krishnasamy, 2020). The questionnaire (Appendix D) was sent to a small group of participants and 30 data samples were obtained on the first trial. The following amendments have been made according to the feedback from these surveyeeyes:

Table 3.4.3a Amendments on Questionnaire after the First Trial Distribution

Question	Content	Amendment
P-SUS1a	There is a possibility to get infected by Covid-19 due to using cash or making payments with physical contact.	Amendment on misspelling
P-SUS1b	My chances of being infected by Covid-19 if I use cash or making payments with physical contact are high.	Revised in Chinese translation
PU4a	Using mobile payment improves my overall performance.	Rephrase the question to be more specific
PU4c	Using mobile payment enhances my effectiveness.	Revised in Chinese translation
PT8d	I would expect that the mobile payment system to be reliable.	Revised in Chinese translation

Source: this report

Upon the pilot testing on the 30 data samples, reliability analysis was performed to ensure valid data can be collected in the full-scale survey, which Cronbach's Alpha from each listed factor should meet at least 0.7 to sustain reliability (Taber, 2018). Yet, even though most of the research variables meet the criteria, P-SUS failed to achieve Cronbach's Alpha of 0.7 in the first trial on 19 December 2021. After removing 4 invalid responses out of the 30 received samples, reliability tests on all variables have accomplished the minimum requirement, which the results from the testing are shown as follow:

Table 3.4.3b Reliability Analysis on Pilot Test

Reliability Test	Cronbach's Alpha	
	30 Data Samples	26 Valid Data
Overall	0.952	0.950
P-SUS	0.607	0.707
P-SEV	0.812	0.821
GS	0.815	0.794
PU	0.909	0.908
PEOU	0.948	0.951
SI	0.862	0.841
FC	0.747	0.747
PT	0.868	0.878
BI	0.942	0.939

Source: this report

The Cronbach's Alpha of P-SUS is 0.607 under the first pilot testing indicate that the factor is not reliable enough to analyze the research topic. However, since there are other secondary data supported P-SUS as a reliable factor (Puriwat & Tripopsakul, 2021), investigation was performed to understand the differences in result in which a review on the obtained responses was conducted. After four invalid responses were identified and removed, the Cronbach's Alpha of P-SUS managed to adjust which 0.707 is achieved, illustrating that all nine factors in this research model are reliable to conduct further discussion.

As such, the questionnaire has pushed forward to perform a full-scale survey with the support of the Cronbach's Alpha of all research variables exceeding 0.7 from the reliability analysis in the pilot test after removing the invalid responses.

3.5 Formal Questionnaire

A formal questionnaire (Appendix D) was released on 29 December 2021 after the pilot test was confirmed to be successful and the information according to the sampling size was collected from the target group as designed in this report.

3.5.1 Target Population

A specifically defined target population is required for a survey to identify a unit group that can be used as inferencing in the study (Lavrakas, 2008). Since the research topic relates to the development of mobile payment in Hong Kong, the target population of the questionnaire is targeting individuals with such payment experience. By 2020, it is estimated that 49.4% of individuals aged 15 or above in Hong Kong used mobile payment as a tool for transactions within a year time (C&SD, 2021(a)). To conduct a survey for this study, a further narrowed down target population is adopted aiming at adults who are aged 20 or above, which is estimated to be approximately 6,340,400 by mid-2021 (C&SD, 2021(b); Appendix E), with mobile payment experiences in Hong Kong.

3.5.2 Sampling Method

Among various types of sampling methods, non-probability sampling method snowball sampling is chosen in the selection of sampling through networking and referral (Parker, Scott & Geddes, 2019) due to limitations in resources allocated to the study. The questionnaire constructed in this study is sent to different groups of individuals and further circulate to other respondents through the recipients by online social media platforms to reach the target population, thus no sampling frame is available for such sampling method.

3.5.3 Sample Size

The sample size is calculated based on the latest population statistic, i.e. $N = 6,340,400$ by mid-2021 (C&SD, 2021(b); Appendix E), in Hong Kong by calculating sample size based on a finite population (Etikan & Babtpe, 2019) in this study. The following formula is used to calculate the sample size of the questionnaire:

Table 3.5.3 Sample Size Calculation

$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}} \quad n_0 = \frac{Z^2 pq}{e^2}$	$Z = 1$ - Confidence level
	p = Estimated proportion of an attribute that is present in the population
	$q = 1 - p$
	e = Precision level
	N = Population size
	n = Sample size

Source: Israel, 1992

The equation is developed by Cochran (1963) which measures a representing sample for proportions, where anticipating population proportions in between groups with positive versus negative intention in the use of mobile payment during the pilot test (Malone, Nicholl & Coyne, 2016). The successful rate on an average basis indicating a positive behavior intention (i.e. $p = 0.85$) is defined as the estimated proportion in the population. Furthermore, a typical confidence level of 95% (i.e. Z value equal to 1.96) (Taherdoost, 2017) is adopted, with the precision level, i.e. sampling error, is set according to type I error which 5% of the false-positive result is accepted (Burmeister & Aitken, 2012). Thus, a sample size of at least 201 (Appendix F) for the questionnaire is obtained. As of 15 January 2022, 290 sample data is collected with 5 invalid responses are being removed before performing data analyses.

3.6 Analysis Techniques

By numbering the six-point Likert scale in this survey can establish statistical results that allow different types of statistical analyses to conduct in this study. The following statistical analyses are applied for the quantitative research on the research topic:

3.6.1 Descriptive Statistics

Descriptive statistics are measures of central tendency, including mean, media and mode, and measure of variability, including standard deviation and variance on the collected primary data (Mishra *et al.*, 2019). In this study, the obtained primary data is mainly analyzed by using frequency distributions, mean and standard deviation in which to present the sample allocation, the average score and the average difference of each score to the mean through these descriptive statistics (Fisher & Marshall, 2009).

As such, respondents' attitudes towards various factors can be located and identified, whereas the level of deviation on different variables is also spotted. Since the survey is measured by six-point Likert scale, a result over 4 is considered to meet the satisfaction level and any result below is classified as having a negative approach. Furthermore, standard deviation with more than 1 is regarded as high variance whereas below 1 has a low variance on the observed factor.

3.6.2 Reliability Test

Reliability test is performed after conducting the questionnaire to reduce the measurement error through expanding the true interindividual variability amount in the obtained sample (Matheson, 2019). Cronbach's Alpha is commonly adopted in the reliability test that to measure the internal consistency or reliability in a statistical method (Streiner, 2003). Table 3.6.2 stated the reliability level by the coefficient of Cronbach's Alpha which is adopted in this study.

Table 3.6.2 Reliability Level by Cronbach's Alpha

Cronbach's Alpha	Reliability Level
More than 0.90	Excellent
0.80 - 0.89	Good
0.70 - 0.79	Acceptable
0.60 - 0.69	Questionable
0.50 - 0.59	Poor
Less than 0.50	Unacceptable

Source: George & Mallery, 2003

3.6.3 Factor Analysis

Factor analysis involved a series of procedures to analyze the correlation among a set of variables observed or counted or measured for each factor (Cureton & D'Agostino, 2013). The suitability of the respondent data for factor analysis is firstly tested by Kaiser-Meyer-Olkin ("KMO") Measure of Sampling Adequacy (Kaiser, 1970) and Bartlett's Test of Sphericity (Bartlett, 1950).

KMO test is a statistical measure to identify the proportion of correlation between variables that might be common variance which high KMO value is obtained when the proportion is low. The acceptance level of the KMO value is shown in Table 3.6.3.

Table 3.6.3 Acceptance Level by KMO Value

KMO Value	Acceptance Level
More than 0.90	Excellent
0.80 - 0.90	Great
0.70 - 0.80	Good
0.50 - 0.70	Acceptable
Less than 0.50	Unacceptable

Source: Field, 2013

Bartlett's test is used to examine the null hypothesis and alternative hypothesis, in which to indicate whether original correlation matrix is an identity matrix. The collected data with small significant level (i.e. $p < 0.05$) (Field, 2013) in Bartlett's test is considered as suitable for factor analysis.

The number of factors to be extracted under factor analysis is determined according to Kaiser Criterion which based on eigenvalues of the correlation matrix (Braeken & Van Assen, 2017). Eigenvalue represents the number of total variables explained by a factor, where factors with eigenvalue greater than one are considered as significant since more common variance can be explained (Shrestha, 2021). Furthermore, factor loading values on independent variables are analyzed to understand the relationship of each variable to the corresponding factors (Shrestha, 2021) and variables with factor loading value larger than 0.3 is identified in this study to illustrate the factors.

3.6.4 Correlation Test

Correlation test is demonstrated to verify the correlation between the independent and dependent variables as selected in Chapter 2 (Sacceti, Hendriks & Smilde, 2020). Linear correlation coefficient is commonly used to identify the degree of relationship between two variables which variables with a significant relationship can develop linear regression model to predict the dependent variable with the independent variable (Senthilnathan, 2019).

In practice, Pearson Correlation Coefficient ('r') is considered as an efficient coefficient to apply for measuring linear correlation (Xu & Deng, 2018) and is to indicate the distance of the variables from the line of best fit under the linear relationship, where the significance of relationship is expressed in positive or negative, and different level of correlation coefficients can represent a strong or weak relationship in the variables (Obilor & Amadi, 2018).

Table 3.6.4 Scale of Pearson's Correlation Coefficient

Scale of correlation coefficient	Value
$0 < r \leq 0.19$	Very Low Correlation
$0.2 \leq r \leq 0.39$	Low Correlation
$0.4 \leq r \leq 0.59$	Moderate Correlation
$0.6 \leq r \leq 0.79$	High Correlation
$0.8 \leq r \leq 1.0$	Very High Correlation

Source: Selvanathan *et al.*, 2020

3.6.5 Regression Test

Regression test is an estimation on the relationship between one or more independent variables and the dependent variables, in which are the identified factors constructed under the research model in this study (Schmidt & Finan, 2018). Regression model is constructed according to the following equation:

Table 3.6.5a Multiple Regression Equation

$Y = a + b_1X^1 + b_2X^2 + \dots + b_iX^i$	Y = Dependent Variable
	a = Intercept
	b_i = Slope Coefficients for each Independent Variable i = 1, 2, ..., n
	X^j = Independent Variable j = 1, 2, ..., n

Source: Siegel, 2016

Under regression analysis, standardized beta coefficient (β) is an alternative way to compare the relationship between each individual independent variable to the dependent variable in which a higher absolute value represents a stronger coefficient. Differences between standardized beta coefficient and correlation coefficient as mentioned in Section 3.6.4 is the former correlation is scale-dependent whereas the latter correlation is scale-independent (Schielzeth, 2010). P-value (p) is meant to be a measure of significance level where $p < 0.05$ is considered statistically significant and the risk of incorrect would continue to reduce if p can be kept as low as possible, i.e. 0.01 and 0.001 (Verhagen, Ostelo & Rademaker, 2004). Thus, multiple linear regression of this study is constructed as shown in Table 3.6.5b.

Table 3.6.5b Regression Model of this study

$PU = b_0 + b_1P-SUS + b_2P-SEV + b_3GS$
$BI = b_4 + b_5PU + b_6PEOU + b_7SI + b_8FC + b_9PT$

Source: this report

To further assess the degree of fit of the research model in regression analysis can be referenced by coefficients of determination (R^2) which identify the variation in the response, and a higher R^2 represents the better fit of data (Akossou & Palm, 2013). The variance inflation factors (VIF) can also obtained to measure the degree of multicollinearity existing from R^2 between the independent variables where collinearity is considered as weak when VIF is lower than 10 (Salmerón Gómez *et al.*, 2020).

Meanwhile, regression analysis can present in graph form such as histogram and scatter plot to illustrate the result form the questionnaire. Histogram can be regarded as a forecasting tool by studying the probability distribution based on present and past data, and normal distribution with symmetric around the mean is mostly used to describe the distribution of value in many applications (Murty, 2002). Scatter plot is another widely used visualized way to represent data by revealing correlations through patterns, trends and clusters, and data containing trends can construct regression line through the plot to demonstrate functional relationship (Shao *et al.*, 2016).

3.7 Ethical Research

The research result is conducted under honest report data and all personal information will be kept only for six months after the submission of this study.

3.8 Research Model Limitations

The time restriction and limitation on resources allocated to the preparation of questionnaire, together with restraint in accessible interviewees could affect the quality of the research outcome. By extending the sampling size could enhance the data accuracy of this study and might construct new insights on the same research topic.

3.9 Summary

The research model is conducted by reference to HBM, TAM and UTAUT with eight vital factors, i.e. P-SUS, P-SEV, GS, PU, PEOU, SI and FC, to investigate BI on the use of mobile payment under the pandemic era in Hong Kong. The research result is analyzed with qualitative and quantitative research through obtaining primary and secondary data on the research topic. In particular, primary data is collected through focus group as well as questionnaire with a sampling size based on the Hong Kong population.

Chapter 4. Data Analysis

The findings from the collected primary data in this study is identified and further analyzed by the available secondary data in this section.

4.1 Descriptive Statistics

Descriptive analysis of the research topic is performed in the following by using two research methods, qualitative and quantitative, through conducting focus group and formal survey to obtain relevant responses from local mobile payment users.

4.1.1 Focus Group – Qualitative

The focus group discussion was held on 9 January 2022 (Appendix B and C) and analysis on the use of mobile payment in the local payment environment was performed in the following according to the in-depth discussion with a group of six participants:

The massive coverage of smart card electronic payment system within the city has enhanced the users' dependence and is reflected in the discussion since all participants have chosen 'Octopus Card' as their top cashless payment option. Most of the participants have a higher preference for the use of traditional smart cards due to their long-time established payment practices alongside a high satisfaction level in its convenience and easy to use, i.e. PU and PEOU (Davis, 1989), of such payment approach (Tam, 2020). Yet, the growing attention in mobile payment is observable as many respondents have chosen mobile payment as their second cashless payment option and peer-to-peer transactions is most popular among different digital transactions.

The discussion highlighted that the popularity among peer-to-peer transactions has made SI (Chen, Mao & Liu, 2014) and PU prominent factors for electing mobile payments. Meanwhile, payment services offered by trusted service providers and obtaining transaction confirmations can enhance PT (Singh & Sinha, 2020) in the acceptance of digital transactions. The increase in convenience for transactions and availability in payment facilities also have positive impact on the choosing of digital payment. Additionally, participants have expressed that a large resistance is created to the adoption if the mobile payment application is too complicated to function and extensive personal information is requested (Rafique *et al.*, 2018).

Some female participants admitted that the increase in online shopping amidst the Covid 19 has accelerated the use of mobile payment and the underlying cashless features have also resolved their hygiene concerns (Sahinaslan, Sahinaslan & Gunes, 2021; Abu Daqar *et al.*, 2021). The imposing of the distributing shopping vouchers by the Hong Kong government has further brought a positive impact on these female participants to adopt mobile payment (Dawi, 2019). Due to the majority vouchers collecting options are being mobile applications, together with an increase in retailers setting up mobile payment facilities to capture such retail boom (Lam, 2021), the female participants are more willing to explore alternative payment applications resulting from the carry out of the scheme (Winata & Permana, 2020). In contrast, the Covid 19 Pandemic has less impact on male participants as all of them expressed that they have not changed their payment behavior under such conditions.

Since most of the participants are already frequent users (i.e., at least once a week) of mobile payment with 2 years or above use of experience, even though the Covid 19 Pandemic has certain degree of positive impact on users to explore alternative mobile payment approaches, their payment behavior will not have massive changes and most of them are ready to continuously adopt such advanced payment after the pandemic era (Rachmawati *et al.*, 2020).

To summarize, respondents have found that PU, PEOU, SI, FC and PT are their core factors that influence their BI in mobile payment in the Hong Kong market. The hygiene concerns and the government's promotion under pandemic period also added P-SUS, P-SEV and GS as part of the factors to consider the use of the digital transactions.

4.1.2 Formal Questionnaire – Quantitative

A set of data sample with 285 valid responses with 98.28% valid response rate (Table 4.1.2)

are collected through online survey for the study of mobile payment.

Table 4.1.2 Response Rate by Date

Date	Online Survey		
	Responses	Valid Responses	Valid Response Rate
17-Dec-21	6	6	100%
18-Dec-21	21	18	85.71%
19-Dec-21	9	8	88.89%
20-Dec-21	1	1	100%
29-Dec-21	4	4	100%
30-Dec-21	27	27	100%
31-Dec-21	3	3	100%
1-Jan-22	14	14	100%
2-Jan-22	18	18	100%
3-Jan-22	2	2	100%
4-Jan-22	13	13	100%
5-Jan-22	17	17	100%
6-Jan-22	12	12	100%
7-Jan-22	17	17	100%
8-Jan-22	45	45	100%
9-Jan-22	20	20	100%
10-Jan-22	6	6	100%
11-Jan-22	7	7	100%
12-Jan-22	14	14	100%
13-Jan-22	13	13	100%
14-Jan-22	4	3	75%
15-Jan-22	17	17	100%
Total	290	285	98.28%

Source: this report

4.1.2.1 Demographic information of participants

Demographic information of the participants regarding to gender, age, education level, average price range per mobile payment transaction, type of transactions using mobile payment and choice of mobile payment application are obtained at the same time in the survey.

Table 4.1.2.1a,b Summary of Demographic Information of 285 Respondents

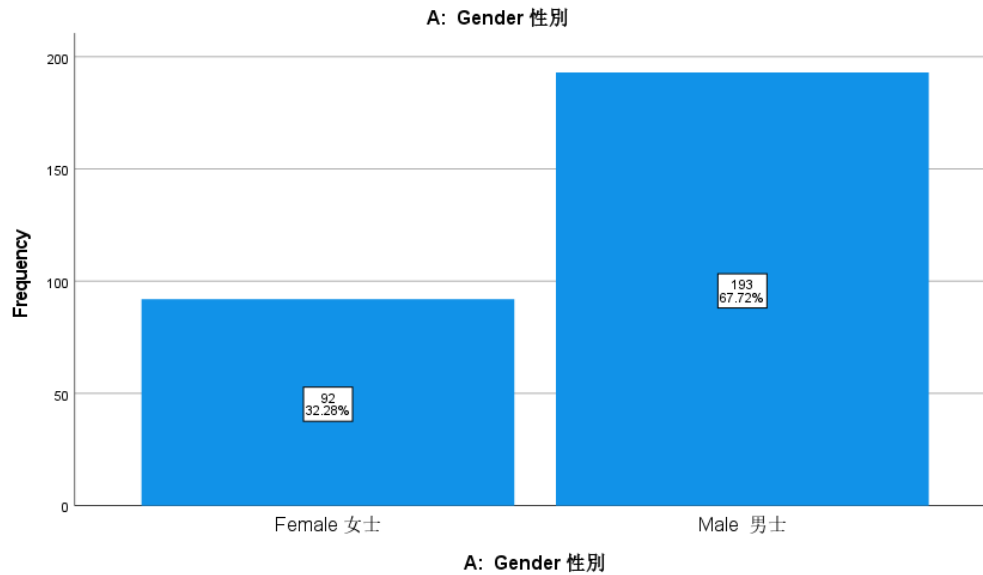
Variables	Information	Frequency	Percentage
Gender	Female	92	32.3%
	Male	193	67.7%
	Total	285	100%
Age	20 - 29	4	1.4%
	30 - 39	59	20.7%
	40 - 49	92	32.3%
	50 - 59	94	33%
	60 - 69	35	12.3%
	70 or above	1	0.4%
	Total	285	100%
Education level	Secondary School	50	17.5%
	Diploma	121	42.5%
	Bachelor Degree	81	28.4%
	Postgraduate or above	33	11.6%
	Total	285	100%
Average price range per mobile payment transaction	Less than HKD100	8	2.8%
	HKD 101 - HKD 200	31	10.9%
	HKD 201 - HKD 500	127	44.6%
	HKD 501 - HKD 1,000	110	38.6%
	HKD 1,001 or above	9	3.2%
	Total	285	100%
Type of transactions using mobile payment as a payment tool	Bills settlement	14	4.9%
	Entertainment	70	24.6%
	Food and Beverage	49	17.2%
	Grocery and daily necessities	52	18.2%
	Peer-to-peer money transfer	24	8.4%
	Retail (e.g. fashion, beauty, luxury, electronic products, etc.)	66	23.2%
	Transportation	7	2.5%
	Others	3	1.1%
	Total	285	100%
	AlipayHK	100	35.1%
	FPS	4	1.4%
	Octopus (app version)	121	42.5%
	PayMe	27	9.5%
Main application for mobile payment transactions	WeChat Pay HK	30	10.5%
	Others	3	1.1%
	Total	285	100%

Source: this report

i) Gender

The participants in this survey are analyzed by gender as follow:

Figure 4.1.2.1a Bar Chart of Respondents' Gender



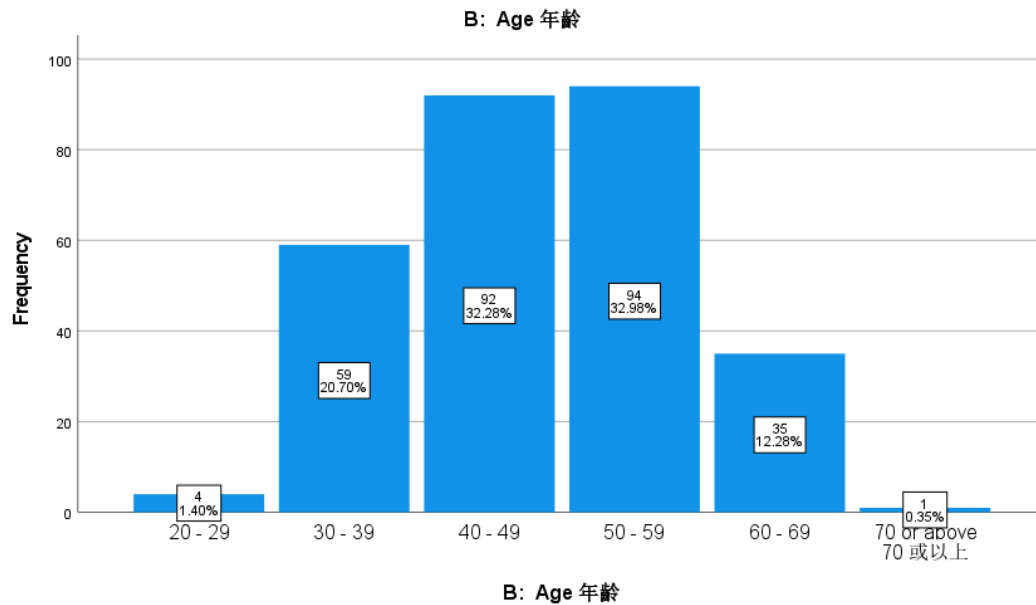
Source: this report

As illustrated in Figure 4.1.2.1a, about 68% are male respondents as compared to 32% of female respondents, which represents males have a higher proportion in the use of mobile payment. Such result could be explained due to the male users having a greater continuance intention in using the payment method once they feel satisfaction (Zhou, Jin & Fang, 2014). Therefore, over 2/3 of the questionnaire in this study was completed by male participants.

ii) Age

The participants in this survey are analyzed by age as follow:

Figure 4.1.2.1b Bar Chart of Respondents' Age



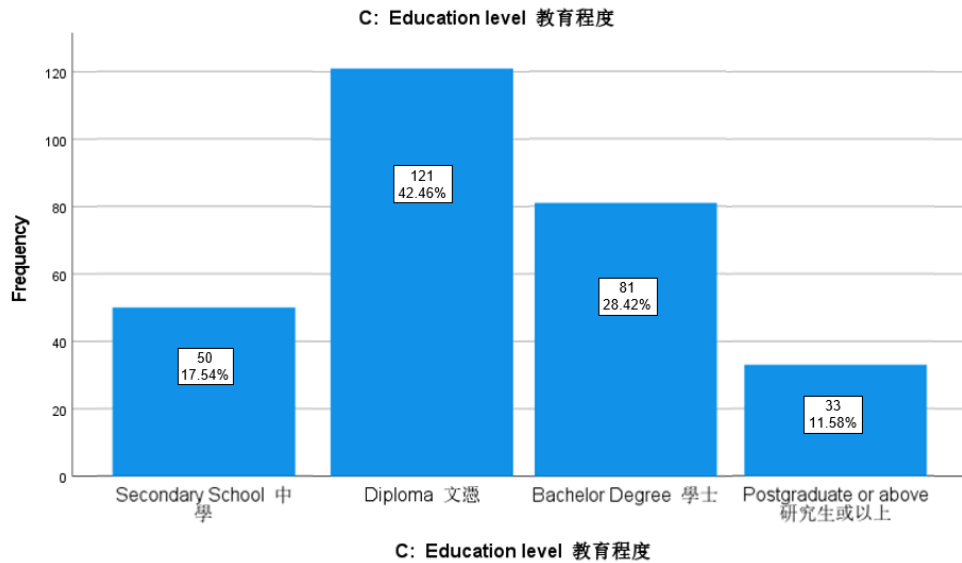
Source: this report

Figure 4.1.2.1b indicates that the age of the respondents mostly allocated in between 30 – 59 which each age group reached over 20% of the received questionnaire, whereas age 20 – 29 and over 70 only attributed less than 2% of the responses that can be obtained. According to C&SD (2021(a)), the age groups of mobile payment users which attributing over 20% of the total mobile payment users mainly allocated between age 25 – 54, representing that the respondents' age distribution in the survey has a similar pattern to the age group allocation with mobile payment practices in Hong Kong.

iii) Education level

The participants in this survey are analyzed by education level as follow:

Figure 4.1.2.1c Bar Chart of Respondents' Education Level



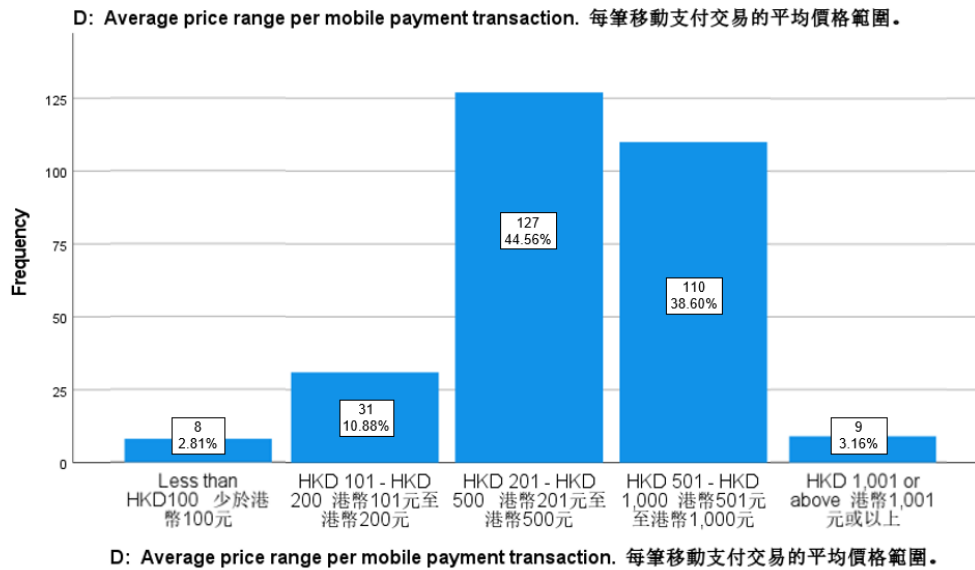
Source: this report

The distribution of population by education level in Hong Kong in 2020 illustrated that 42% achieved upper secondary and non-degree course whereas 25.5% completed degree course (C&SD, 2021(c)). Moreover, prior study has identified that users with higher education level felt less secured by e-payment services (Yaokumah, Kumah & Okai, 2017). As such, these explained that the overall respondents' education levels with mobile payment experiences attributed a higher proportion in secondary and diploma level, in which the participants are concentrated in diploma level following by bachelor and secondary as shown in Figure 4.1.2.1c.

iv) Average price range per mobile payment transaction

The average price range per mobile payment transaction by participants is analyzed as follow:

Figure 4.1.2.1d Bar Chart of Respondents' Average Price Range per Mobile Payment Transaction



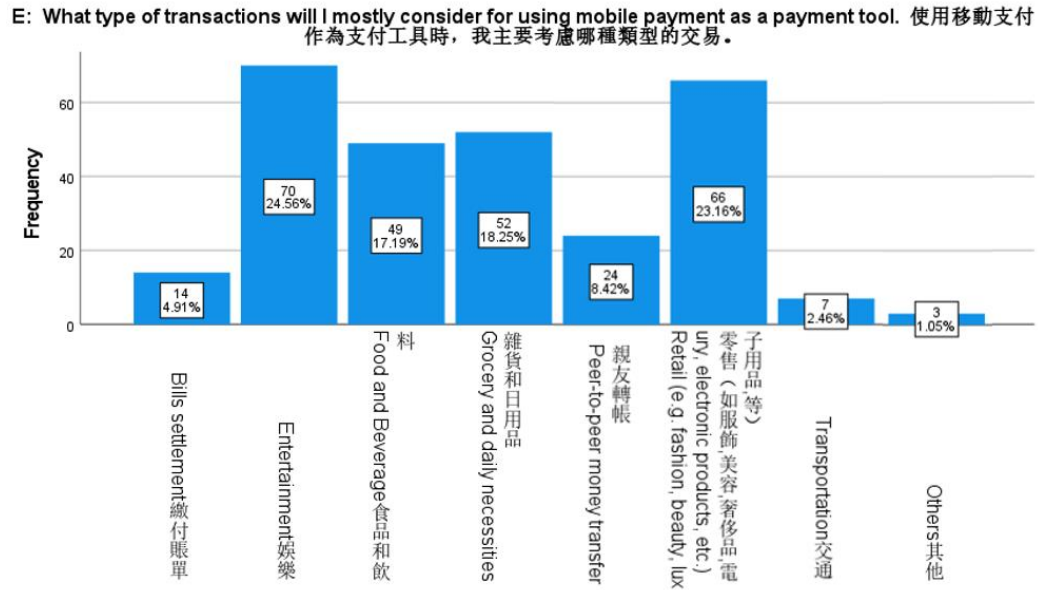
Source: this report

In 2019, the use of digital wallets for payments below HKD 500 and below HKD 100 reached 80% of the overall transactions (Tofugear & Wirecard, 2019), which was more than 20% higher as compared to the similar price range from the recent survey as shown in Figure 4.1.2.1d. With the further development and greater acceptance in mobile payment, it is estimated that the digital wallet will become the most preferred payment in Hong Kong from 36% in 2019 to 47% in 2023 (Fintech News Hong Kong, 2021), as such is expected to a positive impact to the average transaction per payment by mobile payment demonstrating a shift to a higher amount per transaction (i.e. 38.6% for HKD 501 – HKD 1,000) in this study.

v) Type of transactions using mobile payment as a payment tool

The type of transactions using mobile payment by participants is analyzed as follow:

Figure 4.1.2.1e Bar Chart of Respondents' Type of Transactions in using Mobile Payment



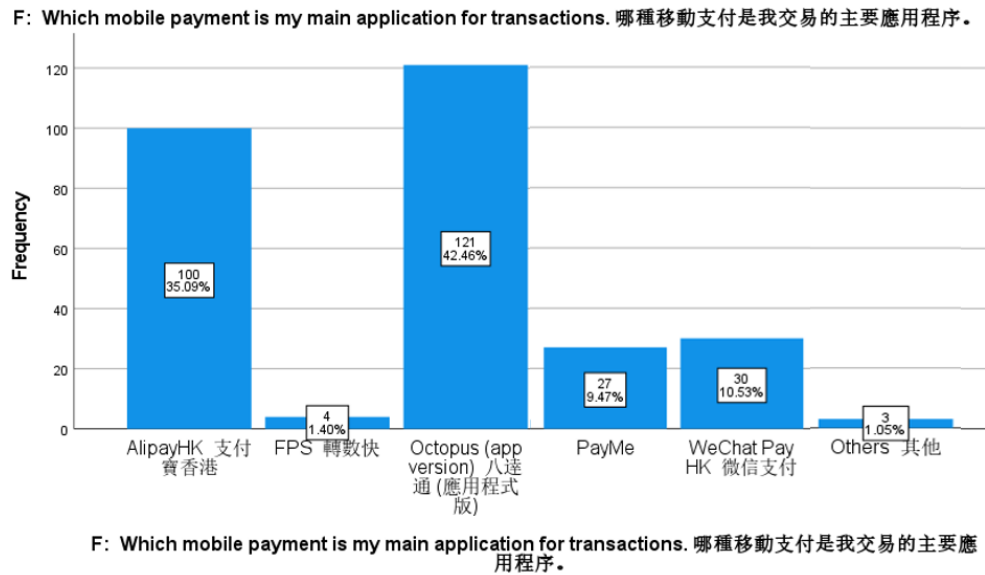
Source: this report

Online shopping, digital payment in store and peer-to-peer money transfer are categorized by C&SD as the main spending channels that can adopt mobile payment. In 2020, C&SD (2021(a)) concluded that types of online purchases mainly focus on daily necessities, clothes and footwear, followed by food/meals related purchases and electronic appliances. Furthermore, there was a high preference for adopting digital payment for entertaining consumption (Visa, 2020). Thus, it is no surprise that these highlighted categories attributed a major proportion among different types of transactions in this study as reflected in Figure 4.1.2.1e.

vi) Main application for mobile payment transactions

Participants' main application for mobile payment transactions are analyzed as follow:

Figure 4.1.2.1f Bar Chart of Respondents' Main Application for Transactions



Source: this report

A survey on payment methods conducted in 2019 demonstrated the payment preference in Hong Kong which Octopus was the most favorable in-store cashless payment method, whereas AlipayHK, WeChat Pay and PayMe ranked within top 4 in the choice of digital wallet (Tofugear & Wirecard, 2019). With the established market share as developed in the early stage, customers' preferences in mobile payment options show no material varies in this study since the responses obtained in the period between December 2021 to January 2022 illustrated that the mentioned payment service providers still sustained a relatively high choice of preference in the market.

4.1.2.2 Cross-Tabulation for Behavior Intention by Demographic

Cross-tabulation is another quantitative analytical tool to analyze categorical data. The tool is to observe two sets of variables obtained in the survey to identify the connection between different sets of collected data (Kamakura & Wedel, 1997). The use of cross-tabulation in this study allows researcher to find whether demographic variables correlate with behavior intention for mobile payment (Raj, Raj & Singh, 2020).

i) Behavior Intention and Age

The following illustrates the cross-tabulation between behavior intention on mobile payment and the users' age:

Table 4.1.2.2a Factor for Intention to Continuously Use Mobile Payments in the Future

			B: Age						Total
			20 - 29	30 - 39	40 - 49	50 - 59	60 - 69	70 or above	
BI9d: I intend to continuously use mobile payments in the future.	Strongly Disagree	Count	0	0	0	1	2	0	3
		% within B: Age	0.00%	0.00%	0.00%	1.10%	5.70%	0.00%	1.10%
	Very Disagree	Count	0	0	1	0	2	0	3
		% within B: Age	0.00%	0.00%	1.10%	0.00%	5.70%	0.00%	1.10%
	Disagree	Count	0	4	4	0	1	0	9
		% within B: Age	0.00%	6.80%	4.30%	0.00%	2.90%	0.00%	3.20%
	Agree	Count	0	12	22	25	9	1	69
		% within B: Age	0.00%	20.30%	23.90%	26.60%	25.70%	100.00%	24.20%
	Very Agree	Count	4	31	45	46	14	0	140
		% within B: Age	100.00%	52.50%	48.90%	48.90%	40.00%	0.00%	49.10%
Strongly Agree	Count	0	12	20	22	7	0	61	
	% within B: Age	0.00%	20.30%	21.70%	23.40%	20.00%	0.00%	21.40%	
Total	Count	4	59	92	94	35	1	285	
	% within B: Age	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	

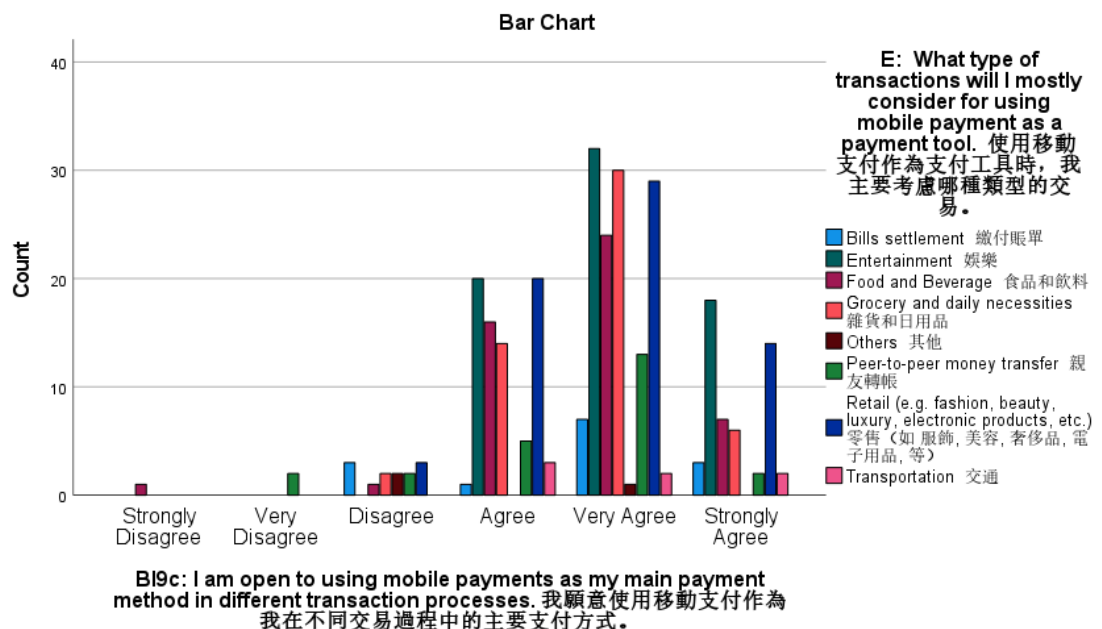
Source: this report

Apart from the respondent who is aged above 70, the majority of the respondents from all other aged groups have expressed ‘very agree’ to continuously use mobile payments in the future. The proportion on ‘very agree’ shows higher in the younger age group, i.e. 100% who aged 20 – 29, and demonstrated a gradual decline in percentage alongside the increase in age range, i.e. dropped to 40% who aged 60 – 69. The result might be explained by a greater acceptance of technology by the younger generation as compared to older adults (Olson *et al.*, 2011) which could impact their intention in continuously using mobile payment.

ii) Behavior Intention and Different Types of Transaction

The following illustrates the cross-tabulation between BI on mobile payment and different categories of transactions:

Figure 4.1.2.2b Bar Chart for Using Mobile Payments as Main Payment Method in Different Transaction Process



Source: this report

Table 4.1.2.2c Factor for Using Mobile Payments as Main Payment Method in Different Transaction Process

		E: What type of transactions will I mostly consider for using mobile payment as a payment tool.								
		Bills settlement	Entertainment	Food and Beverage	Grocery and daily necessities	Peer-to-peer money transfer	Retail (e.g. fashion, beauty, luxury, electronic products, etc.)	Transportation	Others	Total
BI9c: I am open to using mobile payments as my main payment method in different transaction processes.		Count	0	0	1	0	0	0	0	1
	Strongly Disagree	% within E: What type of transactions will I mostly consider for using mobile payment as a payment tool.	0.00%	0.00%	2.00%	0.00%	0.00%	0.00%	0.00%	0.40%
		Count	0	0	0	0	2	0	0	2
	Very Disagree	% within E: What type of transactions will I mostly consider for using mobile payment as a payment tool.	0.00%	0.00%	0.00%	0.00%	8.30%	0.00%	0.00%	0.70%
		Count	3	0	1	2	2	3	0	13
	Disagree	% within E: What type of transactions will I mostly consider for using mobile payment as a payment tool.	21.40%	0.00%	2.00%	3.80%	8.30%	4.50%	0.00%	4.60%
		Count	1	20	16	14	5	20	3	79
	Agree	% within E: What type of transactions will I mostly consider for using mobile payment as a payment tool.	7.10%	28.60%	32.70%	26.90%	20.80%	30.30%	42.90%	27.70%
		Count	7	32	24	30	13	29	2	138
	Very Agree	% within E: What type of transactions will I mostly consider for using mobile payment as a payment tool.	50.00%	45.70%	49.00%	57.70%	54.20%	43.90%	28.60%	48.40%
Total		Count	3	18	7	6	2	14	2	52
	Strongly Agree	% within E: What type of transactions will I mostly consider for using mobile payment as a payment tool.	21.40%	25.70%	14.30%	11.50%	8.30%	21.20%	28.60%	18.20%
		Count	14	70	49	52	24	66	7	285
		% within E: What type of transactions will I mostly consider for using mobile payment as a payment tool.	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

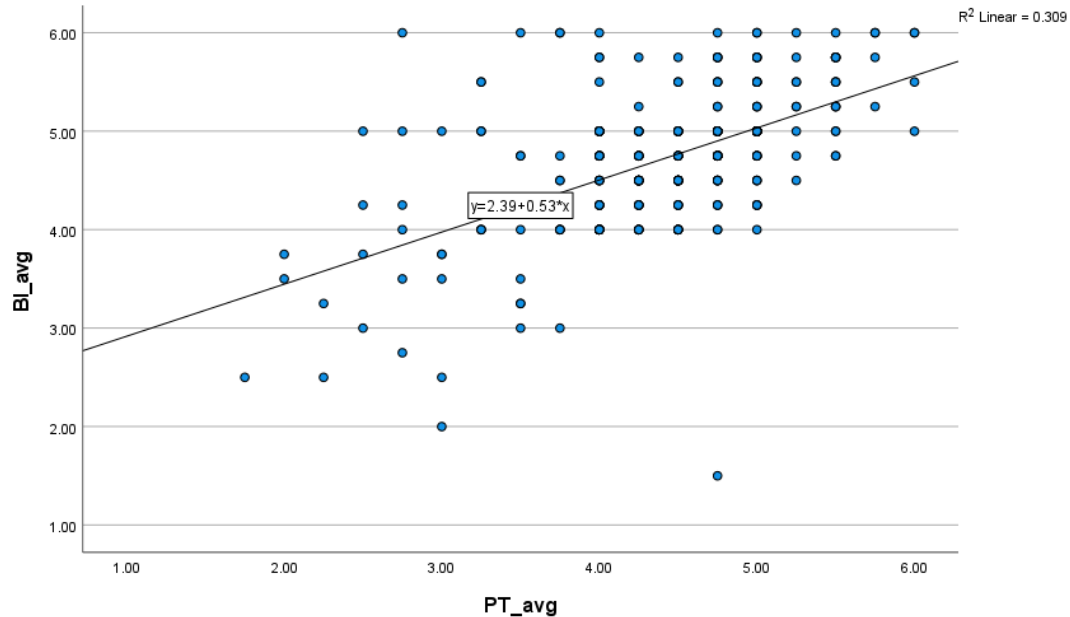
Source: this report

According to Figure 4.1.2.2b, respondents in the survey mostly expressed ‘very agree’ to use mobile payment as the main payment tool in the listed types of transactions except when applying on transportation. In particular, participants have a higher satisfaction to adopt mobile payment for transactions such as bills settlement, grocery and daily necessities and peer-to-peer money transfer, where over 50% of them conveyed ‘very agree’ to accept the digital payment as their main payment tool as illustrated in Table 4.1.2.2c. This might be explained by the shift in consumers’ spending behavior have focused on essential consumptions as a result of Covid 19 (KPMG & Gini, 2020), in which the contactless and reduction in physical barriers on these essential transactions during the pandemic would improve the satisfaction on mobile payment.

4.1.2.3 Perceived Trust with Behavior Intention

The following demonstrates a discussion on two variables in this research topic by scale.

Figure 4.1.2.3 Perceived Trust with Behavior Intention



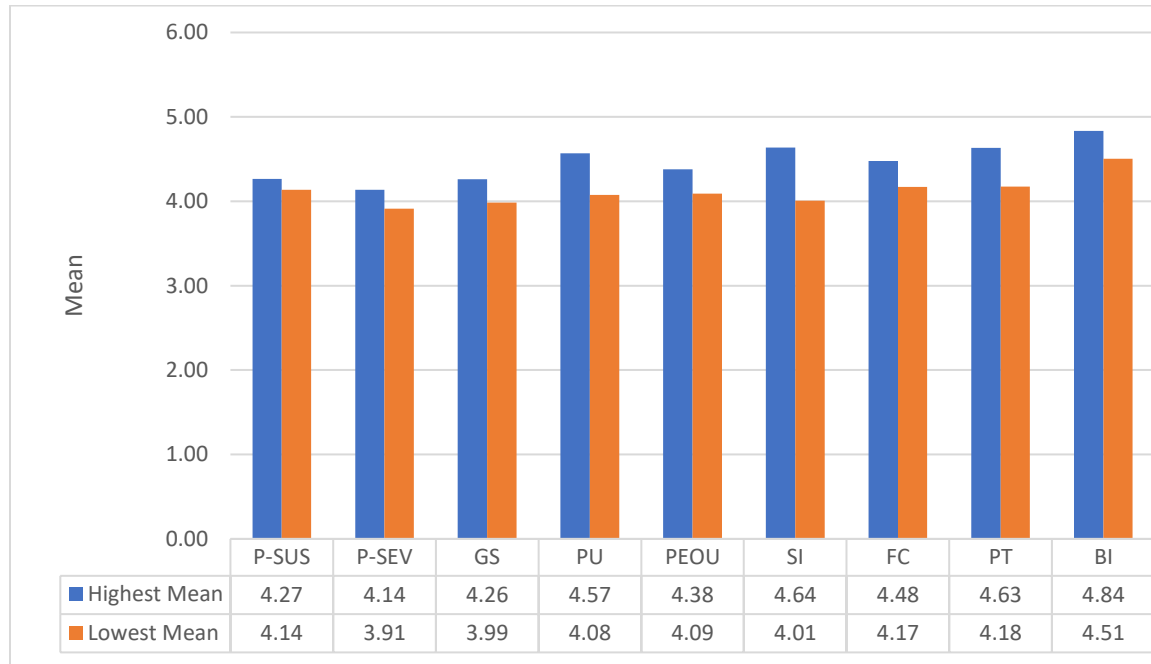
Source: this report

By accessing the Pearson Correlation Relationship between the average value of each independent variables with the average value of dependent variable, H8 achieved the highest correlation relation with $r = 0.556^{**}$ among all hypotheses. The relationship between PT and BI is shown in Figure 4.1.2.3 which indicated that high PT would relate to high BI towards mobile payment. Such result echoes with the outcome evaluated by Wong & Mo (2019) confirming that PT has a positive impact on consumer intention to use mobile payment.

4.1.2.4 The Highest Means of Each Factor with Standard Deviations

Each factor is analyzed by mean and standard deviation as follow:

Figure 4.1.2.4a The Highest Mean of Each Factor



Source: this report

Figure 4.1.2.4a indicated that BI obtained the highest mean among all factors of 4.84 which explained that the intention to use mobile transactions among the respondents can nearly achieve very agreed level, whereas P-SEV has the lowest mean 3.91 demonstrated that the participants are less agreed with the severity brought by Covid-19 would impact the use of mobile payment. Furthermore, the standard deviation of BI and P-SEV is 0.906 and 0.874 respectively which are both less than 1, thus illustrating that the respondents' opinions on these factors are not diversified.

Table 4.1.2.4b The Highest and Lowest Mean of Each Factor

	Minimum	Maximum	Mean	Std. Deviation
P-SUS1c: I feel that Covid-19 will develop health problems for me in the future.	2	6	4.27	0.907
P-SUS1b: My chances of being infected by Covid-19 if I use cash or making payments with physical contact are high.	2	6	4.14	0.863
P-SEV2c: If I get infected by Covid-19 due to using cash or making payments with physical contact, my whole life would change.	1	6	4.14	0.895
P-SEV2a: Thinking about getting infected by Covid-19 due to using cash or making payments with physical contact makes me nervous.	1	6	3.91	0.874
GS3b: For me, the Hong Kong government supporting mobile payment is important.	1	6	4.26	0.879
GS3a: The Hong Kong government is active in setting up the facilities to enable mobile payment.	1	6	3.99	0.880
PU4d: I find mobile payment to be useful for my daily living.	2	6	4.57	0.769
PU4a: Using mobile payment improves my overall performance.	2	6	4.08	0.727
PEOU5d: The mobile payment is simple to use.	2	6	4.38	0.744
PEOU5a: The mobile payment app is clear to use.	2	6	4.09	0.745
SI6b: Many people around me are using mobile payment.	2	6	4.64	0.751
SI6a: People who are important to me think I should use mobile payment.	1	6	4.01	0.796
FC7b: I have the knowledge necessary to use mobile payment systems.	1	6	4.48	0.837
FC7d: Specialized instructions concerning the use of mobile payment systems are available to me.	1	6	4.17	0.893
PT8c: I believe that I would get an immediate confirmation message when the transaction is completed.	2	6	4.63	0.840
PT8a: Mobile payment system is trustworthy.	1	6	4.18	0.825
BI9d: I intend to continuously use mobile payments in the future.	1	6	4.84	0.906
BI9a: Given the opportunity, I will use mobile payments during Covid-19 pandemic.	2	6	4.51	0.739

Source: this report

As listed in Table 4.1.2.4b, all factors except the lowest mean of P-SEV and GS could achieve a value above 4, indicating that the respondents have a positive attitude towards the majority of the factors in the survey. All standard deviation is less than 1 representing that the participants have quite similar preferences towards these factors.

4.2 Reliability Test

Reliability test on the primary data is performed as follow:

Table 4.2 Reliability Test Result of Each Factor

Factors	Cronbach's Alpha			Reference	No of items
	This Research N=285	Other Research			This Research
		α	α		
P-SUS	0.768	0.727	1,080	Daragmeh, Sági & Zéman, 2021	3
P-SEV	0.793	0.763	1,080		3
GS	0.798	0.897	257	Chen, Chen & Chen, 2019	5
PU	0.843	0.753	338	Franque, Oliveira & Tam, 2021	4
PEOU	0.887	0.919	978	Wu <i>et al.</i> , 2019	4
SI	0.804	0.790	614	Cao & Niu, 2019	4
FC	0.838	n/a	491	Patil <i>et al.</i> , 2020	4
PT	0.858	0.854	436	Al-Saedi <i>et at.</i> , 2020	4
BI	0.903	0.877	739	Zhao & Bacao, 2021	4
Total	0.934				35

Source: this report

Table 4.2 demonstrated that Cronbach's Alpha from all factors met the minimum reliability standard of 0.7 (refer to Table 3.6.2). All factors are compared with Cronbach's Alpha references from other research except for FC which has no available data.

Apart from GS and PEOU, factors in this study achieved a higher reliability level as compared with other research. Factors such as P-SUS, P-SEV and GS only met acceptable level are less reliable among all selected factors. Since these factors are not the core variables developed under TAM (Davis, 1985) and UTAUT (Venkatesh *et al.*, 2003), the adoption of these factors in the study of technological-based payment behavior might reduce its standalone reliability level. In contrast, BI and the overall factors reflected strong reliability with Cronbach's Alpha above 0.9. In particular, the overall factors obtained the highest rate of 0.934, such indicated that the factors adopted in this study are reliable to the research topic.

4.3 Factor Analysis

A factor analysis on the eight independent variables related to the research topic is performed below:

Table 4.3a KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.881
Bartlett's Test of Sphericity	Approx. Chi-Square	5098.4
	df	465
	Sig.	0

Source: this report

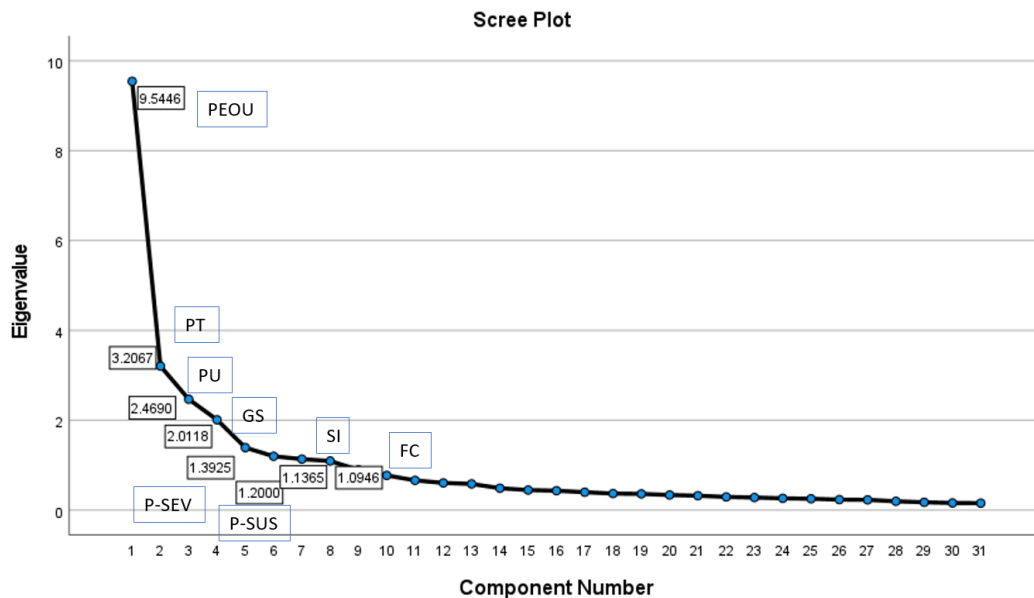
The respondent data in the survey is proved to be feasible for factor analysis after adopting KMO and Bartlett's test as shown in Table 4.3a. The KMO value of 0.881 indicates the sampling achieved great adequacy (refer to Table 3.6.3) and the p-value of 0, which is less than 1% significant level in Bartlett's test, further confirm the data is suitable for factor analysis (Field, 2013). Important factors with eigenvalues higher than one (Shrestha, 2021) are further extracted to highlight these significant factors addressed in this survey.

Table 4.3b Total Variance Explained

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1 PEOU	9.545	30.789	30.789
2 PT	3.207	10.344	41.133
3 PU	2.469	7.965	49.098
4 GS	2.012	6.49	55.588
5 P-SEV	1.392	4.492	60.08
6 P-SUS	1.2	3.871	63.951
7 SI	1.136	3.666	67.617
8 FC	1.095	3.531	71.148
Extraction Method: Principal Component Analysis.			

Source: this report

Figure 4.3c Scree Plot for Eigenvalues



Source: this report

Table 4.3b and Figure 4.3c demonstrated the initial eigenvalues greater than one which illustrated majority of the factors in this study. The selected eight factors represented 71.148% of total explained variance in the survey. PEOU obtained the highest eigenvalue of 9.545 attributing 30.789% of total variance indicated that it is the most important among all factors. It is followed by PT with eigenvalue 3.207 which represented 10.344% of total variance. PU and GS have similar eigenvalues of 2.469 and 2.012 respectively that comprised 7.965% and 6.49% of total variance. The importance of P-SEV, P-SUS, SI and FC are accounted to be similar with eigenvalues slightly over 1 with 4.492%, 3.871%, 3.666% and 3.531% of variance respectively.

Table 4.3d Rotated Component Matrix^a for Factor's Analysis

Component	Factor	Independent Variables	Factor Loading Values	
			This Research N = 285	Other Research
1	PEOU	PEOU5b: The mobile payment app is understandable.	0.829	0.800 Wu et al., 2019
		PEOU5c: The mobile payment app makes it easy to become skillful.	0.823	0.840 N = 978
		PEOU5a: The mobile payment app is clear to use.	0.797	0.790
		PEOU5d: The mobile payment is simple to use.	0.767	0.830
2	PT	PT8d: I would expect that the mobile payment system to be reliable.	0.849	0.841 Al-Saedi et al., 2020
		PT8c: I believe that I would get an immediate confirmation message when the transaction is completed.	0.817	0.877 N = 436
		PT8b: I believe that all the transactions data are confidential.	0.782	0.835
		PT8a: Mobile payment system is trustworthy.	0.734	0.780
3	PU	PU4c: Using mobile payment enhances my effectiveness.	0.826	0.778 Franque,
		PU4b: Using mobile payment increases my productivity.	0.812	0.813 Oliveira & Tam,
		PU4a: Using mobile payment improves my overall performance.	0.703	0.729 2021
		PU4d: I find mobile payment to be useful for my daily living.	0.561	0.709 N = 338
4	GS	GS3c: The Hong Kong government promotes the use of the mobile payment.	0.798	0.902 Chen, Chen & Chen, 2019
		GS3a: The Hong Kong government is active in setting up the facilities to enable mobile payment.	0.726	0.773 N = 257
		GS3b: For me, the Hong Kong government supporting mobile payment is important.	0.664	0.913
		GS3d: For me, the Hong Kong government promoting the use of the mobile payment is important.	0.644	0.857
		GS3e: The Hong Kong government has good laws and regulations for mobile payment.	0.533	0.761
5	P-SEV	P-SEV2b: I am afraid to think about the health problems of getting infected by Covid-19 if I use cash or making payments with physical contact.	0.821	0.827 Daragmeh, Sági & Zéman, 2021
		P-SEV2a: Thinking about getting infected by Covid-19 due to using cash or making payments with physical contact makes me nervous.	0.764	0.801 N = 1,080
		P-SEV2c: If I get infected by Covid-19 due to using cash or making payments with physical contact, my whole life would change.	0.486	0.842
6	P-SUS	P-SUS1a: There is a possibility to get infected by Covid-19 due to using cash or making payments with physical contact.	0.801	0.832
		P-SUS1b: My chances of being infected by Covid-19 if I use cash or making payments with physical contact are high.	0.742	0.784
		P-SUS1c: I feel that Covid-19 will develop health problems for me in the future.	0.712	0.795
7	SI	SI6a: People who are important to me think I should use mobile payment.	0.452	0.830 Cao & Niu, 2019
		SI6b: Many people around me are using mobile payment.	0.737	0.800 N = 614
		SI6c: People who affect my behavior think I should use mobile payment.	0.722	0.840
		SI6d: The mass media makes me use mobile payment.	0.625	0.790
8	FC	FC7d: Specialized instructions concerning the use of mobile payment systems are available to me.	0.665	0.540 Patil et al., 2020
		FC7c: I can get help from others when I have difficulties using mobile payment systems.	0.485	0.600 N = 491
		FC7b: I have the knowledge necessary to use mobile payment systems.	0.358	0.840

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.^a

a. Rotation converged in 7 iterations.

Source: this report

Even though PEOU achieved the highest eigenvalue as shown in Table 4.3b, its variables are not the strongest to represent the corresponding factor. Instead of PEOU, PT obtained the largest factor loading value of 0.849 among all variables and the result is very close to the reference value as shown in Table 4.3d. As such, PT is the independent variable that can mostly indicate the relationship with BI. In contrast, FC has the lowest factor loading value of 0.358 and the largest variance with the reference value, which demonstrated that the independent variable has the weakest relationship with BI among all variables as listed.

4.4 Correlation Test

Correlation test is carried out to measure the relationship between different independent variables with dependent variables in this study.

Table 4.4 Pearson Correlation Relationship and Comparison on Correlation with Other Research

		This Research (N=285)		Other Research		
		r**	β	N	β	Reference
H1	P-SUS --> PU	0.303	0.180***	142	0.358***	Puriwat & Tripopsakul, 2021
H2	P-SEV --> PU	0.260	0.117*	654	0.165***	C.C. & Prathap, 2020
H3	GS --> PU	0.377	0.192***	466	0.590**	Aji, Berakon & Husin, 2020
H4	PU --> BI	0.515	0.294***	124	0.366*	Scherer, Siddiq & Tondeur, 2019
H5	PEOU --> BI	0.445	0.124*	340	0.388***	Rafique <i>et al.</i> , 2020
H6	SI --> BI	0.484	0.128*	406	0.115**	Wang <i>et al.</i> , 2020
H7	FC --> BI	0.545	0.141**	296	0.254**	Alam <i>et al.</i> , 2020(b)
H8	PT --> BI	0.531	0.229***	1,562	0.120*	Chao, 2019

**. Correlation is significant at the 0.01 level (1-tailed).

*. p - value < 0.05 indicates significance level at 5%

**. p - value < 0.01 indicates significance level at 1%

***. p - value < 0.001 indicates significance level at 0.1%

Source: this report

By reference to Table 4.4, hypotheses in this study are strong enough to establish relationships as illustrated in Table 3.6.4, in which the Pearson Correlation Relationship between the independent and corresponding dependent variables have low to moderate correlation. By testing each individual variable, FC has the highest correlation with BI among all hypotheses with $r = 0.545$ at 99% confidence level whereas P-SUS, P-SEV and GS have a relatively lower correlation as compared with other independent variables.

Yet, since the reference research obtained in this study used standardized beta coefficient to measure the relationship between the independent variable and dependent variable from regression model, the same methodology is illustrated to compare the correlation with other research for consistency. All independent variables are statistically significant with p-value < 0.05 as shown in Table 4.4 and the absolute amount of β illustrated a slight difference with the references. The largest variance is GS with nearly 0.4 whereas SI recorded the closest result in β as compared to other research. Such indicates that the correlation between the independent and dependent variables established under this research model have no material differences with previous studies.

4.5 Regression Test

An estimation of the relationship between the two dependent variables, PU and BI, with the corresponding independent variables, P-SUS, P-SEV, GS and PU, PEOU, SI, FC, PT respectively, is performed to formulate the strongest relationship in this research models. Regression test in this study has adopted stepwise method to identify the strongest relationship with PU and BI, in which 9 and 17 models are constructed respectively to establish the following result:

Table 4.5a Model Summary and ANOVA of Dependent Variable

Dependent Variable													
Perceived Usefulness			Behavioral Intention										
PU4a: Using mobile payment improves my overall performance.			BI9b: I am willing to continuously use mobile payments in the near future during Covid-19 pandemic.										
Model Summary ^b													
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate									
9	.415 ^a	0.172	0.163	0.665									
a. Predictors: (Constant), GS3d: For me, the Hong Kong government promoting the use of the mobile payment is important., P-SUS1b: My chances of being infected by Covid-19 if I use cash or making payments with physical contact are high., P-SEV2c: If I get infected by Covid-19 due to using cash or making payments with physical contact, my whole life would change.													
b. Dependent Variable: PU4a: Using mobile payment improves my overall performance.													
Model Summary ^b													
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate									
17	.635 ^a	0.404	0.393	0.615									
a. Predictors: (Constant), PT8b: I believe that all the transactions data are confidential., PU4d: I find mobile payment to be useful for my daily living., SI6b: Many people around me are using mobile payment., PEOU5d: The mobile payment is simple to use., FC7b: I have the knowledge necessary to use mobile payment systems.													
b. Dependent Variable: BI9b: I am willing to continuously use mobile payments in the near future during Covid-19 pandemic.													
ANOVA ^a													
Model		Sum of Squares	df	Mean Square	F	Sig.	Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	25.858	3	8.619	19.463	<.001 ^b		Regression	71.492	5	14.298	37.783	<.001 ^b
9	Residual	124.444	281	0.443			17	Residual	105.582	279	0.378		
	Total	150.302	284					Total	177.074	284			
a. Dependent Variable: PU4a: Using mobile payment improves my overall performance.							a. Dependent Variable: BI9b: I am willing to continuously use mobile payments in the near future during Covid-19 pandemic.						
b. Predictors: (Constant), GS3d: For me, the Hong Kong government promoting the use of the mobile payment is important., P-SUS1b: My chances of being infected by Covid-19 if I use cash or making payments with physical contact are high., P-SEV2c: If I get infected by Covid-19 due to using cash or making payments with physical contact, my whole life would change.							b. Predictors: (Constant), PT8b: I believe that all the transactions data are confidential., PU4d: I find mobile payment to be useful for my daily living., SI6b: Many people around me are using mobile payment., PEOU5d: The mobile payment is simple to use., FC7b: I have the knowledge necessary to use mobile payment systems.						

Source: this report

The R^2 for the two dependent variables PU and BI are 0.172 and 0.404 respectively as shown in Table 4.5a under Model Summary. Such indicated that the corresponding five independent variables can reflect a stronger determination level of BI than the three independent variables of PU, where BI is comparatively more predictable by adopting the regression model factors (Akossou & Palm, 2013). Since the use of mobile payment under an idiopathic situation might not be constant factors in the adoption of digital payment, perceived factors that are more influential under Covid 19 Pandemic would develop a weaker relationship to PU than the other independent variables.

Meanwhile, Table 4.5a of ANOVA illustrated that the p-value sustained at a low level where both dependent variables are recorded less than 0.001 with the corresponding confidence level at 99.9% (Verhagen, Ostelo & Rademaker, 2004). By reference to the determination of statistically significant as mentioned in Section 3.6.5, it demonstrated that the dependent variable in this study is possible to form an effective regression model.

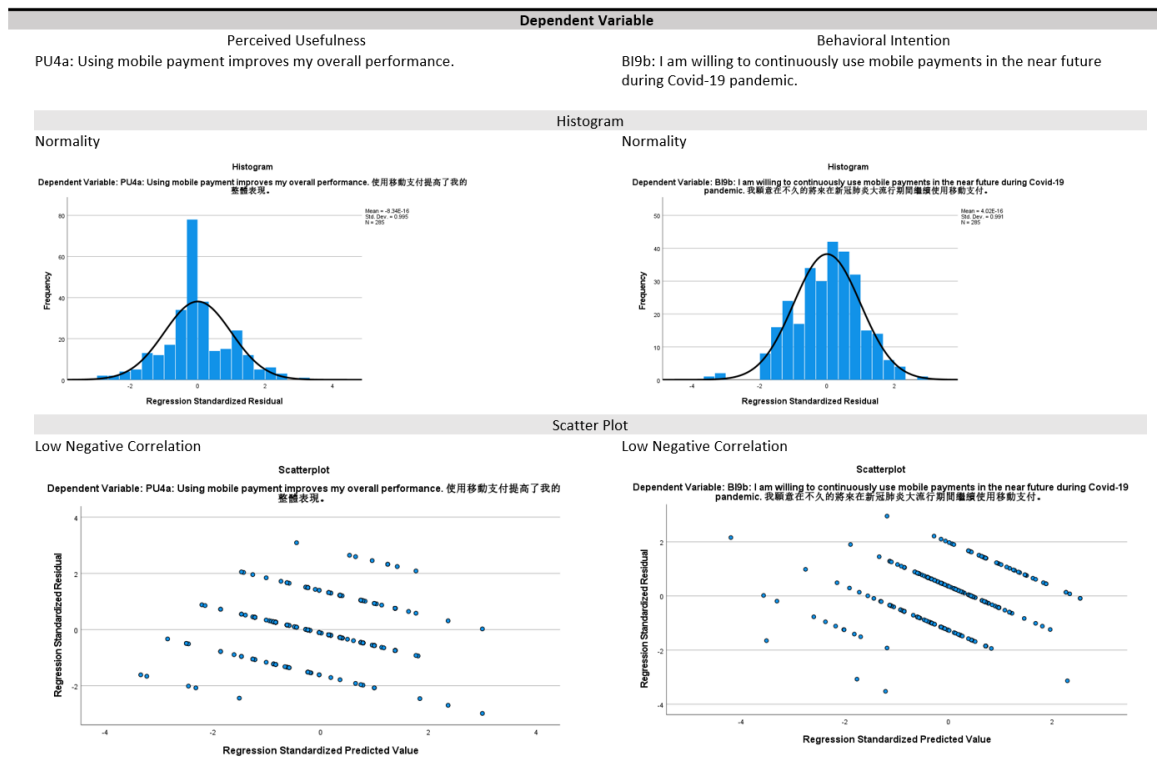
Table 4.5b Coefficients of Dependent Variable

Dependent Variable												
Perceived Usefulness						Behavioral Intention						
PU4a: Using mobile payment improves my overall performance.						BI9b: I am willing to continuously use mobile payments in the near future during Covid-19 pandemic.						
Coefficients ^a												
Model	Unstandardized Coefficients		Sig.	Collinearity Statistics		Model	Unstandardized Coefficients		Sig.	Collinearity Statistics		
	B	Std. Error		Tolerance	VIF		B	Std. Error		Tolerance	VIF	
9	(Constant)	2.052	0.269	<.001			(Constant)	0.687	0.31	0.028		
	P-SUS1b	0.180	0.048	<.001	0.891	1.123	PU4d	0.294	0.055	<.001	0.758	
	P-SEV2c	0.117	0.047	0.013	0.890	1.124	PEOU5d	0.124	0.060	0.038	0.680	
	GS3d	0.192	0.046	<.001	0.939	1.065	17	SI6b	0.128	0.056	0.023	0.763
a. Dependent Variable: PU4a: Using mobile payment improves my overall performance.							FC7b	0.141	0.054	0.009	0.664	1.507
							PT8b	0.229	0.034	<.001	0.921	1.085
						a. Dependent Variable: BI9b: I am willing to continuously use mobile payments in the near future during Covid-19 pandemic						
Equation												
Perceived Usefulness (Y1)						Behavioral Intention (Y2)						
=	2.052					=	0.687					
+	0.192	x	GS3d (Government Support)			+	0.294	x	PU4d (Perceived Usefulness)			
+	0.180	x	P-SUS1b (Perceived Susceptibility)			+	0.229	x	PT8b (Perceived Trust)			
+	0.117	x	P-SEV2c (Perceived Severity)			+	0.141	x	FC7b (Facilitating Conditions)			
						+	0.128	x	SI6b (Social Influence)			
						+	0.124	x	PEOU5d (Perceived Ease of Use)			

Source: this report

Both dependent variables (PU and BI) can develop an effective regression model where positive relationship is established with the support of positive coefficients generated as shown in Table 4.5b. Such indicates that all corresponding independent variables are important factors, in particular GS ($b_3 = 0.192$) and PU ($b_5 = 0.294$) are the most significant factors attributing to the regression models respectively (Schielzeth, 2010). All VIF recorded below 2 explained that there is a low possibility that multicollinearity exists in both regression models (Salmerón Gómez *et al.*, 2020), together with achieving the significant level below 0.05 (Verhagen, Ostelo & Rademaker, 2004), reliable linear regression can be developed for each dependent variable and equations are formulated to predict the outcome by employing different factors.

Table 4.5c Histogram and Scatter Plot of Dependent Variable



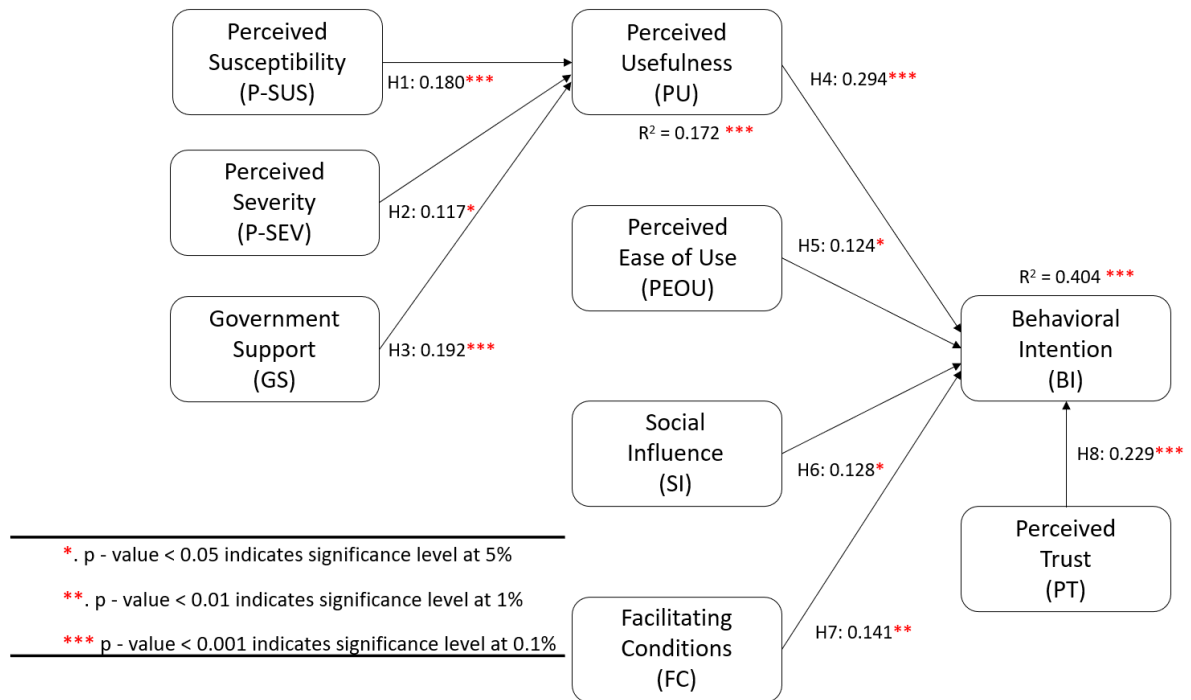
Source: this report

By reference to Table 4.5c, both PU and BI can construct histogram with normal distribution due to its symmetrically distributed around the mean, indicating that the models are appropriately fit for this study (Murty, 2002). Meanwhile, the scatter plot illustrated that the models have a weak negative correlation (Shao *et al.*, 2016) between the factors by displaying a relatively flat downward slopping pattern in the diagram. Yet, since the factors meet the statistically significant level as shown in Table 4.5b, even though scatter plot demonstrated a weak correlation, the research model is still relevant for this study.

4.6 Hypothesis Testing by using Correlation and Regression Analysis

The results from correlation and regression test as mentioned in Section 4.4 and 4.5 are combined as follow:

Figure 4.6 The Research Model by Hypotheses



Source: this report

4.7 Summary

The research model established under this study is being tested by performing both qualitative and quantitative analyses in this chapter. Through conducting focus group and formal survey, the responses are evaluated by qualitative and quantitative research in which is proven that the factors and hypotheses are relevant and reliable to develop the research topic.

Chapter 5. Conclusions and Recommendation

This section evaluates the findings on the use of mobile payment to conclude the development in Hong Kong and provide achievable recommendations for the further expansion of such payment tool.

5.1 Conclusion

The penetration rate of smartphones in Hong Kong has been the highest among Asia where almost 90% of the citizens aged over 10 years old are smartphone owners (Statista, 2022(b)) which stimulate the adaption of mobile-based technology, resulting a 46.7% of smartphone owners were mobile payment users in 2020 (DataReportal, 2021). Thus, to sustain and improve the utilization rate of mobile payment, it is important to understand the essential elements affecting the intentions of users for effectively promoting on such payment method.

Essential elements, i.e. P-SUS, P-SEV, GS, PU, PEOU, SI, FC, PT and BI, have been selected based on the research topic. Focus group as mentioned in Section 4.1.1 was performed and verified that the nine chosen variables are all impactful to the participants' intention in the use of mobile payment in Hong Kong . The reliability and importance of these factors towards the use of mobile payment are further proven by the reliability test and factor analysis as shown in Section 4.2 and 4.3 after analyzing the responses from a formal survey.

A research model is being constructed by reference to the existing commercial environment and eight hypotheses are established to assess the relationship between the eight independent variables towards two dependent variables, i.e. P-SUS, P-SEV, GS towards PU and PU, PEOU, SI, FC, PT towards BI. Pearson Correlation Relationship under the correlation test in Section 4.4 has confirmed that hypotheses in this study are strong enough to form corresponding relationship. Regression test in Section 4.5 has also affirmed that the hypotheses established a positive correlation and the strongest elements under each independent variable that impacts the corresponding dependent variable is being identified for further study.

Amidst Covid 19 Pandemic, the reliance on technology is tremendous, from mitigation and prevention measures for the spread of the virus (Ting *et al.*, 2020; Whitelaw *et al.*, 2020) to the implementation of all sorts of physical distancing approaches (Garfin, 2020), have prominent the advantages of adopting technology within the health crisis. The precaution attitude (P-SUS) towards the virus has accelerated the adoption of contactless payment (Tong *et al.*, 2020; Renu, 2021) and bring positive impact on PU (Daragmeh, Sági & Zéman, 2021; Puriwat & Tripopsakul, 2021; C.C. & Prathap, 2020) due to the users' belief in the adverse consequences that could be brought by the virus (Tong *et al.*, 2020).

The implementation of the Consumption Voucher Scheme has further facilitated the development of mobile payment and survey has shown that 75% of the citizens would continue to use the payment method after experiencing the usefulness of the payment tool (Kantar, 2021). As such, the government's advocating of the use of mobile payment under the scheme has brought favorable impact on PU towards digital transactions under the pandemic period (Winata & Permana, 2020; Aji, Berakon & Husin, 2020).

PU and PEOU have been regarded as some of the core factors which bring significant positive effects to motivate the usage of mobile applications (Rafique *et al.*, 2020; Rafique *et al.*, 2018). Thus, applications that are simple to manage and at the same time can improve efficiency and effectiveness during transactions could stimulate the adoption of mobile payment (Kamal, Shafiq & Kakria, 2020; Daragmeh, Lentner & Sági, 2021). This provides an important indicator for the mobile application developers as guidance to consider the criteria under PU and PEOU as a higher priority in technological development to boost the continuity in the acceptance of mobile payment.

Consumers' intention in the use of mobile applications is greatly influenced by SI, mainly comprise of peers and content producers in different social platforms (Yu *et al.*, 2021), particularly when the technology application is being newly introduced (Joa & Magsamen-Conrad, 2021). Meanwhile, FC is another main determinant of the adoption of digital money where the better facilities available can stimulate the desire to accept the technology (Alfanzi & Daulay, 2021). Service providers can therefore focus on social media promotions to attract newcomers and setting up adequate facilities in the retail environment to enhance favorable conditions for motivating users' willingness to utilize the digital payment (Nur & Panggabean, 2021).

Furthermore, the role of PT is getting important and become a significant element that can affect consumers' intention (Adiratna & Wulansari, 2021). The insufficient trust level could be one of the reasons explaining why services providers face greater obstacles in the acceptance of digital wallets in Hong Kong as compared to other regions in the prior years (Wong & Mo, 2019; JPMorgan, 2019). Attempts that can reinforce the trustworthiness in digital payment would provide beneficial circumstances for the recognition of such payment tool (Liébana-Cabanillas *et al*, 2018). Developers can therefore consider PT as an essential factor to further improve and resolve the security and privacy issues arise during the transactions to strengthen the consumers' trust level.

5.2 Recommendation

According to the findings obtained from this study, recommendations based on theoretical and managerial implications on the development of mobile payment is stated in this section to provide adequate and achievable solutions for different stakeholders in the business.

5.2.1 Theoretical Implications

Two dependent variables, PU and BI, are established in this study and theoretical implication is suggested according to the correlations with the corresponding independent variables, i.e. P-SUS, P-SEV, GS and PU, PEOU, SI, FC, PT, as follow:

With reference to the current health crisis, P-SUS and P-SEV which represent users' health concerns is implemented in the research model (Rosenstock, 1974), together with the governments' positive attitude toward mobile payment in the pandemic period (Al Haderi, 2014), are assessed for measuring the impact on PU towards mobile payment (Puriwat & Tripopsakul, 2021; C.C. & Prathap, 2020; Aji, Berakon & Husin, 2020). Correlation test demonstrated that P-SUS, P-SEV and GS can construct significant relationships with PU in which GS weights the highest at $r=0.377^{**}$, following by P-SUS at $r=0.303^{**}$ and P-SEV at $r=0.260^{**}$, such results echo with the outcome from regression test which ranking according to the coefficient aligns with Pearson Correlation Relationship. The result indicates that government's participation in the development of mobile payment is essential to uplift the usefulness of the payment (Tan & Teo, 2000), coefficient outcome in this study further demonstrate that respondents believe government's promotion has the strongest impact on PU of mobile payment. Thus, the government takes a key role in establishing the ecosystem of mobile payment (Moghavvemi *et al.*, 2021)

Another discussion area lays on the effect on consumers' intention towards the use of mobile payment under the influential of the corresponding independent variables such as PU, PEOU, SI, FC and PT. By reference to conceptual models such as TAM and UTAUT, fundamental elements namely PU, PEOU (Davis, 1985) and SI, FC (Venkatesh *et al.*, 2003) is implemented into the research model, together with critical factor PT which is supported by other empirical studies (Reichheld & Schefter, 2000; Alalwan, Dwivedi & Rana, 2017), to form a comprehensive assessment on the impact on BI. Hypotheses established towards BI has proven to be positively influencing the dependent variable under correlation test, which FC obtained the strongest relationship at $r=0.545^{**}$ and PEOU being the weakest at $r=0.445^{**}$ among all independent variables. By reference to the coefficients, PU has the strongest positive impact towards BI, following by PT, FC, SI and PEOU when predicting consumers' intention. In particular, PU and PT achieved a higher ranking among other independent variables weighted at over 0.2 with coefficients of 0.294 and 0.229 respectively.

Empirical results have also confirmed the importance of PU which can enhance users' motivation to engage with new applications once they believe it can uplift their performance by adopting the technology (Arghashi & Yuksel, 2022). Regression test performed in Section 4.5 has further affirmed that it is particularly impactful when the users believe that mobile payment is a useful tool for daily living. Once mobile payment manages to bring efficient and effective daily transactions could stimulate the tool to be a day-to-day technology that strengthens the users' intention (Franque, Oliveira & Tam, 2021; Morosan & DeFranco, 2016).

A higher level of trustworthiness in the mobile payment tool can boost the users' incentive in adopting the technology (Franque, Oliveira & Tam, 2022; Liébana-Cabanillas *et al.*, 2018). This study has highlighted the users' security and privacy concerns on transaction data as a major predictor of estimating the usage intention (Section 4.5) and such area has also been pointed out during the focus group discussion (Section 4.1.1). To sustain the confidence level from the users, service providers with high integrity level and adequate safeguard measures employed during each transaction can build up trust level among experienced users (Oliveira *et al.*, 2017; Handarkha, 2020), whereas new users are more likely to develop trust through word of mouth from celebrities and familiar friends and relatives (Handarkha, 2020; Joa & Magsamen-Conrad, 2021).

By reference to the research model established in this study, GS is the most influential factor towards PU whereas PU and PT rank highest towards BI. Thus, stakeholders should mainly focus on GS, PU and PT to enhance the sustainability of mobile payment with limited resources.

5.2.2 Managerial Implications

Practical suggestion based on GS, PU and PT is proposed below to strengthen the further development of digital payment in the Hong Kong market.

Contribution by the government is considered as taking a major role in the development of mobile payment (Moghavvemi *et al.*, 2021) and users believe that government promotion is particularly important in strengthening the usefulness of the payment tool as stated in Section 4.5. The implementation of the Consumption Voucher Scheme recently is a way to advocate the use of digital payment (Winata & Permana, 2020; Aji, Berakon & Husin, 2020), yet the government could further extend the initiative beyond an ones-off special scheme to regular distribution of fundings. In short run, the choice of pension or funding receiving options can be expended to various types of digital wallets which could encourage the recipients to be further engaged with mobile payment in Hong Kong (Appiah *et al.*, 2019). Other regional government with higher participations in the development of mobile payments have already investigating the possibility of issuing digital currencies in the upcoming future (Manganiello & Sariel-Gaon, 2021) which could act as a strong driving engine in the adoption of the technology in long run (Nasri & Charfeddine, 2012).

PU is always determined as one of the key elements when the technology is related to mobile applications (Tam, Santos & Oliveira, 2018). Even though the enhancement in GS can stimulate PU as demonstrated in this study, further approaches are necessary to strengthen users' intention by integrating the payment tool into daily living and develop such payment method as a usage habit (Amoroso & Lim, 2017). Survey has demonstrated that the adoption of such digital payment is largely driven by younger generation with 93% among 18 – 34 years old and recorded a descending percentage with higher age group (Paypal, 2022) and the results echo with the findings in Section 4.1.2.2i. Such indicates there is a need to uplift the elder generation to understand the usefulness of mobile payment. Therefore, resources should allocate to support the elder generation by hosting different

introduction sections, setting up testing booths and trail payments in districts concentrating on elderlies allowing them to experience the new payment method, together with developing retail network that reaches a wider age group, could enhance the integration of mobile payment in daily transactions among the aged groups in Hong Kong (Liébana-Cabanillas, Sánchez-Fernández & Muñoz-Leiva, 2014).

PT is another critical factor for increasing the users' intention as previous studies have identified the awareness of security and privacy issues in the local market creates obstacles to the development of mobile payment (Wong, 2018; Wong & Mo, 2019). Thus, the integrity level and safeguard measures on data protection should be enhanced regularly to resolve the users' concerns (Oliveira *et al.*, 2017), including minimizing the personal data required and setting a time limit for the storage of users' transaction details, together with a periodical upgrade and modifying security systems to safeguard users' personal information. Further steps can be applied to new users including advertising and promotion in social media platforms since prior study has suggested that trust level can be transferred by social impact among young and less experienced users (Handarkha, 2020).

5.3 Limitation and Further Research

In Hong Kong, health factors, i.e. P-SUS and P-SEV, towards the impact of Covid 19 among the citizens are generally lower than other regions (Li, Lau & Chan, 2022) largely due to the stable situation which the city has experienced several months of zero local cases with relatively low death rates during the start of this study (HKUMed, 2022). The sudden outbreak of the 5th wave after the completion of formal survey brought adverse situation, with over thousands of local cases alongside hundreds of death cases per day, may deepen the citizens' belief in the necessity of precautionary measures and consequences brought from the virus

(Tong *et al.*, 2020), which could alter the results in P-SUS and P-SEV as compared to this study. It is suggested that the same research topic can be performed during different pandemic stage to assess a more extensive view of the impact of mobile payment during a health crisis. Furthermore, the research model in this study mainly focuses on the correlation between various independent variables towards a single dependent variable, whereas intercrossing relationships between these factors might coexist in real case. Participants have raised out the correlation between GS and FC during the focus group discussion as mentioned in Section 4.1.1 due to the increase in available mobile payment facilities resulting from Consumption Voucher Scheme, whereas empirical results also suggested the relationship between other independent variables such as social impact (SI) towards the transfer of trust (PT) among specific user groups (Handarkha, 2020) and adequate technical and knowledge support (FC) can enhance the users' belief in the usefulness and ease of use of the technology (Liébana-Cabanillas, Sánchez-Fernández & Muñoz-Leiva, 2014). As such, an extension of intercrossing hypotheses between different independent variables in this research model can be proposed in future studies to construct a more comprehensive overview of the factors inter influencing each other in the development of mobile payment.

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Appendix A Timetable

Period		Workflow	Content*					Assignment
From	To		1	2	3	4	5	
18 Oct 21	23 Oct 21	To develop research topic						To prepare and complete Research Proposal
24 Oct 21	28 Nov 21	To construct the research model						
29 Nov 21	11 Dec 21	To establish questionnaire						
12 Dec 21	26 Dec 21	To prepare, conduct and review on pilot test						To prepare and complete Research Study
27 Dec 21	15 Jan 22	To prepare and distribute formal questionnaire and collect adequate responses						
27 Dec 21	9 Jan 22	To prepare, arrange and held focus group discussion						
16 Jan 22	16 Feb 22	To run SPSS results						
16 Jan 22	31 Mar 22	To gather collected data and conduct analysis						
1 Mar 22	25 Apr 22	Proof reading and amendments						

* 1 = Introduction

2 = Literature Review

3 = Research Models

4 = Data Analysis

5 = Conclusion and Recommendations

Corresponding
Chapters

Agenda

議程

Date:	9 Jan 2022	日期:	2022 年 1 月 9 日
Time:	21:30pm	時間:	下午 9 時 30 分
Meeting Type:	Zoom Meeting	會面形式:	視訊會面

Discussion items

1. Which payment method will you prefer the most, and why?
2. What are the factors that encourage/discourage you to use mobile payment, and why?
3. In what circumstances you will/ will not choose to use mobile payment, and why?
4. What are your concerns about using mobile payment?
5. Does the Covid-19 situation impact your use of mobile payment, and why?
6. Does the impose of Consumption Voucher Scheme change your payment behavior, and why?
7. Will you consider/continue to use mobile payment after the Covid 19 Pandemic, and why?

討論項目

1. 您最喜歡哪種付款方式，并請提供原因。
2. 哪些因素會鼓勵/阻礙您使用移動支付，并請提供原因。
3. 在什麼情況下您會/不會選擇使用移動支付，并請提供原因。
4. 您在使用移動支付時有什麼顧慮？
5. 在新冠肺炎情況下是否會影響您使用移動支付，并請提供原因。
6. 消費券計劃的實施是否會改變您的支付行為，并請提供原因。
7. 在新冠肺炎大流行之後，您會考慮/繼續使用移動支付嗎？為什麼？

Appendix C Responses in Focus Group Discussion

Focus group - Participant I	
Gender:	Male
Age:	50 - 59
Experience in mobile payment:	Above 5 years
Frequency in use of mobile payment:	At least once per week
Q1	Mainly Octopus card, following by PayMe; credit cards and PPS
Q2	Friends using the same payment application such as PayMe motives the use of mobile payment because it makes peer-to-peer transactions more convenient. Payment platform provided by trusted service providers also irritates the use of mobile payment.
Q3	Depends on types of payment and transaction amount
Q4	Trustworthiness and privacy during mobile transactions
Q5	No differences
Q6	No differences
Q7	No differences since mobile payment is already a regular payment method before the pandemic

Focus group - Participant II	
Gender:	Female
Age:	50 - 59
Experience in mobile payment:	Above 5 years
Frequency in use of mobile payment:	At least once per week
Q1	Mainly Octopus card, following by PayMe; credit cards; PPS; FPS and AlipayHK
Q2	Friends using the same payment application and it is convenient to use; Increase in the number of retail shops that provides mobile payment as one of the payment options; An application platform that is easy to perform will increase the usage of mobile payment
Q3	Depends on types of payment and any discount offer; Convenient is another critical element to use mobile payment
Q4	Any mobile payment facilities available in the retail spots; Whether it is easy to get access for support when issues occur during mobile payment
Q5	Increased the number of mobile payment transactions due to the hygiene concerns when using cash; Increased in online shopping during the pandemic has stimulated the use of digital payment.
Q6	No differences
Q7	No material different but may increase the use of mobile transactions since I have used such payment method more regularly during the pandemic

Focus group - Participant III	
Gender:	Male
Age:	40 - 49
Experience in mobile payment:	Above 5 years
Frequency in use of mobile payment:	At least once per week
Q1	Mainly Octopus card, following by PayMe; credit cards; Google Pay and Wechat Pay
Q2	Mobile payment is convenient to use and has lots of mobile payment options from different service providers
Q3	Mostly use mobile payment because it is convenient with the different top-up options and minimum cash required
Q4	Not much concerns on the use of mobile payment; Feel secured enough with the instant transaction confirmation received from service providers
Q5	No differences
Q6	Choose Wechat Pay as the receipt platform due to the discount offered from the service provider, as such enhance the number of usages in mobile payment
Q7	No differences since mobile payment is already a frequent payment method before the pandemic

Focus group - Participant IV	
Gender:	Female
Age:	40 – 49
Experience in mobile payment:	3 – 5 years
Frequency in use of mobile payment:	Occasionally
Q1	Mainly Octopus card, following by EPS; credit cards; AlipayHK
Q2	Not comfortable with the security in mobile transactions is an obstacle
Q3	Mostly preferred debit payment and Octopus card in which mobile payment is ranked at a lower priority
Q4	Main concern is the security and privacy issue during mobile payment
Q5	No differences
Q6	Setup AlipayHK as the receipt platform due to the increase in the number of retail shops providing mobile payment facilities
Q7	Will still prefer using debit/credit card as the main transaction methods

Focus group - Participant V	
Gender:	Male
Age:	30 – 39
Experience in mobile payment:	3 – 5 years
Frequency in use of mobile payment:	At least once per week
Q1	Mainly Octopus card, following by PayMe; cash; AlipayHK; credit cards
Q2	Trustworthy service providers with receiving instant transaction confirmation could encourage the use of mobile payment
Q3	Would prefer Octopus card and mobile payment rather than cash for daily transactions
Q4	Main concern is the security and privacy issue during mobile payment
Q5	No differences
Q6	No differences
Q7	No differences since mobile payment is already a regular payment method before the pandemic

Focus group - Participant VI	
Gender:	Female
Age:	40 – 49
Experience in mobile payment:	Above 5 years
Frequency in use of mobile payment:	At least once per week
Q1	Mainly Octopus card, following by AlipayHK; PayMe; credit cards
Q2	More comfortable with cashless transactions; Prefer mobile payment services from trusted service providers
Q3	Would prefer Octopus card and mobile payment, any discount offering is also affecting the choice of payment method
Q4	Mainly concern on privacy issues and would avoid using payment platforms which required many personal information
Q5	Increase the use of contactless payment due to hygiene issues
Q6	Increase the use of mobile payment since more retailers set up mobile payment facilities due to the Consumption Voucher Scheme
Q7	No differences since mobile payment is already a regular payment method before the pandemic

Survey on Consumers' Behavioral Intention towards Mobile Payment during the Covid 19 Pandemic in Hong Kong 於新冠肺炎大流行期間香港消費者對移動支付的行為意向調查

Mobile payment refers to payments settled by official currencies using mobile devices such as smartphone or tablet.

移動支付指使用智能手機或平板電腦等流動設備進行以官方貨幣結算的付款。

The aim of this survey is to collect the perceived factors that influence the use of mobile payment amidst the Covid 19 Pandemic in Hong Kong. The collected information help to identify the correlation between various factors that impact the behavioral intention of mobile payment users.

本次調查的目的是收集香港在新冠肺炎大流行期間影響移動支付使用的感知因素。收集的信息有助於識別各種因素與移動支付用戶的行為意圖之間的相關性。

This survey is targeting surveyees aged 20 or above and is conducted on a voluntary, confidential, and anonymous basis. The collected information is solely used for this study and will be destroyed after 6 months upon the completion of the research. Any participant who does not feel satisfied with the survey could withdraw at any time.

本次調查以 20 歲或以上的受訪者為對象。在自願、保密和匿名的基礎上進行。收集的信息僅用於本研究，並將在研究完成後 6 個月後銷毀。任何對調查不滿意的參與者可以隨時退出。

***Required**

Part 1 第一部分

Six-Point Likert Scale is adopted in the following section, ranking at: 1 = Strongly Disagree; 2 = Very Disagree; 3 = Disagree; 4 = Agree; 5 = Very Agree; 6 = Strongly Agree. Please select the most suitable response for the corresponding question.

以下部分採用李克特六點量表，等級為：1 = 強烈不同意；2 = 非常不同意；3 = 不同意；4 = 同意；5 = 非常同意；6 = 強烈同意。請為相應的問題選擇最合適的答案。

P-SUS1a: There is a possibility to get infected by Covid-19 due to using cash or making payments with physical contact. 使用現金或進行支付時與他人有身體接觸有可能感染新冠病毒。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意

☐ ☐ ☐ ☐ ☐ ☐

Strongly Agree 強烈同意

P-SUS1b: My chances of being infected by Covid-19 if I use cash or making payments with physical contact are high. 如果我使用現金或進行支付時與他人有身體接觸，會增加我被新冠病毒感染的機率。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意

☐ ☐ ☐ ☐ ☐ ☐

Strongly Agree 強烈同意

P-SUS1c: I feel that Covid-19 will develop health problems for me in the future. 我覺得新冠病毒將來會給我帶來健康問題。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意

☐ ☐ ☐ ☐ ☐ ☐

Strongly Agree 強烈同意

P-SEV2a: Thinking about getting infected by Covid-19 due to using cash or making payments with physical contact makes me nervous. 考慮到如因使用現金或進行支付時與他人有身體接觸而被感染新冠病毒會讓我感到緊張。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意

☐ ☐ ☐ ☐ ☐ ☐

Strongly Agree 強烈同意

Pre-fill responses, then click 'Get link'

P-SEV2b: I am afraid to think about the health problems of getting infected by Covid-19 if I use cash or making payments with physical contact. 因使用現金或進行支付時與他人有身體接觸被感染新冠病毒所引發的健康問題會讓我感到害怕。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意

☐ ☐ ☐ ☐ ☐ ☐

Strongly Agree 強烈同意

P-SEV2c: If I get infected by Covid-19 due to using cash or making payments with physical contact, my whole life would change. 如果我因使用現金或進行支付時與他人有身體接觸而被新冠病毒感染，我的整個生活都會改變。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意

☐ ☐ ☐ ☐ ☐ ☐

Strongly Agree 強烈同意

GS3a: The Hong Kong government is active in setting up the facilities to enable mobile payment. 香港政府積極建立設施以支持流動支付。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意

☐ ☐ ☐ ☐ ☐ ☐

Strongly Agree 強烈同意

GS3b: For me, the Hong Kong government supporting mobile payment is important. 對我而言，香港政府支持移動支付很重要。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意

☐ ☐ ☐ ☐ ☐ ☐

Strongly Agree 強烈同意

Pre-fill responses, then click 'Get link'

GS3c: The Hong Kong government promotes the use of the mobile payment. 香港政府提倡使用流動支付。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意

☐ ☐ ☐ ☐ ☐ ☐

Strongly Agree 強烈同意

GS3d: For me, the Hong Kong government promoting the use of the mobile payment is important. 對我而言，香港政府推動移動支付的使用很重要。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意

☐ ☐ ☐ ☐ ☐ ☐

Strongly Agree 強烈同意

GS3e: The Hong Kong government has good laws and regulations for mobile payment. 香港政府對移動支付有良好的法律法規。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意

☐ ☐ ☐ ☐ ☐ ☐

Strongly Agree 強烈同意

PU4a: Using mobile payment improves my overall performance. 使用移動支付提高了我的整體表現。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意

☐ ☐ ☐ ☐ ☐ ☐

Strongly Agree 強烈同意

Pre-fill responses, then click 'Get link'

PU4b: Using mobile payment increases my productivity. 使用移動支付提高了我的工作效率。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意 ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree 強烈同意

PU4c: Using mobile payment enhances my effectiveness. 使用移動支付提高了我辦事的果效。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意 ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree 強烈同意

PU4d: I find mobile payment to be useful for my daily living. 我發現移動支付對我的日常生活很有用。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意 ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree 強烈同意

PEOU5a: The mobile payment app is clear to use. 移動支付應用程序使用清晰。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意 ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree 強烈同意

Pre-fill responses, then click 'Get link'

PEOU5b: The mobile payment app is understandable. 移動支付應用程序是容易理解的。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意 ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree 強烈同意

PEOU5c: The mobile payment app makes it easy to become skillful. 移動支付應用程序容易令使用者操作變得熟練。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意 ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree 強烈同意

PEOU5d: The mobile payment is simple to use. 移動支付使用簡單。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意 ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree 強烈同意

SI6a: People who are important to me think I should use mobile payment. 對我很重要的人認為我應該使用移動支付。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意 ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree 強烈同意

Pre-fill responses, then click 'Get link'

SI6b: Many people around me are using mobile payment. 我身邊很多人都在使用移動支付。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意

☐ ☐ ☐ ☐ ☐ ☐

Strongly Agree 強烈同意

SI6c: People who affect my behavior think I should use mobile payment. 會影響我行為的人認為我應該使用移動支付。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意

☐ ☐ ☐ ☐ ☐ ☐

Strongly Agree 強烈同意

SI6d: The mass media makes me use mobile payment. 大眾媒體讓我使用移動支付。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意

☐ ☐ ☐ ☐ ☐ ☐

Strongly Agree 強烈同意

FC7a: I have the resources necessary to use mobile payment systems. 我擁有使用移動支付系統所需的資源。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意

☐ ☐ ☐ ☐ ☐ ☐

Strongly Agree 強烈同意

Pre-fill responses, then click 'Get link'

FC7b: I have the knowledge necessary to use mobile payment systems. 我擁有使用移動支付系統所需的知識。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意

☐ ☐ ☐ ☐ ☐ ☐

Strongly Agree 強烈同意

FC7c: I can get help from others when I have difficulties using mobile payment systems. 當我使用移動支付系統有困難時，我可以向他人尋求幫助。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意

☐ ☐ ☐ ☐ ☐ ☐

Strongly Agree 強烈同意

FC7d: Specialized instructions concerning the use of mobile payment systems are available to me. 我可以獲得有關使用移動支付系統的專門說明。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意

☐ ☐ ☐ ☐ ☐ ☐

Strongly Agree 強烈同意

PT8a: Mobile payment system is trustworthy. 移動支付系統值得信賴。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意

☐ ☐ ☐ ☐ ☐ ☐

Strongly Agree 強烈同意

Pre-fill responses, then click 'Get link'

PT8b: I believe that all the transactions data are confidential. 我相信所有的交易數據都是保密的。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意

☐ ☐ ☐ ☐ ☐ ☐

Strongly Agree 強烈同意

PT8c: I believe that I would get an immediate confirmation message when the transaction is completed. 我相信交易完成後我會立即收到確認消息。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意

☐ ☐ ☐ ☐ ☐ ☐

Strongly Agree 強烈同意

PT8d: I would expect that the mobile payment system to be reliable. 我預期移動支付系統是可靠的。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意

☐ ☐ ☐ ☐ ☐ ☐

Strongly Agree 強烈同意

B19a: Given the opportunity, I will use mobile payments during Covid-19 pandemic. 如果有機會，我將在新冠肺炎大流行期間使用移動支付。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意

☐ ☐ ☐ ☐ ☐ ☐

Strongly Agree 強烈同意

Pre-fill responses, then click 'Get link'

BI9b: I am willing to continuously use mobile payments in the near future during Covid-19 pandemic. 我願意在不久的將來在新冠肺炎大流行期間繼續使用移動支付。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意 ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree 強烈同意

BI9c: I am open to using mobile payments as my main payment method in different transaction processes. 我願意使用移動支付作為我在不同交易過程中的主要支付方式。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意 ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree 強烈同意

BI9d: I intend to continuously use mobile payments in the future. 我打算以後繼續使用移動支付。 *

1 2 3 4 5 6

Strongly Disagree 強烈不同意 ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree 強烈同意

Part 2 第一部分

Demographic Information
基本信息

Pre-fill responses, then click 'Get link'

A: Gender 性別 *

- ☐ Male 男士
- ☐ Female 女士

B: Age 年齡 *

- ☐ Below 20 20 以下
- ☐ 20 - 29
- ☐ 30 - 39
- ☐ 40 - 49
- ☐ 50 - 59
- ☐ 60 - 69
- ☐ 70 or above 70 或以上

C: Education level 教育程度 *

- ☐ Primary School or below 小學或以下
- ☐ Secondary School 中學
- ☐ Diploma 文憑
- ☐ Bachelor Degree 學士
- ☐ Postgraduate or above 研究生或以上

Pre-fill responses, then click 'Get link'

D: Average price range per mobile payment transaction. 每筆移動支付交易的平均價格範圍。*

- ☐ Less than HKD100 少於港幣100元
- ☐ HKD 101 - HKD 200 港幣101元至港幣200元
- ☐ HKD 201 - HKD 500 港幣201元至港幣500元
- ☐ HKD 501 - HKD 1,000 港幣501元至港幣1,000元
- ☐ HKD 1,001 or above 港幣1,001元或以上

E: What type of transactions will I mostly consider for using mobile payment as a payment tool. 使用移動支付作為支付工具時，我主要考慮哪種類型的交易。*

- ☐ Retail (e.g. fashion, beauty, luxury, electronic products, etc.) 零售 (如 服飾, 美容, 奢侈品, 電子用品, 等)
- ☐ Food and Beverage 食品和飲料
- ☐ Entertainment 娛樂
- ☐ Grocery and daily necessities 雜貨和日用品
- ☐ Bills settlement 繳付賬單
- ☐ Transportation 交通
- ☐ Peer-to-peer money transfer 親友轉帳
- ☐ Others 其他

Pre-fill responses, then click 'Get link'

F: Which mobile payment is my main application for transactions. 哪種移動支付是我交易的主要應用程式。 *

- ☐ AlipayHK 支付寶香港
- ☐ WeChat Pay HK 微信支付
- ☐ PayMe
- ☐ Octopus (app version) 八達通 (應用程式版)
- ☐ Tap & go 拍住賞
- ☐ FPS 轉數快
- ☐ Others 其他

The end of the survey. Thank you for your participation! 調查結束。感謝您的參與！

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Google Forms

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Appendix E Target Population

		Population											
		Number ('000)						% of total population					
		2019		2020		2021		2019		2020		2021	
Year	Reference time-point	Mid-year	Year-end	Mid-year	Year-end	Mid-year	Year-end p	Mid-year	Year-end	Mid-year	Year-end	Mid-year	Year-end p
Both sexes	0 - 4	261.5	255.2	246.7	236.6	229.0	221.2	3.5	3.4	3.3	3.2	3.1	3.0
	5 - 9	309.7	307.9	303.1	293.5	289.4	283.1	4.1	4.1	4.1	4.0	3.9	3.8
	10 - 14	281.3	286.4	286.1	291.5	289.4	291.9	3.7	3.8	3.8	3.9	3.9	3.9
	15 - 19	281.6	280.6	270.5	263.1	264.9	277.3	3.8	3.7	3.6	3.5	3.6	3.7
	20 - 24	397.8	381.9	365.8	344.2	326.2	324.0	5.3	5.1	4.9	4.6	4.4	4.4
	25 - 29	490.1	486.4	480.0	465.3	458.4	447.9	6.5	6.5	6.4	6.3	6.2	6.1
	30 - 34	555.7	552.8	546.2	535.9	527.0	519.4	7.4	7.4	7.3	7.2	7.1	7.0
	35 - 39	609.5	608.2	604.4	592.5	587.7	575.1	8.1	8.1	8.1	8.0	7.9	7.8
	40 - 44	572.7	576.9	579.7	583.4	586.6	584.2	7.6	7.7	7.7	7.9	7.9	7.9
	45 - 49	592.9	596.0	591.1	582.3	583.0	576.1	7.9	7.9	7.9	7.8	7.9	7.8
	50 - 54	589.8	578.3	575.9	575.1	575.2	572.6	7.9	7.7	7.7	7.7	7.8	7.7
	55 - 59	652.3	654.5	645.0	633.1	630.9	617.6	8.6	8.6	8.6	8.5	8.5	8.4
	60 - 64	585.5	595.9	605.1	612.9	613.9	614.4	7.8	7.9	8.1	8.3	8.3	8.3
	65 - 69	450.9	459.0	465.9	475.6	492.2	507.7	6.0	6.1	6.2	6.4	6.6	6.9
	70 - 74	310.4	329.2	342.5	359.4	370.8	381.6	4.1	4.4	4.6	4.8	5.0	5.2
	75 - 79	188.3	187.9	184.8	188.2	197.1	209.7	2.5	2.5	2.5	2.5	2.7	2.8
	80 - 84	171.9	171.5	170.1	169.8	165.2	162.6	2.3	2.3	2.3	2.3	2.2	2.2
	>= 85	206.0	211.9	218.1	224.3	226.2	235.6	2.7	2.8	2.9	3.0	3.1	3.2
	All age groups	7 507.9	7 520.5	7 481.0	7 426.7	7 413.1	7 403.1	100.0	100.0	100.0	100.0	100.0	100.0

= 6,340,400

Appendix F Sample Size Calculation

$$\begin{aligned}
 n &= \frac{N \left(\frac{Z}{e} \right)^2 pq}{N - 1 + \left(\frac{Z}{e} \right)^2 pq} \\
 &= \frac{6,340,400 \times \frac{3.8416^2 \times 0.8462 \times 0.1538}{0.0025}}{6,340,599} \\
 &= \frac{1.0000 \times 200}{201} \text{ at least sample size}
 \end{aligned}$$

N	6,340,400	Target Population
Z	1.96	Confidence level 95%
e	5.0%	Type I error
p	0.85	Successful rate from Pilot test (BI9)=22/26
q	0.15	Failure rate