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A Study of the Impact of Cultural Characteristics on Consumers' Behavioral Intention for Mobile Payments: A Comparison between China and Korea

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Abstract: The development and usage of mobile payments, a new type of electronic payment method that is more flexible and convenient compared to traditional payment methods, are uneven across different countries. This indicates that there may be a correlation between cultural characteristics of different countries and consumers' intention to use mobile payments. This study aims to explore whether cultural characteristics have a moderating effect on consumers' behavioral intention to use mobile payments in China and Korea. Based on the technology acceptance model (TAM), this study incorporates Hofstede's five cultural dimensions theory (power distance, individualism–collectivism, uncertainty avoidance, masculinity–femininity) as moderating variables. In total, 306 questionnaires were distributed to Chinese consumers, and 305 questionnaires were distributed to Korean consumers. Structural equation modeling (SEM) was used to test the hypotheses. The study found that both Chinese and Korean consumers perceive usefulness to have a significant impact on their behavioral intention to use mobile payments, and that perceived ease of use also has a significant impact on perceived usefulness. However, there were differences in the models between the two countries, where perceived ease of use has a significant impact on behavioral intention to use mobile payments in China but not in Korea. Regression analysis was conducted on the cultural dimensions as moderators, revealing that uncertainty avoidance has a negative moderating effect on the relationship between perceived ease of use and behavioral intention to use mobile payments. Between-group chi-square difference tests were conducted on the structural equation models for both countries, and the results showed no significant differences in the moderation coefficients for uncertainty avoidance between China and Korea. Finally, based on the findings, recommendations are proposed for the development of mobile payments.

Keywords: mobile payment; behavioral intention; technology acceptance model; national culture; Hofstede's cultural dimensions theory; China; Korea

1. Introduction

With the emergence of the fourth industrial revolution, mobile commerce has become an increasingly popular business model. It relies on mobile communication networks and utilizes mobile communication terminals and devices, such as mobile phones, palmtop computers, and wearable devices, to exchange a range of business information and conduct various activities [1]. As a payment method in people's modern daily lives, mobile payment substantially simplifies the payment process by linking bank cards to mobile phones and utilizing the "electronic wallet" function. Its convenience shortens the communication time between users and businesses, enabling people to obtain information quickly and enjoy an array of services at any time and in any location. From the initial cash payment to the current electronic payment, there have been different stages, such as by bank card payments, credit card payments, online payment, and mobile payments. Compared with

online payment, mobile payment breaks through the limitations of space and time, has incomparable advantages, and is more attractive [2].

According to the 50th Statistical Report on Internet Development in China released by the China Internet Network Information Center (CNNIC), as of June 2022, the number of online payment users in China reached 904 million, an increase of 810,000 compared to December 2021, accounting for 86% of the total netizens. The mobile payment market ranked first in the world for three consecutive years [3]. According to data recently released by the People's Bank of China, in the third quarter of 2022, banks across the country handled a total of 127.637 billion non-cash payment transactions at a value of CNY 1276.1 trillion, representing a year-on-year increase of 6.61% and 15.05%, respectively [4]. According to the survey report on the Usage of Mobile Payment Users in 2022 in the China Payment and Clearing Association, individuals aged 18–40 are the main mobile payment users, and older user groups are steadily increasing. Moreover, the penetration rate of mobile payment in various scenarios has been further improved, with rates of 96.9%, 76.3%, and 68.5% in the food and beverage, transportation, and people's livelihood service scenarios, respectively. Medical health has become one of the most common scenarios [5]. With the rapid development of next-generation information technologies such as artificial intelligence, big data, and 5G, as well as the continuous integration of digital technology and inclusive finance, China's current use of mobile payment services has vast market potential.

At present, in Korea, due to the rapid expansion of the mobile payment market after the spread of the COVID-19 pandemic, the average daily usage amount of convenient payment services that use smartphones such as Kakao Pay and Samsung Pay has exceeded KRW 700 billion. According to the statistics of the Bank of Korea, the average daily usage of mobile payment services in the first half of 2022 was KRW 723.2 billion. Compared with 2016, the amount has increased by nearly 30 times. The use of mobile payments has increased by more than 10% every 6 months since 2020 [6]. According to data from the Kakao Pay prospectus, the number of annual active users of Kakao Pay jumped from 15.1 million in 2018 to 28.3 million in June 2021, which means that 6 out of every 10 Koreans are using it [7]. According to the app and retail analytics service Wise App/Retail/Goods, Samsung Pay had 15.77 million users in November, an increase of 750,000 over the same period last year. This also means that most smartphone users in Korea are using Samsung Pay. In addition to Samsung Pay, there is Shinhan pay, KB Pay, NH Pay, Naver Pay, KakaoPay, PayCo, and other services. In Korea, mobile payment services also have positive prospects [8]. According to the Hankyung News Agency in February 2023, the Korean Financial Services Commission will open Apple Pay, a non-contact payment method based on NFC, in the first half of 2023 [9]. Korea's mobile payment business is also developing rapidly.

Due to the different economic models, political systems, and cultural backgrounds of the two countries, their mainstream payment methods are distinct. In China, mobile payment has become the dominant payment method, with credit cards being used for a large number of prepayments and also in some other cases and cash being almost eliminated. In Korea, credit cards are the mainstream payment method for various daily situations, such as transportation, dining, and shopping. As a result, people's willingness to use mobile payment services varies in different national and cultural contexts. According to the FinTech 2021 Digital Payments report released by Statista, China had the world's largest digital payment market in 2020, with a digital payment scale of USD 2496.5 billion, accounting for 45.6% of the market. The United States was the second-largest market, with USD 1035.4 billion in digital payments, accounting for 18.915% of the market. In 2020, Europe's digital payment market was worth USD 919.8 billion, accounting for 16.80% of the global total, while other regions constituted only 18.68% [10]. From a global perspective, the development of mobile payment services is extremely uneven, indicating a specific connection between national culture and consumers' willingness to use mobile payment services. Therefore, this study aims to investigate the relationship between cultural characteristics and willingness to use mobile payment from consumers' personal perspectives.

This study conducted a survey on Chinese and Korean consumers by using Davis's technology acceptance model (TAM) questionnaire and Dorman and Howell's 1988 cultural dimension questionnaire. Descriptive statistics were analyzed by using the SPSS software, and strict translation and reliability and validity tests were conducted on both questionnaires.

The significance of this study lies in the fact that the technology acceptance model (TAM) is a fundamental theory in the field of information systems that studies the acceptance and adoption of information technology by individual users. It has been successfully applied to new information system applications such as online shopping, e-commerce, and virtual reality. In particular, for mobile payments, biometric technologies such as facial recognition and palm recognition are also applied to the new interactive mode of mobile payments. This study introduces cultural dimension theory as a moderating variable into the model and empirically verifies the impact of cultural factors on consumers' intentions to use mobile payments in different national contexts. In previous studies, research on Chinese and Korean consumers' intentions to use mobile payments was conducted mainly from the perspective of individual characteristics. The innovation of this study lies in the introduction of Hofstede's cultural dimension theory while studying consumers' personal characteristics, using cultural factors as moderating variables, attempting to explore the differences in behavioral intention for mobile payment between China and South Korea, and calculating the differences in the moderation coefficients for the two countries, respectively, in order to better compare China and South Korea. In most studies on the impact of national cultural characteristics on consumers' behavioral intention for mobile payments, most scholars studied the dimension of uncertainty avoidance only in Hofstede's cultural five dimensions and did not consider power distance, individualism–collectivism, and masculine–feminine qualities as variables to be studied. A country's culture is inseparable. In the increasingly closely connected world, providing theoretical basis for developing targeted marketing strategies for consumers with different cultural backgrounds has strong application significance for the promotion and popularization of mobile payment business.

2. Literature Review

2.1. Theoretical Model and Research Hypothesis

The technology acceptance model (TAM) is a model proposed by Davis in 1989, when he studied users' acceptance of information systems based on rational behavior theory. The original purpose of putting forward TAM was to explain the decisive factors of computer wide acceptance. TAM introduces two main determinants:

Perceived usefulness reflects the degree to which a person thinks that using a specific system will improve his work performance.

Perceived ease of use reflects the degree to which a person thinks it is easy to use a specific system [11].

Since its inception, the TAM model has been widely used by scholars to investigate users' adoption intentions of emerging technologies in conjunction with other models. Wei Quan et al. applied the model to explore Chinese and Korean consumers' perceptions of three payment methods (mobile, traditional, and cryptocurrency) in international hotels. The results indicated that Chinese and Korean consumers' perceptions of usefulness, ease of use, and security varied depending on the payment method [12]. Numerous studies have also shown that perceived usefulness and perceived ease of use have a positive impact on users' adoption of mobile payment services. Recent studies on the adoption of mobile payment technology by the elderly have also utilized the TAM model [13–22]. Bohan Zhang, Yang, C.C., and Liyuan Bao found that older adults' perceived value of mobile technology positively influenced performance expectations, effort expectations, self-efficacy, subjective norms, attitudes, and willingness to adopt the technology [23–25]. There has also been a substantial amount of research on payment-related services such as password-free payment, online banking, and NFC technology. Haruthai Kasemharuethaisuk and Taweesak Samanchuen found that the adoption of digital investment services by Thai

mutual fund distributors was significantly influenced by their perception of usefulness but not by their perception of ease of use [26]. Mohammed Amin Almaiah's research showed that perceived ease of use had a negative impact on perceived confidence and perceived trust in using NFC for digital payments [27]. Chenglong Li et al. found that trust in both facial recognition technology payment service providers and facial recognition technology itself would affect continued use intentions [28]. Yongping Zhong's study demonstrated that perceived usefulness, perceived ease of use, and service security would influence the perceived value and user satisfaction of using contactless payment [29]. Similarly, based on empirical research on mobile payment, Schierz, Schilke, and Wirtz confirmed that perceived ease of use has a significant positive impact on attitude and perceived usefulness, which, in turn, affects usage intention [15]. Based on this, the following hypotheses are proposed:

H1. *Perceived usefulness positively affects behavioral intention for mobile payments.*

H2. *Perceived ease of use positively affects behavioral intention for mobile payments.*

H3. *For mobile payment services, perceived ease of use positively affects perceived usefulness.*

However, some studies have shown that the TAM model may have certain boundary conditions. Cardon and Bryan (2008) point out that culture is among the factors that must be taken into account when examining the adoption of information technology, and it is the most difficult to distinguish, identify, and measure [30]. Therefore, future TAM research should consider cultural factors and include samples from various countries and ethnicities for cross-cultural studies.

The Cultural Dimensions Theory is a framework proposed by the Dutch psychologist Geert Hofstede to measure cultural differences between different countries. Hofstede believes that culture is a psychological process shared by people in an environment that distinguishes one group of people from another. Based on research, he has summarized the differences between cultures into five basic dimensions of cultural values [31].

Power distance refers to the degree of acceptance of people with low status in a particular culture due to the unequal distribution of power in that society or organization. This parameter varies substantially due to the fact that different nations have diverse conceptions of power. Previous studies have not directly indicated that power distance has a relevant effect on the adoption of mobile payment [32]. However, it has a great influence on consumers' attention to service quality [33], degree of trust, impulse purchase [34], price sensitivity, and purchase of luxury jewelry [35–37]. Based on this, the following hypotheses are proposed:

H4. *Power distance has a positive moderating effect on the relationship between perceived usefulness and intention to use mobile payments.*

H5. *Power distance has a positive moderating effect on the relationship between perceived ease of use and behavioral intention for mobile payments.*

Uncertainty avoidance refers to whether a society is threatened by uncertain events and unconventional environments and uses formal channels to avoid and control uncertainty [31]. Many studies directly show that this dimension has a significant impact on mobile payments [38–43]. In addition, many studies have verified that uncertainty avoidance has a considerable effect on the adoption of e-commerce [44–46]. Based on this, the following hypotheses are proposed:

H6. *Uncertainty avoidance has a negative moderating effect on the relationship between perceived usefulness and behavioral intention for mobile payments.*

H7. *Uncertainty avoidance has a negative moderating effect on the relationship between perceived ease of use and behavioral intention for mobile payments.*

The dimension of individualism versus collectivism measures whether a society as a whole values individual interests or collective interests [31]. Research shows that

individualism–collectivism has a significant moderating effect on the adoption of mobile commerce in terms of personal values [47].

H8. *Individualism versus collectivism has a positive moderating effect on the relationship between perceived usefulness and behavioral intention for mobile payments.*

H9. *Individualism versus collectivism has a positive moderating effect on the relationship between perceived ease of use and behavioral intention for mobile payments.*

Masculinity versus femininity depends mainly on whether a society emphasizes typical male qualities, such as competitiveness and arbitrariness, or typical female qualities, such as modesty and concern for others, and defines the roles of men and women [31]. Previous studies have shown that this dimension is affected mostly by product image and product perception in the field of consumption [48,49]. Based on this, the following hypotheses are proposed:

H10. *Masculine versus feminine temperament has a positive moderating effect on the relationship between perceived usefulness and behavioral intention for mobile payments.*

H11. *Masculine versus feminine temperament has a positive moderating effect on the relationship between perceived ease of use and behavioral intention for mobile payments.*

Long-term versus short-term refers to the degree to which members of a particular culture can accept delaying the satisfaction of their material, emotional, and social needs [31]. There are few studies on this dimension in the field of mobile payments. In the research on consumption, Pei Wang and Yuqing Zhao verified that it has a long-term orientation with regard to regulating forced purchase. People with a high long-term orientation may be less likely to make forced purchases [50]. Therefore, this cultural dimension is not used to analyze the Moderating effect.

2.2. Research Model

Based on the above, this research model is proposed, as shown in Figure 1.
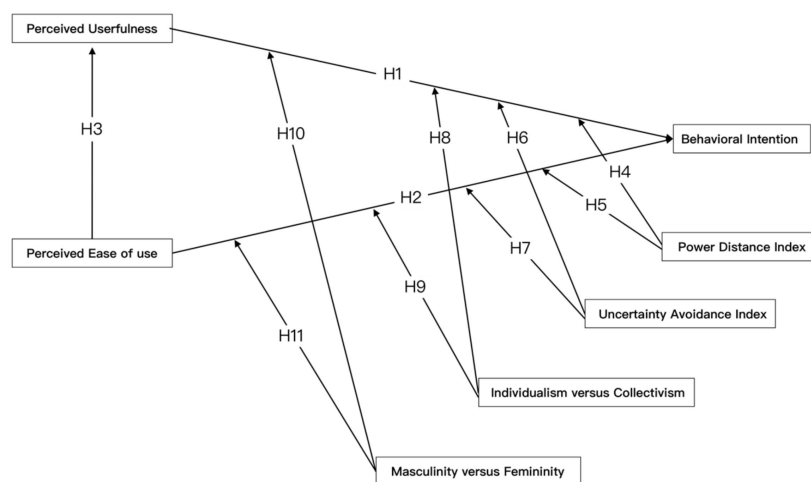
Figure 1. Research model.

The hypothetical model of this study includes variables such as behavioral intention, perceived usefulness, perceived ease of use, power distance, uncertainty avoidance, individualism versus collectivism, and masculinity versus femininity, among which power distance, uncertainty avoidance, individualism versus collectivism, and masculinity versus femininity are moderating variables. The definitions of each variable are provided in Table 1.

Table 1. Definition of each variable.

Variable	Operation Definition	Source
Behavioral intention	The intensity of consumers' behavioral intentions for using mobile payment services	Davis (1989) [11]
Perceived usefulness	The degree to which consumers believe that using mobile payment services can help them improve their performance	Davis (1989) [11]
Perceived ease of use	How easy it is for consumers to learn to use and operate mobile payment services	Davis (1989) [11]
Power distance	The degree to which people of low status in a society accept the unequal distribution of power in a society or organization.	Geert Hofstede (2001) [31]
Uncertainty avoidance	Whether a society avoids and controls uncertainty through formal channels when it is threatened by uncertain events and unconventional environments.	Geert Hofstede (2001) [31]
Individualism versus collectivism	Whether a society as a whole pays attention to the interests of individuals or the interests of the collective.	Geert Hofstede (2001) [31]
Masculinity versus femininity	Whether a certain society represents male qualities such as competitiveness and assertiveness, or female qualities such as humility and caring for others, as well as the definition of male and female functions.	Geert Hofstede (2001) [31]

3. Research Design and Methodology

3.1. Questionnaire Collection

In this study, data were collected in the form of questionnaires, which can be divided into three parts. The first part investigates the mainstream payment methods and payment scenarios in the two countries. The second part examines the information related to mobile payments, including the measurement items for each model variable and cultural dimension in the mobile payment service. The third part investigated information on demographic variables, including gender, age, education level, and occupation.

The questionnaire includes scales derived from Davis' TAM Scale of Technical Acceptance Model and Dorman and Howell's 1988 Scale of Cultural Dimension. There are 13 items measured by structural equation modeling and 20 items measured by cultural variables, all of which are scored on a 7-point Likert scale ranging from "1 very disagree" to "7 very agree" based on the internationally accepted Richter Scale. Respondents are asked to rate each item on a scale of "very disagree", "disagree", "a little disagree", "indifferent", "a little agree", "agree", and "very agree", corresponding to scores of 1 to 7, respectively.

The questionnaire was distributed by using a simple random sampling technique in Beijing, China, and Seoul, South Korea. The Chinese questionnaire was collected through the "Wenjuanxing" online platform from 2 November to 30 December 2022, with 338 questionnaires collected and 32 invalid questionnaires removed, resulting in a total of 306 valid questionnaires. The South Korean questionnaire was collected through the "Pickply platform from 20 December 2022 to 23 January 2023, with 329 questionnaires collected and 24 invalid questionnaires removed, resulting in a total of 305 valid questionnaires. Both the Chinese and South Korean questionnaires were designed for people who had experience using mobile payments, so the survey samples consisted of people who had used mobile payments before. The survey sample statistics are shown in Table 2. This study primarily used the structural equation modeling (SEM) method, combined with confirmatory factor analysis, hierarchy and regression analysis, and other statistical methods to analyze the data and validate the model hypothesis. The statistical tools used were SPSS 26.0 (SPSS Statistics) and AMOS 26.0".

Table 2. Questionnaire collection.

Item	China		Korea	
	Number	**Percentage**	**Number**	**Percentage**
Valid questionnaire	306	90.53%	305	92.70%
Invalid questionnaire	32	9.47%	24	7.30%
Total	338	100%	329	100%

3.2. Sample Population Distribution

The sample distribution of this study is shown in Table 3, and the information includes nationality, gender, age, and occupation.

Table 3. Sample characteristics.

Item		China		Korea	
		Number	**Percentage**	**Number**	**Percentage**
Sex	Male	170	55.55%	163	53.44%
	Female	136	44.45%	142	46.56%
Age (years)	Below 20	8	2.61%	6	2.70%
	20–29	113	36.93%	112	35.80%
	30–39	137	44.77%	107	34.40%
	40–49	30	9.80%	59	18.80%
	50–59	12	3.92%	19	6.70%
	Over 60	6	1.96%	5	1.50%
Occupation	Student	19	6.21%	73	23.40%
	Manual worker	19	6.21%	40	13.40%
	Office worker	109	35.62%	93	29.50%
	Professional, skilled worker	42	13.73%	51	16.40%
	Researcher	81	26.47%	15	5.50%
	Manager of one or more subordinates (non-managers)	28	9.15%	24	8.20%
	Senior manager of one or more subordinates (managers)	8	2.61%	9	3.60%
Education	Below high-school graduation	73	23.86%	42	15.20%
	Graduation	218	71.24%	234	73.60%
	Master's degree and above	15	4.90%	29	11.20%
Total		306	100%	305	100%

According to the information in Table 2, the sample sizes of both China and Korea consisted of approximately 55% males and 45% females. The ages of the respondents in the Chinese sample were concentrated mainly between 20 and 39 years old, accounting for 81.7% of the total, while the ages of respondents in the Korean sample were concentrated between 20 and 49 years old, accounting for 89.1% of the total, with both countries' samples composed predominantly of young adults. In terms of occupation, the positions of individuals in the Chinese sample were concentrated in office workers, researchers, and technical professionals, accounting for 75.82% of the total, while in Korea, students, office workers, and technical professionals were the majority, accounting for 69.3% of the total. In terms of academic qualifications, the samples from China and Korea were concentrated in undergraduate graduates and those who had received a good education.

3.3. China and Korea Payment Information Survey

In the investigation stage of payment methods and consumption in various countries, statistics were compiled on all payment methods and corresponding consumption scenarios in China and Korea. As shown in Tables 4 and 5, the most commonly used payment methods in China are mobile payment, mainly including WeChat, Alipay, and China

Unionpay Quick Pass applications, accounting for 70.59%, followed by credit cards or debit cards, accounting for 67.97%. The most commonly used payment method in Korea is credit card, accounting for 71.10% of the total, followed by mobile payment, accounting for 43.20% of the total, including KakaoPay, Zero Pay, Naver Pay, and other applications. In terms of consumption scenarios, the frequency of shopping mall, online shopping, and transportation expenses in China ranks first, second, and third. In Korea, the most frequent consumption scene is the vegetable market, followed by the convenience store and large supermarket.

Table 4. Chinese consumers' choice of payment method.

Item		Payment Method		
		Cash	Mobile Pay	Card
Most used	Number	31	216	59
payment method	Percentage	10.13%	70.59%	19.28%
Second preferred	Number	68	30	208
payment method	Percentage	22.22%	9.80%	67.97%

Table 5. Korean consumers' choice of payment method.

Item		Payment Method			
		Cash	Mobile Pay	Card	Money Transfer
Most used payment method	Number	7	74	224	0
	Percentage	2.10%	26.70%	71.10%	0.00%
Second preferred payment method	Number	57	142	83	23
	Percentage	18.50%	46.50%	26.70%	8.25%

3.4. Questionnaire Reliability

In this study, the reliability of the questionnaire was tested by using SPSS.26. The first part of the questionnaire measurement concerns user perception. The Cronbach's Alpha value of the questionnaire in China is 0.886, which is greater than 0.7, indicating good overall reliability. In Korea, the Cronbach's Alpha value of some questionnaires is 0.933, which is also greater than 0.7, indicating good overall reliability. The second part of the questionnaire measures cultural dimensions. The Cronbach's Alpha value of the questionnaire in China is 0.862, which is greater than 0.7, indicating good overall reliability. In Korea, the Cronbach's Alpha value of some questionnaires is 0.874, which is also greater than 0.7, indicating good overall reliability. The test results of subscales in the two countries are shown in Table 8.

3.5. Questionnaire Validity

In this study, we used Amos 26.0 to conduct confirmatory factor analysis (CFA) in order to test the validity of the questionnaire. Prior to conducting CFA, we used SPSS to perform the Kaiser–Meyer–Olkin (KMO) test and Bartlett's sphericity test. The specific values for China and Korea are presented in Table 6. The KMO values for all variables in both China and Korea were greater than 0.7, and the significance level of the Bartlett's sphericity test was less than 0.05, indicating that both questionnaires were suitable for factor analysis.

Table 6. KMO and Bartlett's spherical test for Chinese and Korean samples.

| Variable | KMO | | Bartlett Spherical Test | | | | | |
| | | | Approx. Chi-Square | | df | | Sig. | |
	China	Korea	China	Korea	China	Korea	China	Korea
Behavioral intention	0.826	0.804	513.251	738.674	6	6	0.00	0.00
Perceived usefulness	0.89	0.842	845.837	648.519	10	10	0.00	0.00
Perceived ease of use	0.839	0.843	648.157	732.218	6	6	0.00	0.00
Power distance	0.88	0.821	704.538	788.291	10	10	0.00	0.00
Uncertainty avoidance	0.873	0.829	609.443	477.315	10	10	0.00	0.00
Individualism versus collectivism	0.877	0.847	663.604	707.686	10	10	0.00	0.00
Masculinity versus femininity	0.874	0.866	615.069	986.554	10	10	0.00	0.00

Subsequently, Amos 26.0 was used for confirmatory factor analysis and was divided into three validities: structure, aggregation, and discrimination. The structural validity of China and Korea is shown in Table 7. As shown in Table 7, the chi-square value of China and Korea are 98.570 and 174.810. The X2/df values of China and Korea are 1.59 and 2.82, respectively; thus both are <3, and the fit is ideal. The RMSEA values of China are 0.044, <0.05, and the fit is ideal; the RMSEA values of Korea are 0.077, <0.08, and the fit is acceptable. The NFI of China and Korea were 0.957 and 0.935, respectively; thus, both are >0.9, and the results are well fitted. The IFI of China and Korea are 0.983 and 0.957, respectively; thus, both are >0.9, and the results are well fitted. The CFI of China and Korea are 0.938 and 0.957, respectively; thus, both are >0.9, and the results are well fitted. The RFI of China and Korea are 0.945 and 0.919, respectively; thus, both are >0.9, and the results are well fitted. The TLI of China and Korea are 0.979 and 0.946, respectively; thus, both are >0.9, and the results are well fitted. The GFI of China and Korea are 0.954 and 0.919, respectively; thus, both are >0.9, and the results are well fitted. Overall, the overall model of using behavioral intention (BI), perceived usefulness (PU), and perceived ease of use (PEOU) is well fitted.

Table 7. Overall fit coefficients for China and South Korea.

	CMIN	X2/df	RMSEA	NFI	IFI	CFI	RFI	TLI	GFI
China	98.570	1.59	0.044	0.957	0.983	0.938	0.945	0.979	0.954
Korea	174.810	2.82	0.077	0.935	0.957	0.957	0.919	0.946	0.919

The aggregation validity of China and Korea is shown in Table 8. The factor loadings of each latent variable of BI, PU, PEOU, PDI, UAI, IVC, and MVC corresponding to each topic are >0.5, indicating that each latent variable has a high level of representativeness corresponding to the topic. In addition, the average variance extracted (AVE) of each latent variable is >0.5, and the composite reliability (CR) is >0.8, which demonstrates that the aggregation validity is ideal.

Table 8. Factor loading coefficients and Cronbach's α value for China and Korea.

Country	Measurements	Estimate	AVE	CR	Cronbach's α	
	BI1	0.78				
	BI2	0.808				
	BI3	0.737	0.595	0.854	0.855	
	BI4	0.758				
	PU1	0.837				
	PU2	0.776				
	PU3	0.793	0.635	0.897	0.897	0.886
	PU4	0.776				
	PU5	0.802				

Table 8. *Cont.*

Country	Measurements	Estimate	AVE	CR	Cronbach's α	
China	PEOU1	0.8	0.658	0.885	0.885	
	PEOU2	0.83				
	PEOU3	0.78				
	PEOU4	0.833				
	PDI1	0.773	0.586	0.876	0.876	
	PDI2	0.775				
	PDI3	0.773				
	PDI4	0.75				
	PDI5	0.755				
	UAI1	0.759	0.547	0.858	0.858	
	UAI2	0.71				
	UAI3	0.75				
	UAI4	0.744				
	UAI5	0.734				0.862
	IVC1	0.789	0.569	0.868	0.868	
	IVC2	0.739				
	IVC3	0.747				
	IVC4	0.781				
	IVC5	0.714				
	MVC1	0.718	0.549	0.859	0.859	
	MVC2	0.763				
	MVC3	0.777				
	MVC4	0.723				
	MVC5	0.723				
Korea	BI1	0.784	0.679	0.894	0.893	
	BI2	0.845				
	BI3	0.871				
	BI4	0.791				
	PU1	0.822	0.545	0.856	0.858	0.933
	PU2	0.618				
	PU3	0.775				
	PU4	0.715				
	PU5	0.744				
	PEOU1	0.841	0.689	0.898	0.896	
	PEOU2	0.872				
	PEOU3	0.858				
	PEOU4	0.742				
	PDI1	0.726	0.576	0.868	0.862	
	PDI2	0.736				
	PDI3	0.873				
	PDI4	0.89				
	PDI5	0.506				
	UAI1	0.741	0.555	0.861	0.815	
	UAI2	0.724				
	UAI3	0.814				
	UAI4	0.691				
	UAI5	0.748				0.874
	IVC1	0.614	0.571	0.868	0.866	
	IVC2	0.777				
	IVC3	0.796				
	IVC4	0.787				
	IVC5	0.787				
	MVC1	0.844	0.665	0.908	0.907	
	MVC2	0.83				
	MVC3	0.847				
	MVC4	0.846				
	MVC5	0.699				

As shown in Table 9, there is a significant correlation among BI, PU, and PEOU ($p < 0.01$). In addition, the absolute values of correlation coefficients are all less than the corresponding AVE square root, which means that there is a certain correlation among the

latent variables and a certain degree of discrimination between them. Thus, the discrimination validity of the scale data is ideal.

Table 9. Discriminant validity between China and Korea.

		BI	**PU**	**PEOU**
	BI	0.584		
China	PU	0.119 ***	0.246	
	PEOU	0.127 ***	0.107 ***	0.503
	AVE square root	0.764	0.496	0.709
		BI	PU	PEOU
	BI	0.679		
Korea	PU	0.764 ***	0.545	
	PEOU	0.563 ***	0.653 ***	0.689
	AVE square root	0.824	0.738	0.830

*** p-value < 0.01; the diagonal line is the AVE evaluation variance extraction amount.

3.6. Comparison of Chinese and Korean National Cultures

In summary, some questionnaires in China and some questionnaires in Korea were well adapted in both reliability and validity. Thus, according to the data obtained from the questionnaire, a cultural comparison between China and Korea was carried out. Ac-cording to descriptive statistical analysis, as shown from the mean value of the statistics in Table 10, China and Korea are basically equal in the dimension of power distance. In the dimension of uncertainty avoidance, Korea is higher than China; in the dimension of individualism and collectivism, China is higher than Korea. Moreover, in the dimension of masculinity versus femininity, China is higher than Korea, which shows that the countries' cultures have obvious differences in the other three dimensions, except for power distance, which is consistent with Hofstede's statistical results.

Table 10. Descriptive statistics of cultural dimensions in China and Korea.

	Country	Statistics	Question 1	Question 2	Question 3	Question 4	Question 5	Mean Value
Power distance	China	Mean value	3.25	3.06	3.15	2.96	2.85	3.054
		Standard deviation	1.449	1.478	1.51	1.496	1.483	
	Korea	Mean value	3.22	3.27	2.68	2.67	3.82	3.132
		Standard deviation	1.913	1.771	1.887	1.794	1.896	
Uncertainty avoidance	China	Mean value	4.64	4.82	4.74	4.92	5.01	4.826
		Standard deviation	1.685	1.668	1.647	1.653	1.654	
	Korea	Mean value	5.18	5.34	5.35	5.28	5.55	5.34
		Standard deviation	1.436	1.187	1.297	1.276	1.264	
Individualism versus collectivism	China	Mean value	5.13	5.33	5.23	5.43	5.53	5.334
		Standard deviation	1.458	1.455	1.482	1.454	1.408	
	Korea	Mean value	4.1	4.2	4.11	3.89	3.41	3.942
		Standard deviation	1.54	1.54	1.608	1.572	1.68	
Masculinity versus femininity	China	Mean value	4.87	5.07	4.97	5.17	5.27	5.07
		Standard deviation	1.484	1.514	1.455	1.483	1.43	
	Korea	Mean value	3.01	3.13	3.16	3.28	3.57	3.23
		Standard deviation	1.827	1.886	1.851	1.806	1.892	

3.7. Validating Model Assumptions

In this study, Amos 26.0 and SPSS 26.0 were used to verify the path hypotheses in the research model. Firstly, the relationship between dependent variables and independent variables was verified in China and Korea via structural equation modeling, and then, the moderating effect in the research model was verified by the SPSS 26.0 layer and regression method to analyze whether the cultural variables have a significant moderating effect on each path.

There are 31 variables in this research model, and the China model and the Korea model developed by Amos software are shown in Figures 2 and 3.
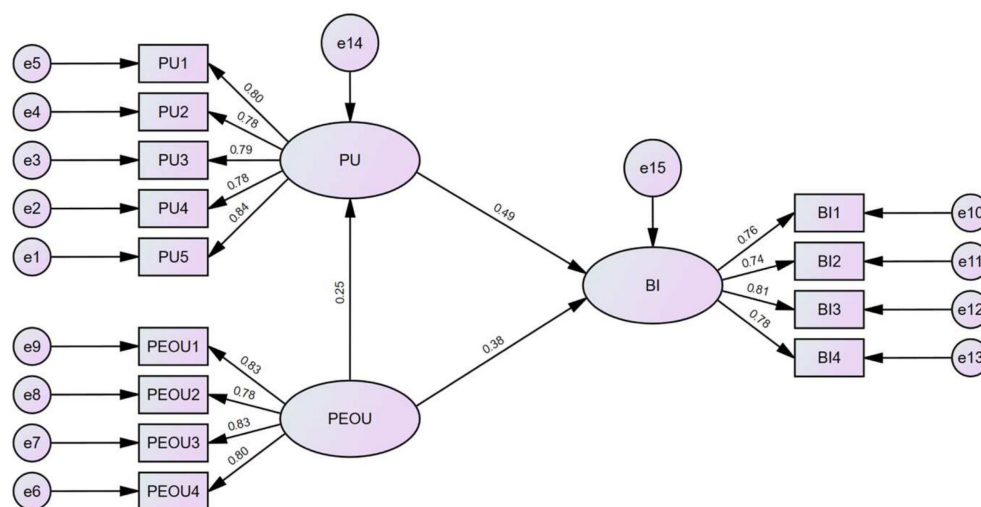

Figure 2. Structural equation model of mobile payment in China.
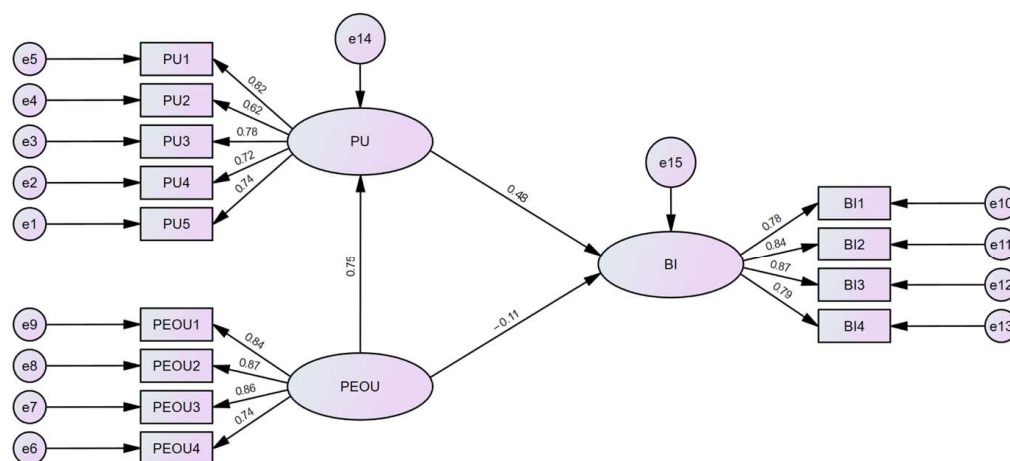

Figure 3. Structural equation model of mobile payment in Korea.

Without considering the adjustment variables, the significant relationship among the variables of the Chinese consumer mobile payment model is shown in Table 11. According to the processing results of structural equations, the hypotheses of this study are verified, as shown in Table 12.

Table 11. Significant relationship among individual variables in Chinese samples.

Path	Estimate	S.E.	C.R.	*p*	Significant Difference
PU ← PEOU	0.222	0.058	3.842	***	Significant
BI ← PU	0.482	0.06	7.974	***	Significant
BI ← PEOU	0.339	0.053	6.421	***	Significant

*** *p*-value < 0.01.

Table 12. Assumptions of the Chinese consumers' mobile payment acceptance model.

Hypothesis of the Mobile Payment Acceptance Model of Chinese Consumers	Verification Result
H1: Perceived usefulness positively affects behavioral intention for mobile payments.	True
H2: Perceived ease of use positively affects behavioral intention for mobile payments.	True
H3: For mobile payment services, perceived ease of use positively affects perceived usefulness.	True

Finally, as established through the modified Chinese consumer mobile payment acceptance model, perceived usefulness and perceived ease of use have a significant impact on behavioral intention, while perceived ease of use also has a positive impact on perceived usefulness (Figure 4).
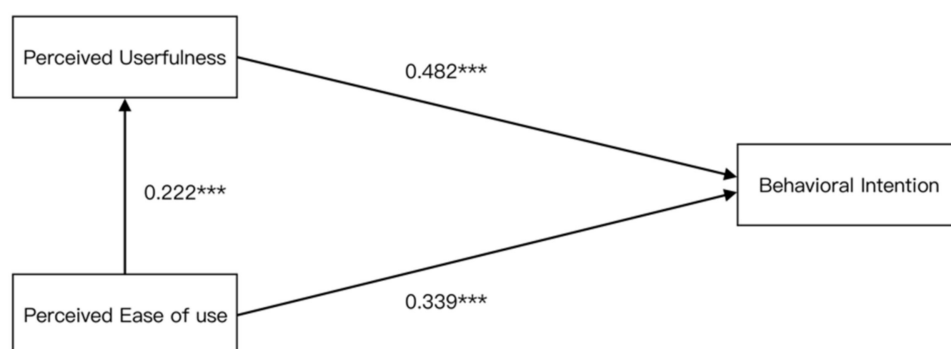
Figure 4. Modified model of Chinese consumers' mobile payment acceptance. *** *p*-value < 0.01.

Without consideration for the adjustment variables, the significant relationship among the variables of the Korean consumer mobile payment model is shown in Table 13. According to the processing results of the structural equations, the hypotheses of this study are verified, as shown in Table 14.

Table 13. Significant relationship between individual variables in Korean samples.

Path	Estimate	S.E.	C.R.	*p*	Significance
PU ← PEOU	0.736	0.071	10.352	***	Significant
BI ← PU	0.486	0.031	9.814	***	Significant
BI ← PEOU	−0.118	0.08	−1.468	0.142 > 0.05	Non-significant

*** *p*-value < 0.01.

Table 14. Assumptions of the Korean consumer mobile payment acceptance model.

Hypothesis of Korean Consumers' Mobile Payment Acceptance Model	Verification Result
H1: Perceived usefulness positively affects behavior intention for mobile payments.	True
H2: Perceived ease of use positively affects behavior intention for mobile payments.	False
H3: For mobile payment services, perceived ease of use positively affects perceived usefulness.	True

Finally, as established through the modified Korean consumer mobile payment acceptance model, perceived usefulness has a significant impact on user's behavioral intention, perceived ease of use has a significant impact on perceived usefulness, and perceived ease of use has no significant impact on users' behavioral intention (Figure 5).
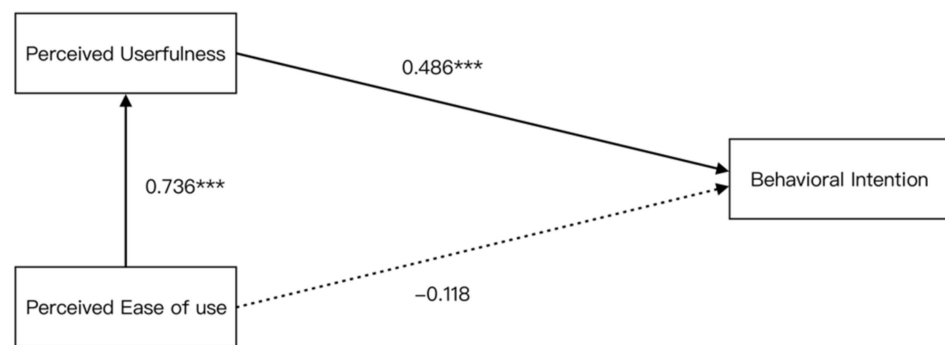
Figure 5. Korean consumer mobile payment acceptance correction model. *** *p*-value < 0.01.

According to the research results of consumer mobile payment acceptance models in China and Korea, which are presented in Table 15, perceived ease of use in Chinese consumers' mobile payment acceptance model has a positive influence on their behavioral intention. In the Korean model, perceived ease of use does not have a significant influence on behavioral intention, and there are also obvious differences in the relationship coefficients between the two other paths. Based on this comparative study of Chinese and Korean cultures, it can be inferred that there are significant differences in uncertainty avoidance, individualism versus collectivism, and masculinity versus femininity between the two countries. Therefore, it can be speculated that cultural variables may play a role in the model, but data are still needed to prove the hypothesis of regulatory effectiveness.

Table 15. Comparison of the mobile payment acceptance models between Chinese and Korean Consumers.

Relationship between Variables	Chinese Model Estimate (Standardized)	Korean Model Estimate (Standardized)
PU ← PEOU Perceived ease of use affects perceived usefulness	0.222 ***	0.736 ***
BI ← PU Perceived usefulness affects behavioral intention	0.482 ***	0.486 ***
BI ← PEOU Perceived ease of use affects behavioral intention	0.339 ***	−0.118 (non-significant)

*** *p*-value < 0.01.

3.8. Cultural Variable Moderation Effect Test

This study used SPSS hierarchical regression to verify the regulatory effect of cultural variables. When testing the moderating effect, it is essential to consider whether there is serious multi-collinearity in the data. The first step is to standardize the data to reduce its multi-collinearity. This involves calculating the mean value of each variable, subtracting the mean value from the variable score, and obtaining standardized data. The second step is to calculate the interactive items of the standardized independent and moderating variables. This is achieved by multiplying the standardized data of the independent variables and moderating variables to obtain the data of the interactive terms. The third step is to confirm the control variables and perform hierarchical regression. After obtaining the final result, the significance level of the interaction coefficient between the standardized independent variable and the moderator must be checked. If the value is <0.05, the moderating effect is significant. If the standardized coefficient is positive, the influence of the moderating variable on the independent variable to the dependent variable is positive. If the standardized coefficient is negative, the influence of the moderating variable on the independent variable to the dependent variable is negative (Table 16).

**Table 16.** Coefficients of moderating effects of cultural characteristics on each path.

Model		Non-Normalized Coefficient		Standard Coefficient	t	Sig.
		B	**Standard Error**	**Trial Version**		
H4	z Perceived usefulness x Power distance	−0.001	0.035	−0.002	−0.037	0.971
H5	z Perceived ease of use x Power distance	0.035	0.035	0.058	1.005	0.316
H6	z Perceived usefulness x Uncertainty avoidance	−0.026	0.037	−0.041	−0.041	−0.709
H7	z Perceived ease of use x Uncertainty avoidance	−0.077	0.035	−0.129	−2.199	0.029
H8	z Perceived usefulness x Individualism versus collectivism	−0.036	0.034	−0.056	−1.06	0.29
H9	z Perceived ease of use x Individualism versus collectivism	−0.038	0.033	−0.068	−1.158	0.248
H10	z Perceived usefulness x Masculinity versus femininity	−0.047	0.035	−0.066	−1.376	0.17
H11	z Perceived ease of use x Masculinity versus femininity	−0.027	0.031	−0.046	−0.85	0.396

This paragraph presents the results of the study on the moderating effect of cultural characteristics on the relationship between perceived usefulness, perceived ease of use, and behavioral intention toward mobile payment. Firstly, based on the significance test of the interaction coefficients between power distance and perceived usefulness, as well as perceived ease of use, it was concluded that power distance did not have a significant moderating effect, and thus, hypotheses H4 and H5 were not supported. Secondly, the study examined the moderating effect of uncertainty avoidance on the relationship between perceived usefulness, perceived ease of use, and behavioral intention toward mobile payment and found that uncertainty avoidance did not have a significant moderating effect on the relationship between perceived ease of use and behavioral intention but did have a significant moderating effect on the relationship between perceived usefulness and behavioral intention. Therefore, hypothesis H6 was not supported, while H7 was supported. Next, the study examined the moderating effect of individualism and collectivism on the relationship between perceived usefulness, perceived ease of use, and behavioral intention toward mobile payment and found that neither individualism nor collectivism had a significant moderating effect. Hence, hypotheses H8 and H9 were not supported. Finally, the study examined the moderating effect of masculinity and femininity on the relationship between perceived usefulness, perceived ease of use, and behavioral intention toward mobile payment and found that neither masculinity nor femininity had a significant moderating effect. Therefore, hypotheses H10 and H11 were not supported. Table 17 shows whether the related assumptions based on the moderating effect of this cultural variable are true, and the uncertainty avoidance index of Korea is higher than that of China according to the measurement and calculation mentioned above. Uncertainty avoidance can regulate the relationship between perceived ease of use and behavioral intention for mobile payment, and the direction is negative. That is to say, when the uncertainty avoidance index is higher, perceived ease of use has less influence on the behavioral intention for mobile payment. Therefore, it is verified that perceived ease of use has a positive influence on behavioral intention in the Chinese mobile payment acceptance model, while perceived ease of use has no significant influence on behavioral intention in the Korean model.

In the previous research stage, hypothesis H7 was confirmed, which states that uncertainty avoidance has a negative moderating effect on the relationship between perceived ease of use and perceived usefulness in both Korea and China. Next, we will use the Between-group chi-square difference test to calculate the moderating coefficients of this dimension for the two countries and obtain the critical ratio for comparing the coefficients of the corresponding paths in the structural equations of both countries. This will enable us to determine whether there is a significant difference in the negative moderating effect of uncertainty avoidance on the relationship between perceived ease of use and perceived usefulness in South Korea and China (Figures 6 and 7).

Table 17. Hypotheses related to the moderating effect of cultural variables.

Hypothesis No.	Related Hypotheses of Regulatory Action	Verification Result
H4	Power distance has a positive moderating effect on the relationship between perceived usefulness and behavioral intention for mobile payments.	False
H5	Power distance has a positive moderating effect on the relationship between perceived ease of use and behavioral intention for mobile payments.	False
H6	Uncertainty avoidance has a negative moderating effect on the relationship between perceived usefulness and behavioral intention for mobile payments.	False
H7	Uncertainty avoidance has a negative moderating effect on the relationship between perceived ease of use and behavioral intention for mobile payments.	True
H8	Individualism versus collectivism has a positive moderating effect on the relationship between perceived usefulness and behavioral intention for mobile payments.	False
H9	Individualism versus collectivism has a positive moderating effect on the relationship between perceived ease of use and behavioral intention for mobile payments.	False
H10	Masculine versus feminine temperament has a positive moderating effect on the relationship between perceived usefulness and behavioral intention for mobile payments.	False
H11	Masculine versus feminine temperament has a positive moderating effect on the relationship between perceived ease of use and behavioral intention for mobile payments.	False
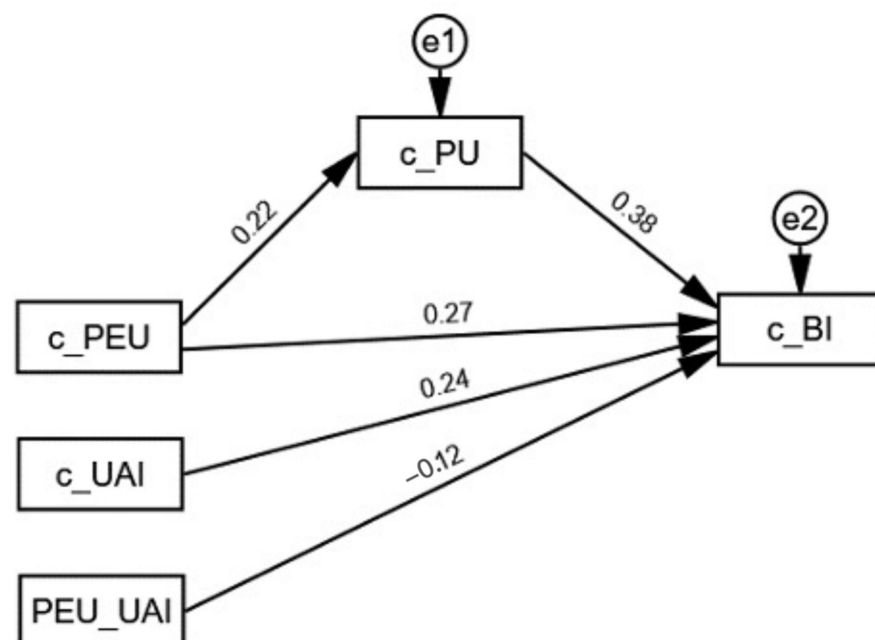
Figure 6. Moderating effect of uncertainty avoidance on the relationship between perceived ease of use and behavioral intention for mobile payment in China.
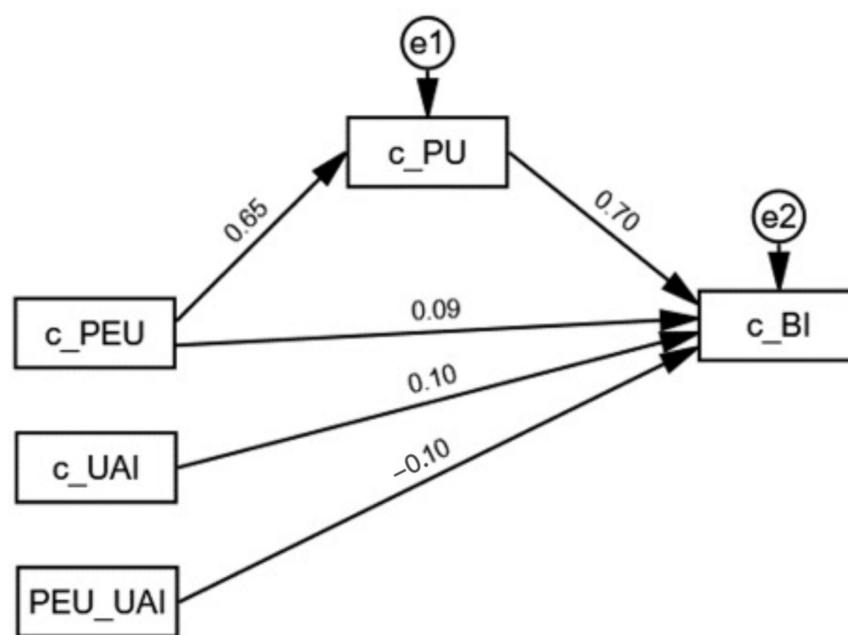
Figure 7. Moderating effect of uncertainty avoidance on the relationship between perceived ease of use and behavioral intention for mobile payment in Korea.

Table 18 above presents the path coefficients and standardized coefficients for both China and South Korea, with the first five coefficients corresponding to China and the last five to South Korea. The last column shows the critical ratio of the comparison of the coefficients between the two countries. If the absolute value of the critical ratio is greater than 1.96, it indicates that there is a significant difference between the coefficients. In this case, the absolute value of the critical ratio for H7 is 0.544 < 1.96, suggesting that the negative moderating effect of uncertainty avoidance on the relationship between perceived ease of use and perceived usefulness is roughly the same in China and South Korea, with only slight differences in the actual values of the coefficients. Therefore, the observed differences in the moderating effect of uncertainty avoidance between the two countries may be attributed to their political, social, and economic differences.

Table 18. Comparison of path coefficients, standardized coefficients, and critical ratios for the respective paths in China and Korea.

Path	Estimate	Standard Estimate	S.E.	C.R.	*p*	Label	Critical Ratio
c_PU ← c_PEU	0.193	0.224	0.048	4.021	***	b1_1	6.435
c_BI ← c_PU	0.379	0.381	0.048	7.960	***	b2_1	5.416
c_BI ← c_PEU	0.230	0.269	0.041	5.610	***	b3_1	−2.242
c_BI ← c_UAI	0.247	0.239	0.048	5.118	***	b4_1	−1.796
c_BI ← PU_UAI	−0.066	−0.119	0.026	−2.555	0.011	b5_1	−0.544
c_PU ← c_PEU	0.593	0.653	0.039	15.043	***	b1_2	
c_BI ← c_PU	0.767	0.696	0.053	14.367	***	b2_2	
c_BI ← c_PEU	0.088	0.088	0.048	1.812	0.070	b3_2	
c_BI ← c_UAI	0.128	0.104	0.045	2.842	0.004	b4_2	
c_BI ← PU_UAI	−0.089	−0.098	0.033	−2.663	0.008	b5_2	

*** *p*-value < 0.01.

The mobile payment intention model in this study is based on the technology acceptance model (TAM) and confirms that perceived ease of use (PEOU) affects perceived usefulness (PU) in both Chinese and Korean models (H3), indirectly influencing the intention to use (H1). The attitude did not directly influence the intention to use mobile payment. This is different from the traditional technology acceptance model. The perceived

usefulness of mobile payment directly affected the intention to use it. The study also confirmed the moderating effect of cultural variables. Specifically, the dimension of cultural uncertainty avoidance has a negative moderating effect on the relationship between perceived ease of use and behavioral intention to use mobile payments (H7). This means that in countries with low uncertainty avoidance, the inhibitory effect of perceived ease of use on the intention to use mobile payment is weakened. In contrast, in countries with high uncertainty avoidance, the inhibitory effect of perceived ease of use on the intention to use mobile payment is strengthened. The study also found that the negative moderating effect of uncertainty avoidance on perceived ease of use was similar in China and South Korea. These findings suggest that promotion strategies for mobile payment need to consider both the individual and cultural characteristics of different countries. In China, people are more likely to adopt mobile payment if it is easy to use. In South Korea, however, risk avoidance is stronger, and people may not try mobile payment even if they perceive it as easy to use.

4. Discussion

Mobile payment has a broad market development prospect worldwide, and with the continuous development of technology, the carrier of mobile payment has evolved from relying on terminals to some wearable devices, and in the future, it may even rely on biometric technology to realize facial recognition payment or palm print payment. To develop new technologies for mobile payments, it is necessary to identify the key factors that affect the development of mobile payment business and find appropriate strategies. Based on the conclusions of this study, some development strategy recommendations are proposed.

Firstly, scenario design should be tailored to different cultures. In China, as long as users' basic security information is ensured, the operation and pages should be simplified, more and more businesses should be linked to mobile payments, the experiential sense of using mobile payments should be enhanced, and marketing should focus on highlighting the convenience of mobile payments brought to life through social word-of-mouth and demonstration effects. However, in the high uncertainty-avoidance culture of South Korea, in addition to strengthening the experiential sense of mobile payment business, attention should also be paid to user privacy, reducing the risks associated with security issues, and reducing South Korean consumers' concerns about mobile payment risks, thereby promoting the adoption of mobile payment business.

Secondly, it is necessary to expand the business scope. This study has demonstrated that perceived usefulness has a positive impact on the behavioral intention to use mobile payments in both high- and low-uncertainty-avoidance cultures, with coefficients of 0.482 and 0.486, respectively. Therefore, in order to increase the utilization rate of mobile payments and expand its market scenario, it is necessary to increase the visibility of mobile payment services and showcase their versatility to users. Currently, mobile payments in China are closely related to daily life, including retail, transportation, medical, and entertainment industries, which can be paid directly or through third-party software. However, in Korea, although the mobile payment industry is also developing rapidly, people still cannot completely abandon traditional payment methods, and most scenarios still use debit card payments. Thus, expanding the application areas of mobile payments and increasing its utilization rate is a direction for mobile payment service providers to develop in Korea.

Finally, based on the models of China and South Korea, it can be concluded that perceived ease of use indirectly affects usage intention through perceived usefulness. Therefore, operators can further simplify the transaction process and enhance the user experience of usefulness by improving ease of use. For example, by differentiating between scanning and being scanned, distinguishing application scenarios, and simplifying transaction steps, the usefulness of mobile payment can be highlighted.

From a theoretical perspective, this study builds a model of mobile payment usage intention based on the technology acceptance model (TAM) and incorporates the Hofstede cultural dimensions as moderating variables. Empirical research shows that this model

effectively explains and predicts consumers' acceptance and adoption of mobile payment and verifies the differences in factors affecting consumers' usage intentions in China and South Korea, two countries with different cultural backgrounds. While most previous studies focused on consumers' personal characteristics, this study incorporates cultural factors as moderating variables from a theoretical perspective, attempting to explore the differences in mobile payment usage intentions between China and South Korea. The study demonstrates that the same cultural features have the same moderating effects on the two countries. Furthermore, most scholars studying the influence of national cultural characteristics on consumers' mobile payment usage intention examine only the dimension of uncertainty avoidance in the Hofstede cultural dimensions and do not include variables such as power distance, individualism–collectivism, and masculinity–femininity in their research. Considering that culture is an inseparable part of cross-country research, it is necessary to fully consider cultural factors in research.

5. Conclusions

In this study, questionnaires were used to collect data on the attitudes of Chinese and Korean consumers toward mobile payment businesses, as well as their respective national cultural dimensions. The reliability and validity of the questionnaires were rigorously tested. The adoption models for consumer mobile payment in the two countries were tested by using structural equation modeling, and the corresponding models were obtained. Hofstede's cultural dimensions theory, including power distance, individualism versus collectivism, uncertainty avoidance, and masculinity versus femininity, were used as regulatory variables to analyze whether each cultural dimension has a regulatory effect on behavioral intention for mobile payment. The study found that in the mobile payment adoption model for Chinese consumers, perceived ease of use and perceived usefulness significantly impact behavioral intention, and perceived ease of use significantly impacts perceived usefulness. However, in the Korean model, the influence of perceived ease of use on behavioral intention is not significant, and the rest are the same as those in the Chinese model. The SPSS hierarchical regression method was then used to analyze power distance, individualism versus collectivism, uncertainty avoidance, and masculinity versus femininity through a regression test and adjustment analysis of the two paths of China and Korea models. The study concluded that uncertainty avoidance has a negative adjustment effect on the relationship between perceived ease of use and behavioral intention for mobile payment. Furthermore, the Between-group chi-square difference test was applied to the structural equation models of both countries to calculate the moderating coefficients of each cultural dimension. The critical ratio for comparing the corresponding path coefficients of the two countries was obtained. The results showed that the negative regulatory effect of uncertainty avoidance was roughly the same in both China and Korea, and no significant difference was observed.

In addition, there are still several limitations due to the research time and conditions. Firstly, the research sample is limited. Although both China and Korea have samples of various occupations and academic qualifications, the sample size of approximately 300 is insufficient to study the comparison between national cultures. China has a vast land area and a large population, with diverse cultural gaps between regions, and users of different ages may have different attitudes toward mobile payment services. Although a comparative study of two countries has been conducted, the sample size is insufficient. Secondly, there are limitations in variable selection. When constructing the research model, a vast amount of the literature was examined, and there are many influencing factors that affect the adoption of mobile payment services. Because of the changing times, the TAM model has experienced various developments in combination with other models, and new variables may also have different impacts on the behavioral intention for mobile payment. For example, Xin Lin et al. studied China and Korea, using KakaoPay as the research object, and combined UTAUT, ISS, and TTF models to verify the influence of different variables on Chinese and Korean consumers' willingness to use mobile payments [51]. In addition to the

four dimensions mentioned in this study, there are also two others: long- and short-term orientation and restraint and indulgence. Although there is no relevant research in the literature directly confirming that these two new dimensions will have an impact on the adoption of mobile payment services, their moderating effects can be further explored in future research. Finally, the mobile payment service has developed to a significant extent, with a broad market and prospects, and predecessors have conducted extensive research in this field. In China, mobile payment has gradually transformed into a more convenient and fast new payment method relying on biometric technology, such as face recognition and palmprint recognition, and further research is needed in this area.

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