

# Technology Acceptance of QR Code Payment and Its Effective Advertisement Media for Multi-Channel Customers

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**Abstract**—Cash settlement accounts for 80% of entire transaction in Japan. Japanese government has announced the “Payment Reform Declaration,” by setting “the Cashless Vision” with a target of 40% cashless payment ratio by 2025 and aims to achieve the world's highest level of cashless payment ratio of 80% in the future. The purpose of this study is to analyze which media has affected the consumers who use QR code payment, PayPay. This research proposes a framework based on the Technology Acceptance Model (TAM) for an effective advertisement medium by using survey data on PayPay. Structure equation analysis is conducted to measure the relationship between different advertising media and consumers' intentions to use, as well as actual usage of PayPay.

**Index Terms**—Advertisement media, cashless payments, structural equation model, technology acceptance model, QR code payments.

## I. INTRODUCTION

When people make purchases for both physical and online, usually several payment options are available. However, cash remains the primary payment option in Japan. Cash settlement accounts for 80 percent of entire transactions in Japan, which is the highest in the developed world as shown in Fig. 1. Major information technology firms are working hard to encourage cashless payment systems with the backing of Japanese government eager to promote cashless society. With the consumption tax hike to 10 percent from 8 percent started in October 1, 2019, the Japanese government offers points redeemable for future discounts to consumers who use QR codes and other forms of cashless payment for nine months [1].

The QR code payment is an innovative product. Originally, a QR code technology was born in Japan. QR code is a two-dimensional barcode standard developed in 1994 by Denso Corporation (currently Denso Wave Inc.). Two-dimensional barcodes store a larger amount of information than one-dimensional barcodes with vertical lines arranged in a horizontal row, making it possible to create various variations of codes. QR codes are open to standards and specifications. In 2000, the international standard ISO was established. Denso Wave, the developer,

has announced that it does not use patent rights for standardized technology in order to diffuse the QR code widely, although it has only patent rights [2].

The Ministry of Economy, Trade and Industry's cashless promotion office, set up with the goal of doubling cashless transactions to 120 trillion yen (the target of 40 percent cashless settlement ratio) by Osaka/Kansai Expo in 2025 [3].

Using QR codes or Quick Response codes, for payments has just started in Japan, with the number of convenience stores, restaurants and other shops slowly adopting this convenient form of payment. For some time, Chinese tourists engaged in explosive shopping spree in Japan. Along with the spread of smartphones, QR code payments like Alipay has grown to a major payment method in mainland China. As many Chinese tourists have come to Japan, many competitive service providers have entered the cashless payment market.

There are two major different types of mobile payment technology available in Japan, i.e., NFC (Near-Field Communication) and a QR code. NFC is used by tapping or hovering the NFC-enabled reader to make a payment. Apple Pay or Google Pay are some examples of using the NFC technology. The QR code is used by scanning with the smartphone. Alipay, WeChat Pay are some examples of QR codes. In Japan, some use the QR code technology, such as PayPay, LINE Pay, Rakuten Pay, Origami Pay, D-barai, Pixiv PAY, and NFC technology based cashless services, such as Apple Pay and Google Pay, are also available. MerPay accepts both technologies. E-money or cashless payment using QR codes have relatively short history, especially in Japan. The oldest is the Line Pay which stated its QR code payment service in December 2014. Apple Pay launched in Japan in 2016 for its iPhone 7. When a new product or service is launched based on new technology like QR code in an existing market, which is dominated by cash payment and other incumbent payment methods such as credit cards are available, what kind of marketing strategy the new entrant can take in order to gain consumers' acceptance.

Dentsu, Inc. [4], one of the largest Japanese international advertising and public relations companies, reported on 2018 advertising expenditures in Japan for traditional media, such as newspapers, magazines, radio and television, as well as those for the Internet and promotional media. According to this report, Japanese advertising expenditures for 2018 totaled 6,530 billion yen, an increase of 2.2% compared with those of 2017. Broken down by medium, advertising expenditures for the traditional media fell in Newspapers (down 7.1%), Magazines (down 9.0%), Radio (up 0.9%) and Television (down 1.8%, including both Terrestrial Television and Satellite Media-Related spending).

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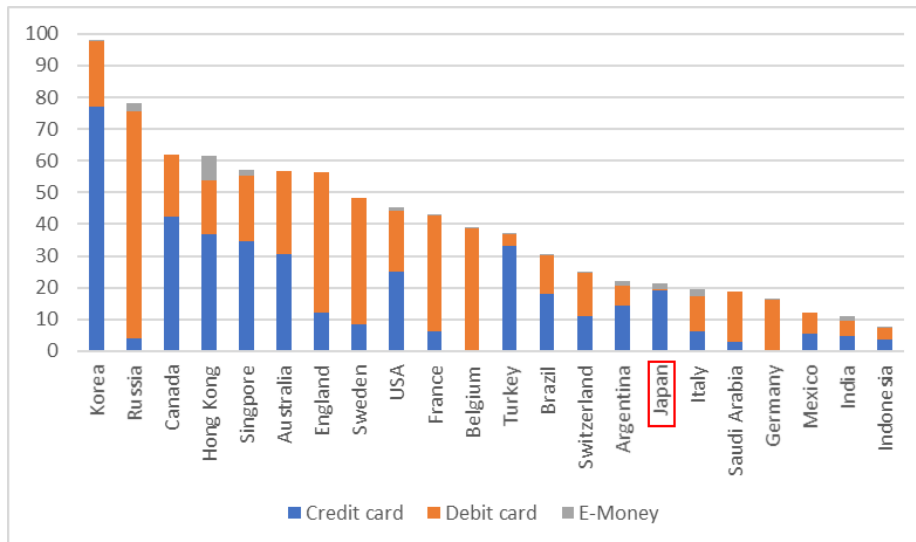


Fig. 1. Cashless settlement ratio in different countries in 2017 (Source: The authors created it base on the data from Japan credit statistics in 2018).

TABLE I: ADVERTISING EXPENDITURES BY MEDIUM FOR 2018

Advertising Medium	Advertisement Cost (in billion yen)	Compared to 2017
Newspapers	478.4	92.9%
Magazine	184.1	91.0%
Radio	127.8	99.1%
TV media	1,912.3	98.2%
Terrestrial broadcasting	1,784.8	98.2%
Satellite broadcasting	127.5	98.1%
Promotional media	2,068.5	99.1%
Internet media	1,758.9	116.5%

(The author created the table based on data from Dentsu, Inc. [4])

On the other hand, Internet advertising expenditures (up 16.5%) achieved robust growth centering on performance-based advertising, which refers to advertising methods that utilize platforms to process vast amounts of data for the automatic or instantaneous optimization of advertising (see Table I). Dentsu mentioned in the 2018 report that the area of integrated solutions, which utilize multi-channel marketing, i.e., a mixture of Internet and traditional media to address challenges that cannot be solved by Internet-based advertising alone, are seen. This paper investigates effective advertisement medium for one of QR code payments, “PayPay” and consumer’s acceptance of new technology for payments by using survey data.

## II. LITERATURE REVIEWS

### A. Technology Acceptance Model

The Technology Acceptance Model (TAM) developed by Davis [5] is an information systems theory, which predicts widely how users come to accept and use a technology. The model suggests a few factors influence their decision about how and when they will use it when users are presented with a new technology. TAM tests the user’s behavior toward information technology, based on perceived usefulness (PU), perceived ease of use (PEU), attitude toward use (ATU) and behavioral intention of use (BIU) [6]. Legris, *et al.* [7] conducted an extensive literature review on 80 empirical TAM studies which were published in six top information system related journals, and Lee *et al.* [8] separately conducted a meta-analysis of 101 TAM literature, published

in information related journals. Both studies concluded that TAM has proven to be a useful theoretical model in helping to understand and explain use behavior in information system implementation and has been cited in most of the research dealing with users’ acceptance of technology. Later, Venkatesh and Davis [9] proposed a model which omits the attitude towards intention to use and measures directly towards intention to use, and they focused more on perceived ease of use. The QR codes are technological breakthrough for payment. Consumer behavior research have suggested the positive link between the actual behavior and intention (e.g., [10]-[13]).

### B. Commercialization

Commercialization is the process of bringing new products or services to market and is necessary to let consumers to learn about these new products or services. A firm does not have national advertising in a national market are not considered as an entrant for the market [14], [15]. There are a variety of methods for commercialization; traditional marketing mix, web experience, and point-of-purchase.

Over the last decade, many retailers are using multi-channel retailing strategy [16] which enable consumers to shop or receive services not only at physical stores, but through internet and mobile phones [17]-[22]. As consumers show the multi-channel buying behavior, commercialization of products/services would be multi-channel as well. In multi-channel advertising, where different online and offline channels are used to advertise products or services, which channels to be used to reach targeted individuals properly will be important for the managerial decision making, especially for the allocations of the advertising budget across channels [23].

In the context of the fast-evolving multi-channel retail environment, multi-channel retailing involves selling to customers through offline, brick-and mortar stores, online channels, direct-to-consumer ecommerce sites, mobile apps, and so on. Marketing across multiple channels implies the consumers are given a choice to interact with the business when and where they want [24]. Advertising through television requires significant funding [25], however, it offers one of the most contemporary promoting methods with

a decisive role in presenting and selling new products [26].

C. TV Marketing vs. Internet Marketing

Even though number of people watching TV has been falling over time, Japanese people still watch television. Advertising on television quickly and effectively spread new products/services nationwide and can boost brand awareness.

As for Internet usage, while teenagers and twenties are using actively, while the older generations' average usage time of internet are less [27] (see Fig. 2). Having internet access at all time, consumers have abundant opportunities to learn about the products/services. Nowadays, many people are tweeting about products or services they use [28] through social media, which instantly enable a large group of people

to talk about business and brand each other [29], [30]. Kwon *et al.* [31] gave a comparative analysis of user acceptance of Facebook and Twitter by extended TAM model to identify important motivational determinants in using social network services.

In their conceptual paper, Varadarajan *et al.* [32] define the Internet-enabled market environment as “a setting that enables buyers and sellers to exchange information, transact, and perform other activities related to the transaction before, during and after the transaction via an information infrastructure network and devices connected to the network based on Internet protocol.” Cashless payment can be considered as technology-based payment solutions and conducted under the Internet-enable market environment.

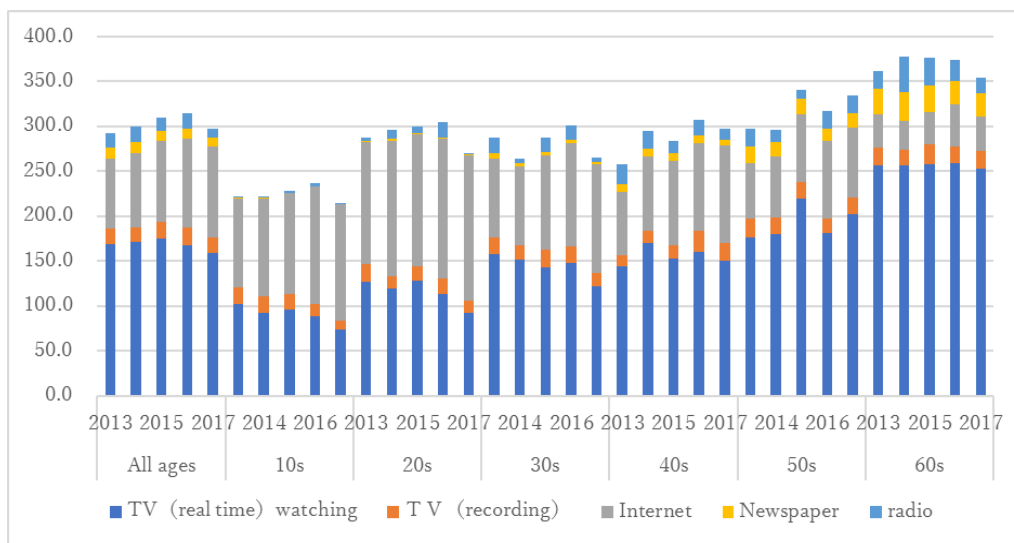


Fig. 2. Average usage time of major media (Source: Ministry of Internal Affairs and Communications Information and Communication Policy Research Institute "Survey on Information Communication Media Usage Time and Information Behavior in 2017").

D. Merchandising and Point-of-Sales

Merchandising is a wide term which relates to the promotional activities run by the manufacturer in the form of special presentations (i.e., in-store displays), as well as initiatives run by the retailer to make the product stand out [33]. Point-of-Sales, or Point-of-Purchase activities, such as in-store product displays have large effects on final purchase outcomes (e.g., [34]-[37]). Three major Japanese convenience store operators, Seven-Eleven Japan Co., Lawson Inc. and Family Mart Co., as well as traditional brick-and mortar shops like department stores, and online shopping sites like Amazon JP, Rakuten JP and Yahoo Japan Shopping, are offering a two to five percent discount for cashless payments under the government’s rebate program with the consumption tax hike, which is implemented for nine months through June 2020. Cashless rebates have been heavily promoted at those brick-and-mortar stores as well as online stores with the five percent or two percent cashless banner displays. It is also heavily promoted on TV commercials.

services through notification by official accounts as well as through word of mouth; the point-of-purchase is to directly appeal to visiting consumers and encourage their use.

The positive link between the actual behavior and intention have been reported within consumer behavior research (e.g., [10]-[13]) and we will consider it in this research as well. Based on these literature, we propose a research model as shown in Fig. 3 to examine the relationship between different advertising media (traditional marketing mix, web experience, point-of-purchase displays), consumers’ decision process (intention to use), and decisions (actual behavior) of consumers in the cashless payment industry.

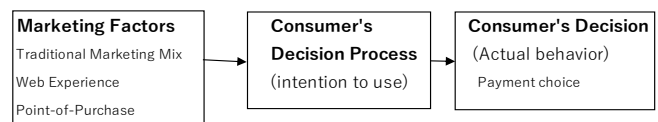


Fig. 3. A framework for studying the effects of advertising exposure on consumers for cashless payments.

III. A RESEARCH MODEL AND DATA

According to previous studies presented in sector II, each media seems to have different roles; TV advertising is to spread brand services; SNS is to mainly raise interest in

This research was conducted using single-source data provided by Nomura Research Institute, Ltd, one of the largest consulting firms in Japan. Single-source data is data that measures media exposure and transaction information for the same people [38]. The data in this study is composed of "the marketing activity" such as advertisements of

products and "Process of consumer behavior." The dataset contains a collection of 3,000 consumers, including 1,546 males and 1,454 females, during the period from January 26 to March 30, 2019. This paper analyses consumers' activities in using cashless payments, especially QR codes payments,

and how they are influenced by different medium, such as TV commercials, SNS, or watching point-of-purchase displays when they stop by at any stores. A list of variables is shown in Table II, and descriptive statistics of the data is shown in Table III.

TABLE II: A LIST OF VARIABLES

SNS	Twitter	0=no use, 1=less than once a month,	
	Facebook	2=once a month, 3=once a week,	
	Instagram	4=2~3 times a week, 5=4~5 times a week,	
	Ameba_blog	6= almost every day	
Cashless payment	PayPay	0=no use, 1=more than once a month,	
	Line Pay	2=more than once a week, 3=more than twice a week	
	Rakuten Pay		
Shopping channel	FF_CONVE	Convenience stores First food restaurants	
	BOOK_ELECTRO	Bookstores Electronics stores	
	MALL_SUPER	Shopping mall Supermarket	
	DRUG_MARKET	Drug stores Groceries stores	
	PC_PHONE	Telephone shopping Internet shopping (PC)	
	TV_ML_DEPT	Department stores Mail orders TV shopping	
	TV CM	PayPay TVCM	0=no, 1= yes

a dummy variable; 0=no, 1= yes

TABLE III: DESCRIPTIVE STATISTICS

Age	20s=604, 30s=769, 40s=919, 50s=708
Gender	Male=1,546, Female=1,454
Marital Status	Single=1,215, Married=1,641, Divocee/Bereavement=144
Having any children	Yes=1,214, No=1,786
Household status	Single household=631, Husband & wife=456, Husband & wife & unmarried children=1,441 A single parent & unmarried children=194, Husband & wife & married children=13, Three generetions =176, Others=89
Income status	No income=48; less than one million yen=102; 1~2 million yen=138; 2~3 million yen=235; 3~4 million yen=319; 4~5 million yen=378; 5~6 million yen=352; 6~7 million yen=322; 7~10 million yen=646; 10~15 million yen=355; 15~20 million yen=60; more than 20 million yen=33

As a proxy for point-of-purchase displays, data for shopping channels are utilized; thirteen different channels are identified in the survey, and they are grouped up to six channels as FF\_CONVE (convenience stores and first food restaurants), BOOK\_ELECTO (bookstores and electronics stores), MAIL\_SUPER (shopping mall and super market), DRUG\_MARKET (drug stores and groceries stores), PC\_PHONE (telephone shopping and internet (PC) shopping), and TV\_ML\_DEPT (department stores, mail orders and TV shopping).

Table IV contains the Pearson correlation coefficient between eleven variables with the two-tailed significance of coefficients. Most of variables correlate well and are statistically significant, and none of the correlation coefficients are particularly large. Therefore, multicollinearity is not a problem for these data.

Based on the Technology Acceptance Model (TAM) and commercialization theories, the authors would like to propose the research model to investigate the relationships

between consumers' intention to use cashless payments, actual use of cashless payment methods, and different media, i.e., TV commercials, social network services (Twitter, Facebook, Instagram, Ameba blog), and point of purchase displays at various retailers. In this research, we focus on the top QR code payments service, PayPay.

As for TV commercials for QR codes related cashless payment, survey data for PayPay sponsored TV programs is available for this study. They have televised heavily around midnight hours, and around one pm on Sundays and weekdays (Monday through Wednesday) as shown in Table V. According to this televised schedule, targeting individuals for PayPay seem to be someone at home during the daytime (e.g. housewives, elderly people) and those are night owls (e.g. people working during the day and younger people) for late hours.

Then, the authors had formed the following hypotheses:

H1: There is a significant, positive relationship between advertisement on SNS and actual use of QR codes payment

H2: There is a significant, positive relationship between TV commercials and actual use of QR code payments

H3: There is a significant, positive relationship between point of purchase displays and actual use of QR code payments

H4: There is a significant, positive relationship between advertisement on SNS and intention to use

H5: There is a significant, positive relationship between TV commercials and intention to use

H6: There is a significant, positive relationship between point of purchase displays and intention to use

H7: There is a significant, positive relationship between consumers' intention to use and actual use

TABLE IV: A CORRELATION MATRIX

	PayPay Know	PayPay Actual	PayPay Intention	PayPay TVCM	Seven-Eleven	Lawson monthly	Family-Mart	Twitter	Facebook
PayPay Know	1	.073**	.114**	.079**	.058**	.038	.045*	.074**	.077**
PayPay Actual Use	.073**	1	.554**	.003	.087**	.129**	.202**	.124**	.108**
PayPay Intention to Use	.114**	.554**	1	.023	.098**	.156**	.144**	.149**	.162**
PayPay TVCM	.079**	.003	.023	1	.030	.004	.017	-.018	.008
Seven-Eleven monthly usage	.058**	.087**	.098**	.030	1	.320**	.357**	.099**	.154**
Lawson monthly usage	.038	.129**	.156**	.004	.320**	1	.351**	.116**	.134**
Family-Mart monthly usage	.045*	.202**	.144**	.017	.357**	.351**	1	.116**	.142**
Twitter	.074**	.124**	.149**	-.018	.099**	.116**	.116**	1	.384**
Facebook	.077**	.108**	.162**	.008	.154**	.134**	.142**	.384**	1
Instagram	.046*	.102**	.125**	.022	.109**	.107**	.107**	.502**	.487**
Ameba blog	.020	.114**	.117**	.092**	.062*	.090**	.056**	.298**	.312**
TV_ML_DEPT	-.006	.172**	.169**	-.012	.046*	.096**	.094**	.051**	.114**
DRUG_MARKET	.027	.009	-.005	.101**	.069**	.075**	.070**	.041*	.047*
MALL_SUPER	.022	.126**	.141**	.052**	.039*	.092**	.033	.029	.043*
FF_CONVE	.080**	.169**	.163**	.026	.382**	.304**	.339**	.175**	.155**
BOOK_ELECTRO	.053*	.075**	.080**	.050**	.138**	.137**	.152**	.131**	.130**
PC_PHONE	.056**	.124**	.144**	.017	.077**	.108**	.119**	.114**	.111**

	Instagram	Ameba blog	TV_ML_DEPT	DRUG_MARKET	MALL_SUPER	FF_CONVE	BOOK_ELECT	PC_PHONE
PayPay Know	.046*	.020	-.006	.027	.022	.080**	.053*	.056**
PayPay Actual Use	.102**	.114**	.172**	.009	.126**	.169**	.075**	.124**
PayPay Intention to Use	.125**	.117**	.169**	-.005	.141**	.163**	.080**	.144**
PayPay TVCM	.022	.092**	-.012	.101**	.052**	.026	.050**	.017
Seven-Eleven monthly usage	.109**	.062**	.046*	.069**	.039*	.382**	.138**	.077**
Lawson monthly usage	.107**	.090**	.096**	.075**	.092**	.304**	.137**	.108**
Family-Mart monthly usage	.107**	.056**	.094**	.070**	.033	.339**	.152**	.119**
Twitter	.502**	.298**	.051**	.041*	.029	.175**	.131**	.114**
Facebook	.487**	.312**	.114**	.047*	.043*	.155**	.130**	.111**
Instagram	1	.363**	.100**	.088**	.071**	.136**	.064**	.064**
Ameba blog	.363**	1	.163**	.079**	.112**	.112**	.097**	.085**
TV_ML_DEPT	.100**	.163**	1	.039*	.061**	.028	.176**	.136**
DRUG_MARKET	.088**	.079**	.039*	1	.021	.076**	-.019	-.001
MALL_SUPER	.071**	.112**	.061**	.021	1	.026	.139**	-.006
FF_CONVE	.136**	.112**	.028	.076**	.026	1	.150**	.095**
BOOK_ELECTRO	.064**	.097**	.176**	-.019	.139**	.150**	1	.075**
PC_PHONE	.064**	.085**	.136**	-.001	-.006	.095**	.075**	1

\*\* Correlation is significant at the 0.01 level (2-tailed). \* Correlation is significant at the 0.05 level (2-tailed).

TABLE V: A HEAT MAP: THE NUMBER OF THOSE WATCHING PAYPAY SPONSORED TV PROGRAMS

	Sun	Mon	Tue	Wed	Thu	Fri	Sat
3:00 AM	10	12	4	6	8	9	4
4:00 AM	1	0	0	0	1	0	3
5:00 AM	3	6	8	1	7	1	4
6:00 AM	4	1	3	5	4	3	5
7:00 AM	2	8	9	7	6	5	3
8:00 AM	3	5	8	13	10	9	4
9:00 AM	2	4	5	5	5	5	2
10:00 AM	2	1	2	2	4	3	3
11:00 AM	6	10	11	15	9	8	6
12:00 PM	14	16	14	13	10	10	7
1:00 PM	13	25	25	25	12	12	9
2:00 PM	16	11	6	9	7	6	8
3:00 PM	9	11	10	15	14	8	10
4:00 PM	19	4	4	4	3	3	6
5:00 PM	4	2	1	1	1	1	6
6:00 PM	4	4	3	2	7	3	3
7:00 PM	3	5	4	3	1	4	5
8:00 PM	6	7	5	7	12	1	11
9:00 PM	5	2	7	3	5	4	1
10:00 PM	7	5	1	0	1	3	3
11:00 PM	9	6	8	3	7	3	3
12:00 AM	22	10	8	18	8	4	6
1:00 AM	17	8	13	12	18	9	9
2:00 AM	20	18	8	14	14	18	3

IV. RESULTS

Path analysis using structural equation modeling (SEM) was employed to estimate the structural relationships of PayPay, different kind of marketing activities and consumer behavior.

A. Structural Equation Modeling

Fig. 4 and Table VI show the research model. The indices suggested an acceptable model fit of the structural model (CFI=0.948, IFI=0.948, RMSEA=0.037). [39], [40]. A result of the research model 1 for the relationships between consumers' intention to use, actual use of PayPay and different types of media show the following seven findings.

H1: There is a positive but weak and not significant relationship between advertisement on SNS and actual use of PayPay

H2: There is a weak, negative and not significant relationship between TV commercials of PayPay and actual use of PayPay

H3-1: First food/convenience stores/department stores/mail orders/TV shopping: There is a significant, positive relationship between point of purchase displays and actual use of PayPay

H3-2: Drug stores/groceries stores/bookstores/electronics stores/telephone shopping/ internet shopping: There is a significant, negative relationship between point of purchase displays and actual use of PayPay

H4: There is a significant, positive relationship between advertisement on SNS and intention to use of PayPay

H5: There is a weak but significant, positive relationship

between TV commercials of PayPay and intention to use

H6-1: First food/convenience stores/department stores/mail orders/TV shopping:

There is a significant, positive relationship between point of purchase displays and intention to use

H6-2: Drug stores/groceries stores/bookstores/electronics stores:

There is a significant, negative relationship between point of purchase displays and intention to use

H7: There is a significant, positive relationship between consumers' intention to use and actual use

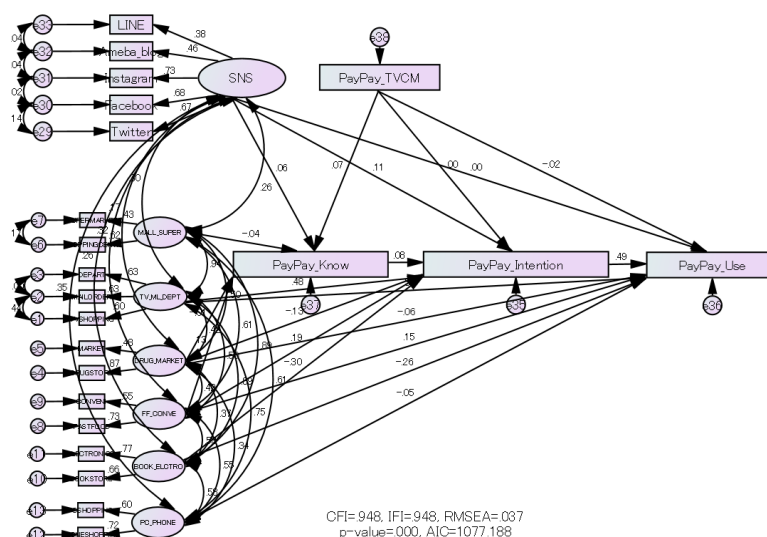


Fig. 4. A Research Model: PayPay

TABLE VI: THE PATH COEFFICIENTS OF RESEARCH MODEL

construct		Std. weight	Unstd. weight	S.E.	C.R. (t-value)	P value
PayPay Know	<--- SNS	0.063	0.007	0.003	2.48	0.013
PayPay Know	<--- MALL_SUPER	-0.041	-0.02	0.019	-1.049	0.294
PayPay Know	<--- DRUG_MARKET	-0.005	-0.001	0.008	-0.179	0.858
PayPay Know	<--- FF_CONVE	0.128	0.041	0.013	3.214	0.001
PayPay Know	<--- PayPay_TVCM	0.072	0.695	0.189	3.676	***
PayPay Intention	<--- PayPay_Know	0.08	0.16	0.039	4.157	***
PayPay Intention	<--- SNS	0.107	0.026	0.007	3.894	***
PayPay Intention	<--- TV_ML_DEPT	0.478	0.784	0.152	5.147	***
PayPay Intention	<--- DRUG_MARKET	-0.131	-0.07	0.017	-4.077	***
PayPay Intention	<--- FF_CONVE	0.192	0.124	0.028	4.445	***
PayPay Intention	<--- BOOK_ELCTRO	-0.302	-0.244	0.077	-3.157	0.002
PayPay Intention	<--- PayPay_TVCM	0.005	0.091	0.362	0.251	0.802
CHANNEL TVSHOPPING	<--- TV_ML_DEPT	0.598	1			
CHANNEL MAILORDER	<--- TV_ML_DEPT	0.628	1.278	0.039	32.809	***
CHANNEL DEPART	<--- TV_ML_DEPT	0.625	1.595	0.065	24.468	***
CHANNEL DRUGSTORE	<--- DRUG_MARKET	0.875	1			
CHANNEL MARKET	<--- DRUG_MARKET	0.478	0.706	0.058	12.097	***
CHANNEL SHOPPINGCENTR	<--- MALL_SUPER	0.616	1			
CHANNEL SUPERMARKET	<--- MALL_SUPER	0.435	1.028	0.051	20.094	***
CHANNEL FASTFOOD	<--- FF_CONVE	0.732	1			
CHANNEL CONVENI	<--- FF_CONVE	0.554	1.04	0.056	18.624	***
CHANNEL BOOKSTORE	<--- BOOK_ELCTRO	0.656	1			
CHANNEL ELECTRONICS	<--- BOOK_ELCTRO	0.769	0.925	0.032	28.583	***
CHANNEL PHONESHOPPING	<--- PC_PHONE	0.721	1			
CHANNEL PCSHOPPING	<--- PC_PHONE	0.598	0.869	0.04	21.523	***
Twitter	<--- SNS	0.672	1			
Facebook	<--- SNS	0.68	0.883	0.044	19.95	***
Instagram	<--- SNS	0.729	0.986	0.052	19.063	***
Ameba_blog	<--- SNS	0.464	0.444	0.028	15.601	***
LINE	<--- SNS	0.385	0.559	0.036	15.62	***
PayPay_Use	<--- PayPay_Intention	0.489	0.713	0.029	24.705	***
PayPay_Use	<--- SNS	0.002	0.001	0.008	0.07	0.944
PayPay_Use	<--- TV_ML_DEPT	0.36	0.862	0.386	2.235	0.025
PayPay_Use	<--- DRUG_MARKET	-0.059	-0.046	0.023	-2.013	0.044
PayPay_Use	<--- FF_CONVE	0.15	0.141	0.05	2.797	0.005
PayPay_Use	<--- BOOK_ELCTRO	-0.256	-0.301	0.155	-1.936	0.053
PayPay_Use	<--- PC_PHONE	-0.05	-0.054	0.079	-0.687	0.492
PayPay_Use	<--- PayPay_TVCM	-0.015	-0.429	0.457	-0.94	0.347

\*\*\* significant at the 0.001 level

TABLE VII: SUMMARY OF THE RESULTS

		PayPay			PayPay
Actual Use	SNS	+	Intention to use	SNS	+***
	TVCM	-		TVCM	na
	Convenience stores	+***		Convenience stores	+***
	First food restaurants	+***		First food	+***
	Bookstores	-***		Bookstores	-***
	Electronics stores	-***		Electronics stores	-***
	Shopping mall	na		Shopping mall	na
	Supermarket	na		Supermarket	na
	Drug stores	-***		Drug stores	-***
	Groceries stores	-***		Groceries stores	-***
	Telephone shopping	-***		Telephone	na
	Internet shopping (PC)	-***		Internet shopping	na
	Department stores	+***		Department stores	+***
	Mail orders	+***		Mail orders	+***
	TV shopping	+***		TV shopping	+***
	PayPay TVCM	-		Intention to use	Actual use

\*\*\* significant at the 0.001 level

### B. A Summary of Results

A summary of results of three different QR code payments is shown in Table VII.

Social media, such as Twitter, Facebook, Instagram, and Ameba blog, have positive relationship with the actual use and intention to use PayPay but not statistically significant. The results of point-of-purchase are varied. There are positive and statistically significant relationships between convenience stores, first food restaurants, department stores, mail orders and TV shopping for actual use of PayPay.

As for intention to use of PayPay, SNS shows that positive and statistically significant relationship. The point-of-purchase at convenience stores, first food restaurants, department stores, mail orders and TV shopping also have positive and statistically significant relationships with intention to use of PayPay. For telephone shopping or internet shopping, consumers more likely use credit cards. And as previous studies reported, a highly significant, positive relationship between consumers' intention to use and actual use was seen for this analysis.

### V. CONCLUSION

This research proposed a framework for an effective advertisement medium for relatively new cashless service, PayPay by using a single source survey data. A structure equation analysis is conducted to measure the relationship between different advertising media and consumers' using intentions, as well as actual uses of the cashless payment service. PayPay has aggressive media exposure on TV and hoped for its effect. However, overall, TV commercials did not affect the frequency of PayPay use. It is necessary for management to review the airing time (currently, mainly on daytime and midnight), clarify the target audience, and examine the CM contents. SNS, including Twitter, Facebook, Instagram, Ameba blog, and LINE, have strong influences over intention to use of PayPay, but less influence over actual use. In terms of point-of-purchase displays, those of convenience stores, first food restaurants, department stores, mail orders and TV shopping have strong influences over both "intention to use" and "actual use," while those in bookstores, electronics stores, drug stores, groceries stores,

telephone shopping and internet shopping have highly significant negative relationship with both intention to use and actual use of PayPay.

Cashless payment market is still new, and it is expected that the number of users will increase in the future. We would recommend reexamining contents and broadcasting time of TV commercials, aggressively promoting through SNS and in-store marketing activities (i.e. point-of-purchase displays) which show significant relationships with actual PayPay use this time.

### CONFLICT OF INTEREST

Michiko Miyamoto and Yuji Kudo declare that they have no conflict of interest.

### AUTHOR CONTRIBUTIONS

MM and YK conducted the research; MM and YK analyzed the data; MM wrote the paper; both authors had approved the final version.

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