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碩士學位論文

On Exploring the Factors that the
Psychological Power of Smartphone
Use affects the Decision-Making



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Abstract

The purpose of this study was to explore the factors affecting the decision making of smartphone users. Recently, the use and dependence of smartphones has been rapidly increasing due to technological advances in the fourth industrial era and the spread of smartphones. In this context, this study set individual connectivity, use and dependencies, familiarity and expertise, validity and effectiveness, self-identity, and control as independent variables and set decision making as dependent variables. In this study, 200 smartphone users were collected, analyzed through questionnaires, and Smartpls 3.0 was used to figure out the impact between variables. Four out of six factors in smartphone users' psychological strength were analyzed to have affected their decision-making. This study examined how the psychological power of smartphone users affected intimacy/personal connectivity, use/dependence, familiarity/experience, validity, control, and decision making. The analysis showed that factors 1,2,4,5,6 with t value of 0.165 and p value of 0.10 all affect decision making, with the remaining factors 3 failing to meet the criteria and thus failing to comply with the criteria, which led to the rejection. However, it has been confirmed that factors 3 affect people who have been using Smartphones for a long time due to mitigation variables. This study is an important provision for the development of future industries and the possibility of smart device evolution. This is part of the psychological strength of the people on smartphones.

Keywords : The Fourth Industrial Revolution, smartphone, Psychological Power, Smartphone Psychological Ownership(SPO), Decision-Making

1. Introduction

As the age of the Fourth Industrial Revolution is approaching, machine learning and automation technologies such as artificial intelligence are increasingly affecting or even affecting the professional world of tourism (Autor, 2015; Davis, 2016; Frey & Osborne, 2013, Michael & James 2016). Accordingly, ICT powers such as the United States, Germany, and Japan are presenting or promoting various policies and strategies in line with the Fourth Industrial Revolution (Goodman & Flaxman, 2016; Mckinsey & Company, 2012).

In people's lives, smartphones can be seen as a necessity of life. Smartphone users always look at smartphones before going to bed and the morning (Lee, YK & Cheng, ZH, 2014).

The use of smartphones has made human life very convenient. users can access a diversity of resources via smartphone and can connect to a variety of tools, including data and people (Egan, et al 2016).

In addition, since the individual compares the physical possessions with the material abilities of others, the smartphone is a symbolic means of expressing itself materially, Power, or self-development. This material meaning corresponds to the characteristic of power to be mentioned in this study.

Takao et al.(2009) suggested that both Internet use and smartphone use are related to communication tools and interoperability. Based on these previous researches, we expect that smartphone users will be relieved of the anxiety of social anxiety and interaction by the power of the smartphone.

Human beings are placed in conflict at every moment of choice, and at the moment when they have to make decisions that require a high level of conscious judgment and determination in addition to simple and repetitive decisions. This behavior is represented by the overall decision-making process, which results in a process of human thinking in which

decisions are made. It is also the result of choosing one of the best ways to achieve your goal at an alternative center for problem-solving. It determines the course of action for the future, and its decision on this behavior is a choice of alternatives. Human beings eventually choose any strategy or action to solve the problem they face or to take advantage of a given opportunity. This is called decision making (George & Jones, 2012).

The cause of human behavior is mainly a direct influence on the direction and intensity of action, and the internal process or state in which more specific goals are carried out are motives. This is a state of consciousness, which directly induces action, tries to solve the problem, and is a situation-dominant concept (Mcleod & becker 1981). Therefore, it is expected that the decision-making process that makes an important decisions for every moment in human beings will have a very important influence on the users who use smartphone. Understanding the decision-making behavior of these users will be a big part of the development and development of the fourth industrial age.

In this study, we discuss the psychological power of the user, and investigate the factors that affect the decision making of smartphone users when they have psychological power.

2. Literature review

2.1 Psychological power of the user

Power is the ability of an actor to influence the behavior and attitude of an individual or group (Yukl, 2002).

French & Raven(1959) which allows for compulsory action on someone, and influences individuals, groups, and others in the system. The stronger the power, the less powerful the power is, the less is the control of the act of power, and because it can concentrate more on its own performance, it causes the wrong decision-making process and the wrong doctor It also shows that the decision has the potential to be further expanded and produced (pitesa, 2013). Many social psychological studies have defined psychological power as essentially a fundamental influence in social relations (Cartwright, 1959; Kemper, 1991). Psychological power is the ability to control human cognitive resources and change their behavior (Emerson, 1962; French & Raven, 1959).

Psychological power is outlined as asymmetrical control over important Component and outcomes in a particular situation or social relationship (Galinsky, et, al., 2008) They focused mainly on how psychological power influenced the formation and perception of the group around them, which is how much effort they make on the information given to them in a socially weak or powerful situation. This can be a very important factor.(Chen, 2004).

In this study, it is noted that users who have such power will make a decision using smartphone, and what difference is there between power users and Who has no power.

The psychological power of the user in the text may be information that can be benefited from using a smartphone, or it may be both the time saved and the knowledge of the goods saved by such information. In other words, it is the context that various information can be

individual psychological power.

Smartphones are not just new communication technologies, but opportunities to rethink what psychology can be. Without a history of psychology, and without methodological tutorials, smartphones could not have been developed (Miller, G. 2012).

Smartphones are everywhere, inconspicuous, intimate, computational, powerful, and remotely connected. Smartphones already have enormous power to continuously collect accurate and objective data on millions of actual behaviors and experiences in the lab (Dufau et al., 2011; Kwok, 2009; Raento, Oulasa, & Eagle, 2009).

In other words, based on these previous studies, we expect that the psychological power of smartphone users will have a considerable influence on decision-making. In the next chapter, we will explore the factors related to this.



2.2 SPO (Smartphone Psychological Ownership)

People vary from about how much psychological ownership they have. They feel different satisfied with the smartphones they use, depends on how and for what object they use their phones. By owning a smartphone, people may invest in higher connectivity or smartphones, while others may not. These individual differences correspond to the SPO (Smartphone Psychological Ownership) (Egan, et al 2016).

Egan, et al(2016) does not expect that the impact of smartphones on psychological power will be the same for everyone. This means that people have different times and tasks when they use their smartphones, which means that they do not have the same level of psychological purpose for all they consider to be their own (Litwinski, 1947; Pierce, Kostova, & Dirks, 2003).

Litwinski(1947) was one of the first to officially report for this facet of ownership. This confirms the step of acquiring the goods, and acceptance to the user is a simple task. For example, while a user occupies a park bench, he feels a sense of ownership of the bench. If someone comes and asks the user to move, he feels that the legitimate argument is violated as the person who first used the bench.

Pierce et al(2003) recommend that a sense of ownership makes an important contribution to psychological purposes. Specifically, psychological proprietary emotions provide motivation for efficacy and effectiveness, self-identity, and desire for a safe place.

In other words, a smartphone meets psychological needs to achieve this purpose. Therefore, this study explores the psychological ownership of the claimed smartphone(Egan, et al 2016). The results of this study recommend that the psychological power of smartphone users will influence the decision-making process by comparing the results of the claim that the smartphone affects the user's psychological power.

Figure1. Egan, et al,(2016) the effect of smartphone on psychological power (modified by SPO). In other words, it is a research model that suggests arbitrary behavior, risk-taking, and moral tendency intervention model.

These prior studies are somewhat complicated, and opinions based on experimental behavior of actual users are complex. We will change the part about fraud, risk-taking, and moral inclination to decision making, and we will draw conclusions the adoption of hypothesis.

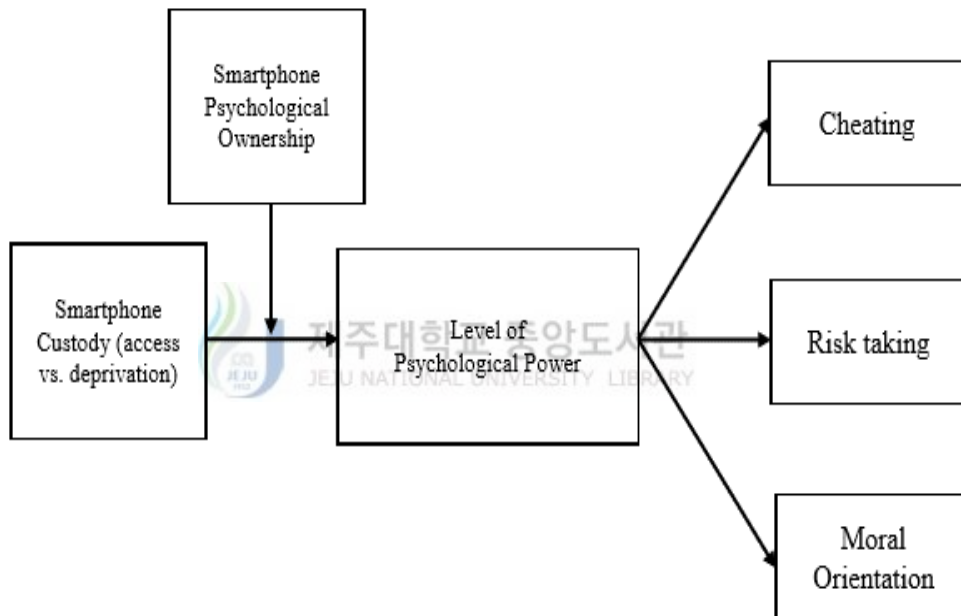


Figure1. The impact of the use of smartphones on psychological power (adjusted by the psychological ownership of smartphones) and the model of arbitrage, risk-taking, and moral inclination (Source: Egan, et al., 2016)

2.3 Psychological power and decision making

In the fourth text, the aforementioned psychological power seeks to define how much people with SPOs influence decision making through smartphone access.

Human beings eventually choose any strategy or action to solve the problem they face or to take advantage of a given opportunity. This is called decision making (George & Jones, 2012).

In other words, decision-making is done through a process to solve the problem faced. This "solving of the problem" is a process of transforming the part of the problem that does not know how to obtain the desired result into the state of the purpose pursued by the individual It says.

Problem-solving ability is defined as an interaction of cognitive, mental, and performance processes to adapt to internal and external requirements (Heppner & Peterson, 1982).

Smartphones provide a great platform for easy and convenient contribution to many people through the expansion of existing web-based applications. In addition, multi-sensor capabilities such as the geographical location of the smartphone, light movement, and audio and visual sensors provide an efficient solution for continuously collecting data and enabling new crowdsourcing applications(Chatzimilioudis, G, 2012).

Bhattacharjee & premkumar(2004) have verified that the user's beliefs and attitudes change before and after the use of the device. and The factors affecting the intention to use continuously were analyzed.

Egan, et al(2016) used empirical approaches to determine how the participants of the smartphone access conditions differ from the participants in the shortage of smartphones in order to predict that the psychological power increases when they access the smartphone. Through experiments and surveys (Egan, et al., 2016), it was defined through the SPO that

smartphone users influence their moral behavior (cheating, risk- taking, etc.).

in this study, Based on the previous study (Pierce, et al., 2003).

this study refer to six factors related to the SPO users of smartphone users based on the psychological power of users This is to determine how this will affect decision making.



3. Research method

3.1 Research model

The purpose of this study is to establish the theoretical concept based on theoretical considerations and to clarify how the psychological power of the users connected with the smartphone affects decision making. Therefore, we try to find out the effect of smartphone access on decision making through SPO route based on previous studies.

Independent variables are smartphone connections based on spo factor, and dependent variables are defined as decision making. In a previous study (Egan, et al., 2016), a smartphone connection was studied experimentally and the relationship between this connection and SPO was derived as follows.



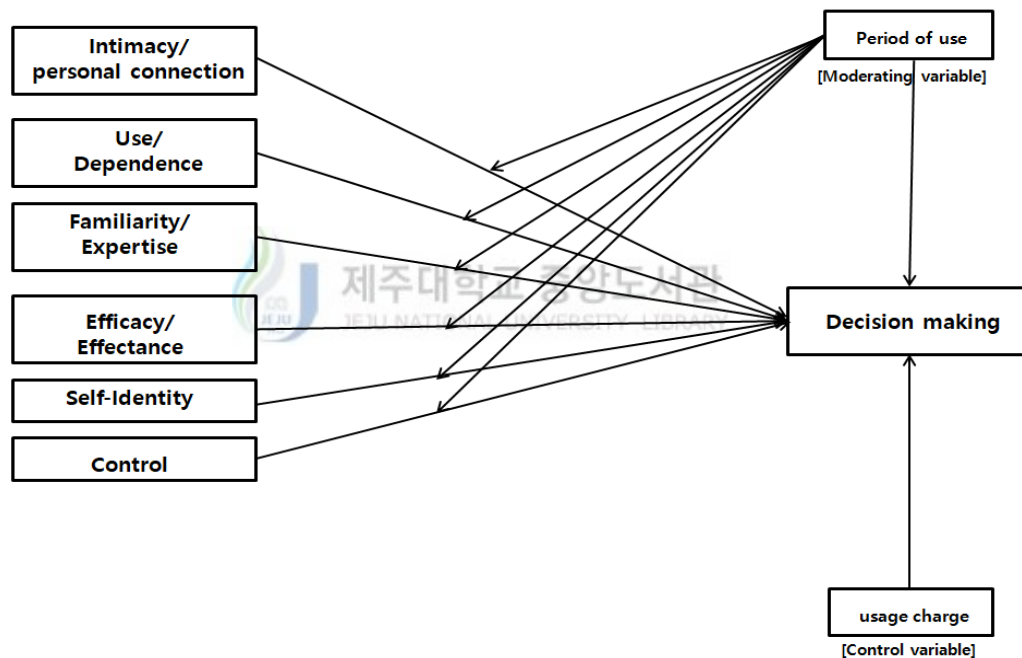
(Egan, et al., 2016 & Pierce, et al., 2003), based on the questionnaire items based on the SPO theory, revealed the SPO factors through smartphone access using the top-down approach, And the contents are as follows (Table 1).

Table1. Post hoc analysis of themes emerging from the six-factor solution(Egan, et al., 2016)

Factor	Item	Independent variable
1	My smartphone is a kind of "home-away-from-home".	Intimacy / Personal Connection
	My smartphone makes me feel connected to home wherever I am.	
	I feel that I've gotten to "know" my smartphone like one does a friend	
	My smartphone is an extension of myself.	
2	I always have my smartphone with me.	Use / Dependence
	I spend a lot of time using my smartphone.	
	I am very possessive of my smartphone. .	
	I would feel lost without my smartphone.	
3	I know how to use all of the features of my smartphone.	Familiarity / Expertise
	I am very familiar with my smartphone.	
	I have taken a lot of time to personalize my smartphone.	
4	My smartphone is extremely useful in helping me achieve my goals.	Efficacy / Effectance
	I am able to accomplish a lot more as a result of having my smartphone.	
	My smartphone makes me feel more capable.	
5	I have a lot of personal information stored on my smartphone.	Self-Identity
	My smartphone reflects my personality.	
6	Other people often use my smartphone. (reverse scored)	Control 제어
	I would be willing to let a friend borrow my smartphone for the day (reverse scored).	
	I am very possessive of my smartphone.	

Six factors that determine the impact of smartphone access on SPOs in previous studies (Egan, et al., 2016) are Intimacy / Personal Connection, Use / Dependence, Familiarity / Expertise, Efficacy / Effectiveness, and that it affects fraud, risk-taking, and moral inclination. Therefore, the research model to investigate the influence of decision making in comparison with this factor is as follows (figure 2).

Figure 2. Research model



3.2 Hypothesis development

In order to accurately explore and analyze the factors derived from the previous studies (Egan, et al., 2016), which were investigated in theoretical review, the following hypotheses established(Table2).

Table2. Establishment of hypothesis based on prior study.

Factor	Definition	Researcher
H1-1 Intimacy / Personal connection will affect decision making.	Smartphones are everywhere, inconspicuous, intimate, computational, powerful, and remotely connected.	(Dufau et al., 2011; Kwok, 2009; Raento, Oulasa, & Eagle, 2009).
	Both internet use and smartphone usage are related to communication tools and interoperability, so that the same attributes can be shared at all times.	(Takao et al., 2009)
	Human interaction refers to interaction with the user depending on the degree of use of the product.	(Bauer and Mead, 1995)
H1-2 Use/ Dependence will affect decision making.	People who depend on the Internet have reported stronger intimacy on the net and a cause for their dependence.	(Griffiths, 1999)
	The passive propensity of smartphone usage causes misuse of credit cards.	(Watson, 2009).
	The passive propensity of an individual argues that it increases obsessive behavior such as Internet addiction.	(Chak and Leung, 2004, İskender and Akin, 2010)
H1-3 Familiarity/ Expertise will affect decision making.	Multi-sensor capabilities, such as the geographical location of the smartphone, light movement, audio and visual sensors, provide an efficient solution for continuously collecting data and enabling new crowdsourcing applications.	(Chatzimilioudis, G, 2012).
	In people's lives, smartphones can be seen as a necessity of life. Smartphone users always wake up early in the morning and look at their smartphones before they go to bed.	(Lee, Y. K. & Cheng, Z. H, 2014).

H1-4 Efficacy/ Effectance will affect decision making.	As the user's self-efficacy (SE) increases, their anxiety will decrease, and on the contrary, they express a lower SE because of the possibility of failure.	(Bandura, 2001, Schunk, 2007)
	Self-efficacy is the individual's belief in his or her ability to perform the intended level of learning or performance.	(Schunk, 2000)
	Those with high self-efficacy use problem-oriented coping strategies, while those with low self-efficacy use emotional coping strategies.	(Weiner,1980)
H1-5 Self-identity will affect decision making.	Smartphones focus on performance, power, or self-development.	(Walsh, White, & Young, 2007).
	Self - identity is the role of the individual in the past and serves to guide future actions that are currently meaningful.	(Furman, 1992)
	Self- identity is the quality of the self whose individual self integrates his personality and maintains continuity and homogeneity of personal meaning.	(Erikson, 1968)
H1-6 Control will affect decision making.	Those with a centrally controlled focus are more likely to participate directly in problem-solving and reduce or eliminate possible stressors.	(Ng et al., 2006, Qiang et al., 2010).
	Self - depletion levels (social adaptation / emotion, etc.) Maybe different in self - regulation situations due to differences in control power.	(Dvorak& Simons, 2009)
	Define that if you do not press or suppress self-control, you interfere with goal-directed behavior.	(Baumeister, 2007)
Decision making	It is verified the user 's beliefs and attitudes change before and after the use of the device. The satisfaction of users' expectations and satisfaction are analyzed as factors affecting continuous intention to use.	(Bhattacharjee &premkumar,2004)
	The cause of human behavior is a state of consciousness, which directly induces action, aims to solve the problem,	(Mcleod&becker 1981)
	Smartphones provide a great platform for easy and convenient contribution to many people through the expansion of existing web-based applications.	(Chatzimilioudis, G, 2012)

The hypotheses of the above table are summarized as follows.

The first intimacy / personal connection will affect decision making.

Takao et al(2009) suggested that both Internet use and smartphone use can be shared at all times because they are related to communication tools and interoperability. They also say that smartphones are everywhere, inconspicuous, intimate, computational, powerful, and remotely accessible. In addition, since both Internet use and the use of smartphones are related to communication tools and interoperability, the same attributes can be shared at any time (Dufau et al., 2011; Kwok, 2009; Raento, Oulasa, & Eagle, 2009). Finally, human interaction means interacting with the user depending on how the product is used (Bauer & Mead, 1995). This corresponds to the intimacy / personal connection of smartphone users to smartphones.

The second hypothesis of use/dependence will influence decision making.

This suggests that the passive propensity of an individual increases compulsive behavior, such as Internet addiction (Chak & Leung, 2004, Iskender & Akin, 2010). And the use of smartphones and passive inclination causes credit card abuse (Griffiths, 1999). In addition, people using the Internet dependently use it as a cause of stronger intimacy and dependency on the net (Griffiths, 1999). These are justifications to support use/dependence.

The third familiarity expertise will influence decision making.

Multi-sensor capabilities, such as the geographical location of the smartphone, light movement, audio, and visual sensors, provide an efficient solution for continuously collecting data and enabling new crowdsourcing applications (Chatzimilioudis, G, 2012) Smartphones can be seen as a necessity of life. Smartphone users always look at their smartphones before they get up in bed in the morning (Lee, Y. K. & Cheng, Z. H. 2014). This corresponds to the familiarity / expertise of smartphone users.

The fourth efficacy/effectance will influence decision marking. People will feel less anxious as the user's SE (self-efficacy) increases, and those who do not express a lower SE because of the idea of failure (Bandura, 2001, Schunk, 2007). In addition, self-efficacy is the individual's belief in the ability to perform his or her intended level of learning or performance (Schunk, 2000), while those with high self-efficacy use problem-oriented coping strategies, Low people use emotion-oriented coping strategies (Weiner, 1980). This is the basis for supporting the fourth hypothesis because it corresponds

to the efficacy of smartphone users using the device.

The fifth self-identity will influence decision making. Smartphones focus on performance, power, or self-development (Walsh, White, & Young, 2007). Self-identity plays a role in an individual's role in the past, (Furman, 1992). And the person's self is the quality of the self that integrates his personality and maintains the continuity and homogeneity of personal meaning (Erikson, 1968). Therefore, smartphone users are supported by the hypothesis that they will use smartphones and feel their self - identity based on the above arguments, which will affect decision - making.

The sixth hypothesis is that Control will influence decision making. This is defined as interfering with goal-directed behavior by not pressing or restraining self-control (Baumeister, 2007). Therefore, those who have a dominant internal control are more likely to participate in problem solving and to reduce or eliminate possible stress factors (Ng et al., 2006, Qiang et al., 2010) Self-depletion levels (social adaptation/emotion, etc.) may be different in self-regulation situations (Dvorak & Simons, 2009). Therefore, in this paper, we want to find out whether smartphone users want to receive external control through this hypothesis setting and questionnaire.

Finally, previous research results on decision making. Smartphones offer a great platform for easy and convenient contribution to many people through the expansion of existing web-based applications (Chatzimilioudis, G, 2012). In addition, the cause of human behavior is a conscious state, which directly induces action, aims at solving problems, and is a situation-dominant concept (Mcleod & becker 1981). Users have verified that the user's beliefs and attitudes change before and after the use of the device, and analyzed the satisfaction and satisfaction of the user as a factor affecting the continuous intention to use (Bhattacharjee & premkumar 2004). Therefore, smartphone users are at the core of this paper's hypothesis that all factors will influence decision-making based on the preceding research.

3.4 Organize and Analyze Questionnaires

In contrast to the effects of SPOs on moral behavior through smartphone accesses proposed in previous studies (Egan, et al., 2016), this study defines what kind of choices the smartphone users will make in decision- I want to. Therefore, this survey limited the respondents to the consumer group using a smartphone for research purposes and the conclusion is drawn by questioning 6 items of SPO to smartphone users.

A 5-point Likert scale (5 = very agreeable, 1 = not agree at all) was used for the measurement.

3.5 Collect data

In this study, we conducted a survey on smartphone users. We collected surveys through smartphone users and completed the collection of 200 copies with the aim of collecting 200 copies. The survey was conducted from May 1, 2019 to May 10, 2019. A total of 194 collected surveys were used for actual statistical analysis.

3.6 Analyze questionnaire

The questionnaire analysis method is statistical processing of the collected data, and it is analyzed using Smart PLS 3.0 after the data coding process. It was used as a software to check external (validity and reliability) and internal models (ie hypothesis testing), and PLS-SEM was considered a suitable choice for this study.

According to previous studies, PLS-SEM is increasingly used in many fields to evaluate structural models. PLS-SEM has become a popular choice for marketing and management researchers due to its ability to analyze complex models with morphological and/or reflective structures with unstructured data and small sample sizes (Hair et al., 2013).

Smart PLS analysis verified reliability analysis, feasibility analysis, unstructured equation model analysis and research hypothesis. Through the analysis of the measurement model, it is confirmed that the internal reliability, the central validity, and the discrimination validity are satisfied, and the psychological power through the connection of the smartphone affects the decision of the user.

This study provides in-depth forecasts on how users will make decisions in new fields in the future, and also provides a research base that can provide characteristics of factors that many companies should consider before launching products.

First, demographic characteristics were analyzed using frequency analysis.

Second, reliability analysis of each item was conducted through reliability analysis.

Third-factor analysis was used to analyze each factor relationship in the items and to group the related variables into one independent factor.

Fourth, through path analysis, variables are influenced by different variables Were used for analysis.

4. Data Analysis

In the reliability test, the Cronbach's Alpha coefficient is calculated to be 0.6 or more, and in the case of the composite reliability (CR), it is significant when it exceeds 0.8. Validity verification is meaningful when the Average Variance Extracted (AVE) is greater than 0.5 (Ringle, et al., 2015). The following Table 3 meets the criterion as a result.

Table3. Construct Reliability and Validity

Var. name	Cronbach's AI	rho_A	Composite Reliability	AVE
intimacy/ personal connection	0.818	0.827	0.879	0.646
use/ dependence	0.788	0.799	0.864	0.617
familiarity/ expertise	0.757	0.772	0.858	0.668
efficacy/ effectance	0.816	0.821	0.891	0.731
self-identity	0.798	0.797	0.882	0.713
Control	0.60	0.790	0.816	0.694

In this study, the square root of AVE is larger than the correlation coefficient with other factors when analyzed to test the conceptual validity of the measurement tool. Therefore, this data is meaningful (Table 4).

Table4. Discriminant validity

Control	0.834						
Decision making	-0.321	0.817					
Efficacy/Effectance	-0.198	0.605	0.855				
Familiarity/ Expertise	-0.290	0.383	0.527	0.817			
Intimacy/ Personal connection	-0.172	0.487	0.496	0.415	0.803		
Self-identity	-0.296	0.598	0.560	0.444	0.513	0.844	
Use/ Dependence	-0.263	0.553	0.529	0.582	0.536	0.640	0.786

* Values of the correlations between LV and square roots of the AVE values in the main diagonal

4.1 Respondent analysis

The characteristics of this study are limited to smartphone users. The questionnaire was conducted among smartphone users from May 1 to May 10, and 200 copies were collected with the goal of collecting 200 copies, and 194 copies were used for final analysis.

4.2 Demographic characteristics of respondents

Pfeffer(1985) found that demographic characteristics are measured by individuals in social science research, these data can be an important variable in reflecting social phenomena. In this study, we used demographic characteristics as control variables and Moderating variables. Demographic characteristics were classified into sex, age, educational background, and duration of smartphone usage. The contents are shown in the following Table 5.

Table5. Demographic analysis

var	Division	Frequency	Ratio(%)
Period of use	not more than a year	11	5.7
	1 to 3 years	28	14.5
	3 to 5 years	27	14.0
	5 to 7 years	53	27.5
	7more than seven years	74	38.3
Gender	Male	103	53.4
	Female	90	46.6
Age	20~29 years old	145	75.1
	30~39 years old	18	9.3
	40~49 years old	10	5.2
	Over 50 years of age	20	10.4
Education	Middle school	1	.5
	High school	39	20.2
	College school	107	55.4
	Graduation	34	17.6
	Above graduate school	12	6.2

4.3 Hypothesis Verification

The results of the analysis using PLS-SEM (Partial Least Squares-Structural Equation Modeling) are shown in Figure.6

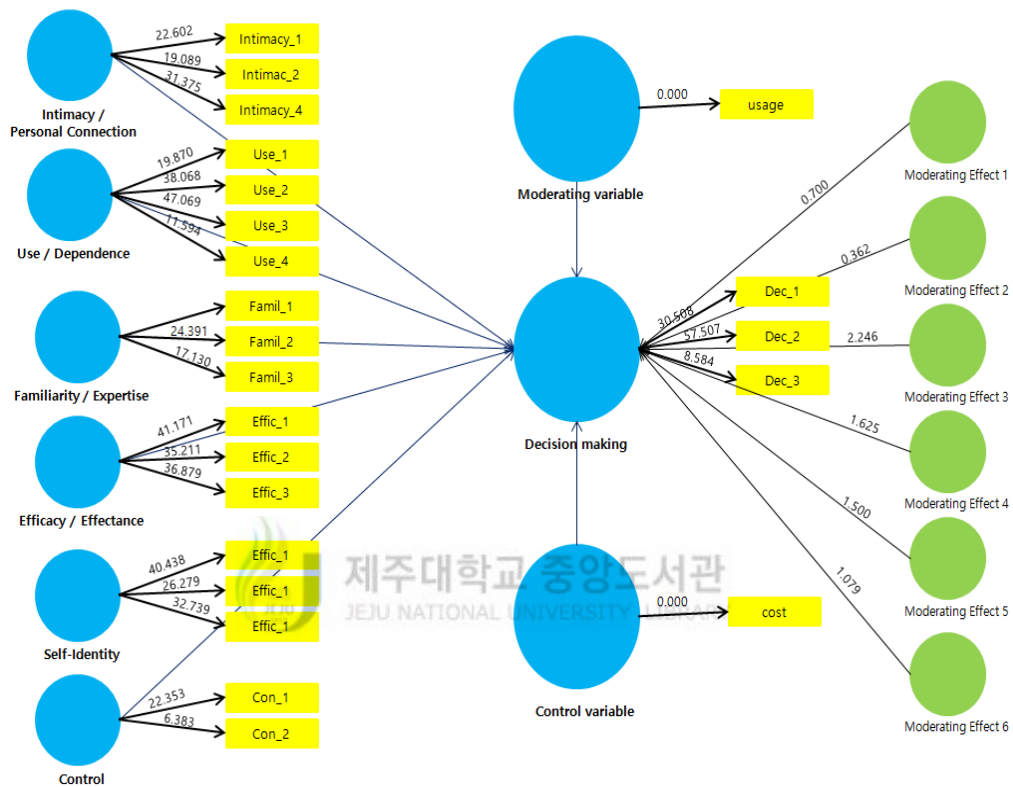


Figure 6. Result of research model using PLS-SEM

The results of the hypothesis test show that 1 Intimacy/Personal, 2 Use/Dependence, 4 efficacy/effectiveness, 5 self-identity, and 6 control are statistically significant in terms of the impact on decision making, as shown in Table 3. This result has a significant result in itself because it satisfies $T > 1.645$, $P < 0.10$ and hypotheses 1, 2, 4, 5, and 6 all meet the criteria and are consequently accepted. In addition, since Hypothesis 6 control is a reverse score, factor 6 is reverse-coded to meet the criterion(Table6).

Table6. Hypotheses analysis results (Dependent variable: decision making)

Hypo.	Independent variable	Original sample	STDEV	T	P	Res
1	Intimacy/ Personal connection	0.129	0.126	1.789	0.074	Accept
2	Use/ Dependence	0.172	0.174	2.107	0.035	Accept
3	Familiarity/ Expertise	-0.092	0.089	1.353	0.176	Reject
4	Efficacy / Effectance	0.342	0.341	4.970	0.000	Accept
5	Self-identity	0.227	0.225	2.614	0.009	Accept
6	Control(reverse scored)	0.172	0.174	2.107	0.035	Accept

Table 7. Moderating effect (moderating variable: period of use)

moderating effect	variable Independent	sample Original	STDEV	T	P	Res
1	intimacy/personal connection	0.108	0.070	1.557	0.120	Reject
2	use/dependence	-0.070	0.066	1.051	0.293	Reject
3	familiarity/expertise	-0.158	0.069	2.289	0.022	Accept
4	efficacy/effectance	-0.027	0.076	0.347	0.729	Reject
5	self-identity	0.132	0.087	1.513	0.131	Reject
6	control	-0.043	0.063	0.678	0.498	Reject

5. Conclusion



5.1 Summary and Implications

In this study, we analyzed smartphone users to investigate the factors affecting decision making of psychophysical power of smartphone. This analysis is based on the feature of smartphone users. The psychological power of smartphone users will have a strong influence on decision making in all areas based on the behavior of smartphone users, which will be meaningful research in tourism, brand purchase, and new product development.

Since the advent of smartphones, steady learning and development of machines have increased the frequency of using smartphones in all areas, and convenience has increased. In this study, we investigated how the psychological power of smartphone users affect users' decision making by using intimacy/personal connection, use/dependence, familiarity/expertise, efficacy, control, and decision making.

According to the analysis results, the following hypothesis was adopted.

First, intimacy/personal relationships are affecting decision making. The T value is 1.789 and the P value is 0.074 so all standard values are met.

$T > 1.645$ and $P < 0.10$ Therefore, intimacy / personal connection means that users feel superior to smartphone users.

Second, use / dependence is affecting decision making. Since the T value is 2.107 and the P value is 0.035, it satisfies all of the standard values

$T > 1.645$ and $P < 0.10$ Therefore, use / dependence means that the user is using the smartphone for a long time and that the dependency on the smartphone is high.

Third, Efficacy / Effectance influences decision making. Since the T value is 4.970 and the P value is 0.000, it satisfies all of the standard values $T > 1.645$ and $P < 0.10$ This means the psychological power of affirmation that users are helped to achieve their goals through a smartphone, which affects decision making.

Fourth, self-identity is affecting decision making. Since the T value is 2.614 and the P value is 0.009, all standard values are met.

$T > 1.645$ and $P < 0.10$ Therefore, self-identity means that the user feels self-identity through the smartphone

Fifth, control influences decision making. Since the T value is 2.107 and the P value is 0.035, it satisfies all of the standard values $T > 1.645$ and $P < 0.10$ In addition, two of the questionnaire items on the actual control appeared as reverse scores. As a result of reverse coding, T and P values were 2.321 and 0.020, respectively.

As future work, Hypothesis 3 needs to further analyze the reasons why the familiarity/expertise is rejected, and it is necessary to further analyze the

familiarity/expertise of smartphone users and items. However, as measured by the moderating variable effect (duration of smartphone usage), factor 3 familiarity/expertise was found to affect decision making with a t value of 2.246 p of 0.025, which is a significant variable. This means that users who have used the smartphone for a long period of time have a significant influence on smartphone decision making when they have the expertise and feel familiar with the smartphone.

That is when a user makes a decision making, the user does not like someone to control them. The focus of this study is the SPO defined in the previous study (Egan, et al., 2016). The psychological ownership felt by the smartphone users will be different for each person's tendency and values, and this psychological power will be divided into a decision of many results. Therefore, future research plans that can lead to positive results of psychological power felt by individuals will be a very important task.

In this study, we analyzed the effect of SPO of smartphone users on decision making in comparison with the effect of smartphone access SPO defined by Egan, et al.(2016) on risk-taking, cheating, and moral orientation.

the results of the experiments in the existing research are realistically low in the daily life of the smartphone users and the difficulty of the questionnaire is too high.

Therefore, in this study, the dependent variable was changed to decision making and the comparative analysis was carried out.

In previous research Egan, et al(2016), both the connection and deprivation status of smartphone users were measured by an experimental method. but the number of users who are in the state of being deprived of smartphones for a long time is very rare, Respectively.

Therefore, this study has a realistic reflection result itself when compared with the study of Egan, et al(2016) because it has always been for the subject who owns the smartphone at all times.

Smartphones are already deeply embedded in life. (Nielsen, 2012) noted that while mobile devices, including smartphones, can not completely replace other screens, it should be noted that content consumption is increasing. Many such studies have already argued that most users in their daily lives want to be helped in making decisions for effective business processing and problem solving by using a device called a smartphone. I feel that the demand and necessity for ubiquitous devices and services that can be conveniently used should be developed.

In addition, the psychological power of the user when using these ubiquitous attributes should also be carefully examined and noticed by all research institutes that can develop various researchers, companies, and ubiquitous fields. In the future, many smartphone devices will be developed considering the inclination of the individual in accordance with the 4th industry era. In line with this ubiquitous era, new technologies considering individual tendency and psychological conditions should be continuously developed. Therefore, this study will be meaningful data for the development of detailed technology and customized service that grasps the psychology of users in fields such as life, tourism, education, and management.

5.2 Theoretical conclusion

The level of psychological power uses and develops more of the user's device, that is, it strongly feels psychological ownership of it. Therefore, further research is needed (Egan, et al., 2016) (French & Raven, 1959), which allows for compulsory action on someone, and influences individuals, groups, and others in the system. The stronger the power, the less powerful the power is, the less is the control of the act of power, and because it can concentrate more on its own performance, it causes the wrong decision-making process and the wrong doctor It also shows that the decision has the potential to be further expanded and produced (pitesa, 2013).

Therefore, the study also wanted to verify whether such acts of power were carried out through smartphones. Studies have shown that smartphone users have established self-identity through spo that they feel through a smartphone without anyone's control, which also affects their decision-making.

Litwinski(1947) was one of the first to officially report for this facet of ownership. This confirms the step of acquiring the goods, and acceptance to the user is a simple task. For example, while a user occupies a park bench, he feels a sense of ownership of the bench. If someone comes and asks the user to move, he feels that the legitimate argument is violated as the person who first used the bench.

In this sense, the psychological power of an individual can be an object that can be influenced by individual smartphone users in a social or a part of life. For example, a traveling companion, a person who is opposed to my knowledge, or a student being taught is the subject of an individual's ability to engage in and influence human relationships.

Egan, et al(2016), said that the level of psychological strength of an individual due to the state of access and deprivation of a smartphone could be observed and compared with

changes in psychological power.

However, while many people always have smartphones, users who have been in a state of smartphone isolation for a long time are difficult to measure under the current circumstances. Except for special situations (such as watching movies, driving, and taking tests), it is rare for people who do not use their smartphones for long periods of time.

Thus, in reality, long-term users of smartphones make certain decisions and find out how to change these results is a difference from the preceding research that this study would like to make.

If the subject of psychological power is smartphone users, people can all have power. In other words, smart devices have the power to influence all decision making. This could be a wake-up call for those who rely on smart technology in the fourth industrial era.



5.3 Practical conclusion

This study shows the potential utility of smartphone usability due to SPO. It Will be a useful and reliable way to assess the potential social awareness of well-known smartphone technologies (eg, smart healthcare, smart device development, AI technology integration, etc.) and users' needs and their relationships. Future devices will continue to grow, so the importance of developing personalized devices for these users will also be an important factor.

In addition to the continuous growth of smart devices, this study can be meaningful data in many fields. Currently, smart devices are used in all industries and people like smartphones are used at every moment when they collaborate, search, and relate to friends. Therefore, we anticipate that the psychological power of everyone using a smartphone will affect many areas. In other words, the target to be able to provide marketing or services using the research results in the future may be a tourist who uses a smartphone, a student who uses a school facility using a smartphone, The user may be a shopper using the smartphone or a worker who collaborates using the smartphone. The results of this study will be basic bases in all fields to be studied through the psychological power of users in all fields such as the tourism industry, brand purchase, education, and marketing.

Finally, we expect this study to be of great help to smart device developers.

This means that smart devices are of course useful to people, but it is still a bit lacking to provide tailored services to individuals. Therefore, to provide personalized services to smartphone users with data such as the questionnaire and research results, the upgraded machine learning will enable a smart device to grow into a smarter device as if it could become a personal secretary . The device will grow even more, and it will be an innovative

device based on the user's psychology due to the appearance and use of personalized custom devices. This study will be a necessary study for the 4th industrial age in the future and it will be an important guideline to raise awareness that human psychology will always be proportional to the growth of the instrument. Therefore, it is hoped that a lot of more practical studies will be developed based on this study.



5.4 Limitations of Research

As future work, Hypothesis 3 needs to further analyze the reasons why the familiarity/expertise is rejected, and it is necessary to further analyze the familiarity/expertise of a smartphone users and items. Of course, the measurement of control variables (duration of smartphone usage) has produced meaningful results, but this is not the case for early smartphone users, as this is the result of people who have used smartphones for a long time. Therefore, it is necessary to develop a new technology that can feel the familiarity and expertise of smartphone that can solve this problem, and it is necessary to study whether it will result in decision making.

In addition, Egan, et al. (2016) conducted an empirical approach to measure smartphone access and moral behavior through the participation of actual users. It will also be necessary to have an experimental approach to the behavior of future decision making.

And, considering the smartphone access and deprivation state that researchers themselves have pointed out in the previous study (Egan, et al., 2016), users in the smartphone deprivation state do not exist for more than a few hours.

Therefore, it is necessary to consider the research method to verify what kind of result the psychological power that can be felt in the state of deprivation of smartphone.

Also, the current tendency to depend on smartphones causes problems in various fields such as addiction, cheating, and security problems. There is a need for countermeasures to compensate for this, and many studies that can deal with many negative factors to be considered in the future development stage will be needed. In addition, specific and empirical research should be presented, including guidelines for positive and healthy use of smartphones.

Survey

Hello? This questionnaire was prepared for research purposes to investigate how users 'Smartphone Psychological Ownership (SPO) through the connection of smartphones affect users' decision making. Even if you are busy, I would appreciate your response.

The questionnaire you responded to will be used as valuable invaluable material for the study of the psychological power of smartphones in exploring the factors that influence decision making and we promise that your opinions will be used only for statistical purposes.

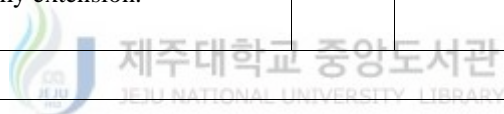
I wish for your unending development



Professor Mincheol Kim

Researcher Soyoung Park

Part 1. Question about Intimacy / Personal Connection among SPO characteristics. Please fill in (✓) for each question.						
Survey		Not very.	Not like that.	is average	Yes	it really is.
		①	②	③	④	⑤
1	My smartphone is a kind of "home life".					
2	My smartphone gives me the feeling that I am connected to my home wherever I am.					
3	My smartphone is like a friend.					
4	My smartphone is my extension.					



Part 2. Question about Use/ Dependence among SPO characteristics. Please fill in (✓) for each question.						
Survey		Not very.	Not like that.	is average	Yes	it really is.
		①	②	③	④	⑤
1	I always have a smartphone.					
2	I spend a lot of time using my smartphone.					
3	I strongly own my smartphone.					
4	I will be lost if I do not have a smartphone.					

Part 3. Question about Familiarity/ Expertise among SPO characteristics. Please fill in (✓) for each question.						
Survey		Not very.	Not like that.	is average	Yes	it really is.
		①	②	③	④	⑤
1	I can use all the features of my smartphone.					
2	I am very familiar with my smartphone.					
3	I spent a lot of time customizing my smartphone.					

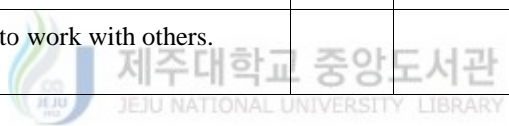


Part 4. Question about Efficacy / Effectance among SPO characteristics. Please fill in (✓) for each question.						
Survey		Not very.	Not like that.	is average	Yes	it really is.
		①	②	③	④	⑤
1	My smartphone is very useful for helping me achieve my goals.					
2	I can do much more because I have a smartphone.					
3	My smartphone makes me more capable.					

Part 5. Question about Self-identity among SPO characteristics. Please fill in (✓) for each question.						
Survey		Not very.	Not like that.	is average	Yes	it really is.
		①	②	③	④	⑤
1	Smartphones have my characteristics.					
2	My smartphone reflects my personality.					
3	My smartphone has a lot of my personal information..					

Part 6. Question about Control among SPO characteristics. Please fill in (✓) for each question.						
Survey		Not very.	Not like that.	is average	Yes	it really is.
		①	②	③	④	⑤
1	Others often use my smartphone (reverse scored).					
2	I will gladly allow a friend to lend me my smartphone(reverse scored).					
3	I am very possessive about smartphones.					

Part 7. The following are questions about the Decision making. Please fill in (✓) for each question.						
Survey		Not very.	Not like that.	is average	Yes	it really is.
		①	②	③	④	⑤
1	I use a smartphone to plan the future or something.					
2	I use my smartphone to determine what I am currently doing.					
3	I use a smartphone to work with others.					



Part 8. The following questions are questions about your personal matters.
Please fill in (✓) for each question.

1. How long have you been using your smartphone?

- ① Less than 1 year ② 1 to 3 years ③ 3 to 5 years ④ 5 to 7 years
- ⑤ More than 7 years

2. What is your gender?

- ① Male ② Female

3. What is your age?

- ① 10 units ② 20 to 29 years ③ 30 to 39 years ④ 40 to 49 years
⑤ 50 years or older

4. What is your academic background?

- ① below middle school ② at high school ③ at College ④ Graduation
⑤ Above graduate school

5. How much is your plan?



- ① 10000 ~ 29,999 ② 30000 ~ 49,999
③ 50000 ~ 69,999 ④ 70000 ~ 89999 ⑤ Over 90000

6. What is your personal income (average monthly income)?

Please enter it manually. ()

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