

## The Effects of Foldable Phone Types on Product Attitude and Purchase Intention: Moderating Effects of Pursued Benefits and Gender

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### Abstract

**Background/Objectives:** This study was done to examine the effect of the types of foldable smartphone (hereafter will be called foldable phone) (book-type vs. clamshell-type) on product attitude and purchase intention of consumers, and moderating effects of benefits pursued by consumers and gender of them.

**Methods/Statistical analysis:** To create the data, this study did a survey to college and graduate school students and common people in Korea. Among collected 509 copies of the questionnaire, 494 copies (251 for book-type; 243 for clamshell-type) were used for analysis excluding 15 which were not sincerely filled out. To test hypotheses, this study used t-test, two-way ANOVA, and regression analysis.

**Findings:** Data analysis showed that respondents were more favorable to book-type foldable phone which folds horizontally than clamshell-type one folding vertically. Second, those who seek symbolic benefits favor book-type product more than those seeking functional benefits, proving the moderating effect of the kind of benefits pursued. Third, there was no moderating effect of gender. While book-type foldable phone was favored more by male respondents than by females, and clamshell-type was favored more by females, the findings were not statistically significant. Fourth, product attitude on foldable phone positively affects product attitude.

**Improvements/Applications:** It is expected that, given the expansion of sales of foldable phones across the world, the findings of this study can provide practical hints to smartphone makers and communication companies in establishing marketing strategies. It is also expected that in establishing advertisement strategies through various media, related companies can refer to the findings of this study in selecting and attacking target customers.

**Keywords:** foldable phone (book-type/clamshell-type), pursued benefit (symbolic/functional), gender, product attitude, purchase intention

### 1. Introduction

After Apple launched iPhone in 2007, the smartphone market has rapidly grown over time. Currently, smartphone greatly affects all the industries including service, finance, manufacturing, and distribution businesses. Up to now, innovation in smartphone has been led by technology and design characteristics[1]. However, with the

maturation of smartphone-related technology, competition in smartphone business is going on in design characteristics rather than on technology. And, consumers pay attention to design[2]. In general, outer forms of smartphone have the basic display of rectangular bar with the horizontal length of it being shorter than vertical one. The mobile phone used before smartphone was distributed in full scale was called feature phone. Basically, the display and buttons were separated in feather phone. Feature phone was released with various forms such as flip type, slide type, and folder type in addition to the bar type. But, the form of smartphone has maintained the same basic form with the only difference in proportions of horizontal and vertical lengths.

Foldable phone equipped with foldable screen, that is, flexible display was released in the market for the first time by Royole, a Chinese brand, followed by new models issued by Samsung Electronics and others. Now, foldable phones are rapidly spreading across the world. Up to now, there have been many researches on general smartphones, mainly focusing on different brands, intention to buy it, and satisfaction with it, etc. While researches on foldable phone are also increasing[2,3,4,5,6], there are not sufficient researches on foldable phone.

Therefore, this study examined the effect of the types of foldable phone on product attitude and purchase intention of consumers, and moderating effects of pursued benefits by consumers and gender of them. It is expected that the findings of this study will help foldable phone makers and those in communication business to set and run marketing strategies.

## **2. Theoretical backgrounds and hypothesis setting**

### **2.1. Foldable phone types and product attitude**

Flexible display is the display which is flexible without damaging the screen. By replacing LCD and OLED glass substrate liquid crystal with specific plastic film, flexible display is strong against shock, light-weighted, and pliable[5]. Flexible display can be classified into foldable, bendable, rollable, and stretchable depending on how they are malleable. What was commercialized first was foldable type phone. Foldable phone is smartphone which can be folded, and it means folding type display phone whose screen can be folded into two based on flexible display technology[6]. Depending on how it is folded, foldable phone is divided into in-folding type and out-folding type. In-folding type then is divided into book-type which is folded into left screen and right screen, and clamshell type which is folded into upper screen and lower screen.

Based on the survey to smartphone users, Choi (2016)[7] predicted that next-generation smartphone would be foldable phone with horizontal two screens because of the change of the number of screens and use in workplace, change of reading behavior and documentary culture, and new consumption method of TV programs and change of communication. According to Jin and Yu (2019)[6], users favor in-folding type phone because they can read contents on the screen as if they read books, and they feel strange to out-folding type. In the conference call to report its performance of the 3rd quarter, 2018, Samsung Electronics announced the plan to launch its foldable phone, emphasizing that, when folded, the foldable phone would become smartphone, and, when spread, it would be like tablet, and that it would characterize multitasking of allowing users to do various jobs quickly and conveniently[8]. It means that the concept of foldable phone when Samsung first released it was close to screen-expanding book-type one.

Many existing researches consider the difference of attributes of different products is a moderating element affecting purchase behavior of consumers[9,10,11]. Book-type foldable phone can be used as big-screen tablet when it is actually used, raising its usability. In contrast, clamshell-type foldable phone becomes similar to common smartphone when it is used, and, when it is carried along, portability and design become excellent. Considering existing

researches, the concept of foldable phone when it was released, and appealing points like usability and portability, we can expect that book-type foldable phone will be preferred to clamshell-type one. Therefore, this study set the following hypothesis.

***H1. Consumers will prefer book-type product to clamshell-type one.***

## ***2.2. Interaction effect of pursued benefits***

Benefit is value or meaning consumer gives to product (or service)[12]. For example, benefits of smartphone include access to it anytime and anyplace, good performance of camera, and consistent performance, etc.

Levitt (1960)[13] points out that a consumer evaluates a product in terms of benefits, that is, positive results. Marketers perceive that, when a consumer purchase a product, he or she purchase the collection of benefits. Since Haley (1968)[14] suggested to classify markets depending on benefits consumers pursue, there have been many researches applying benefit classification and benefits[15,16,17,18,19]. Aaker (1992)[15] divided pursued benefits into rational benefit and psychological benefit. Rational benefit is concrete and objective attributes of a product, and psychological benefit is abstract and subjective one the consumer get from it. Park, Jaworski, and MacInnis(1986)[18] classifies the desires consumer pursue which affect the choice of a product into functional needs, symbolic needs, and experiential needs. Functional needs are related with motivation to solve functional problems, and symbolic needs are internally created needs, which are related with reference groups, roles, or self-images. Experiential needs are needs for sensitive joy, variety, and cognitive stimuli.

Keller (1993)[17] classifies benefits into functional benefit, symbolic benefit, and experiential benefit. Functional benefit is satisfaction of needs of consumer by purchasing a product. Symbolic benefit is the satisfaction of consumer needs to be socially recognized or express oneself. Experiential benefit is positive feeling consumer gets from using the product[12]. Assael (1998)[16] classifies benefit into utilitarian benefit and hedonic benefit. Utilitarian benefit is related with the attributes of a product which determine performance of it, and hedonic benefit is feeling of joy or fantasy consumer gets from using the product[20]. Han (2014)[19] proposes that benefit can be divided into direct and indirect benefits, and that, as consumers tend to focus on design innovation rather than technological innovation, consumers put emphasis on symbolism. Benefits of foldable phone can also be divided into symbolic benefit and functional benefit.

Kim and Gang (2005)[21] tests the effect of internal characteristics of consumer such as innovativeness, personal sensitivity, and knowledge on pursued benefits and product attributes, and proves that there are significant differences in benefits consumers pursue depending on internal characteristics of consumers. Kim and Joo (2015)[20] analyze benefits consumers pursue, and identifies that there is network benefit in addition to utilitarian benefit and hedonic benefit existing researches have pointed out. They categorize consumers into different groups according to benefits they pursue, and propose how they can be differentiated. Suh (2019)[4] classifies the elements affecting preference on new products like foldable phone and bendable phone into usefulness, convenience, joyfulness, and conspicuous consumption. They also argue that as smartphone is the product having social symbolism, marketing based on forms of smartphone is effective to appeal with messages showing images, tendencies, and social statuses of users. Usefulness and convenience suggested in above researches can be understood as functional aspects of benefits, and joyfulness and conspicuous consumption as symbolic aspects. Accordingly, this study classifies benefits pursued by consumers into functional benefits and symbolic benefits, which is consistent with utilitarian benefit and hedonic

benefit.

We can assume that consumers pursuing symbolic benefits will favor book-type foldable phone characterizing big screen and high-specifications, but that those pursuing functional benefits will favor clamshell foldable phone whose merits are functionality and portability. Accordingly, this study set the following hypothesis.

***H2. The effect of foldable phone product types on product attitude will be moderated by pursued benefits.***

***H2-1. Consumer who pursues symbolic benefits will favor book-type product.***

***H2-2. Consumer who pursues functional benefits will favor clamshell-type product.***

### ***2.3. Interaction effect of the gender of consumer***

Benefits consumer pursues vary depending on what kind of innovativeness consumer has. While sensitive consumer puts emphasis on hedonic, experiential, or esthetic elements, reasonable consumer favors functionality, usefulness, and convenience[22].

In her research on consumer attitudes, You (2002)[23] finds out that females tend to have more favorable attitudes to use of mobile phone than males. In his study on the advertisement types of mobile phone companies on social, psychological characteristics and gender of consumers, Park (2013)[24] finds that females are attracted to emotionally appealing advertisements than reasonably appealing ones. Choi (2015)[25] classifies colors and tones of mobile phone cases into six dimensions - pleasantness, attractiveness, grace, attention, practicality, and high-tech – and finds that gender of consumers makes significant differences in favoring pleasantness, practicality, and high-tech. And, Lee and Kim (2017)[26], in their cushion compact products, identify that females have higher interest in design than males, which affects their choice of products, and that most women female images of clean and clear curves in cosmetic designs.

In the outer forms of foldable phone as shown in Figure 1, we can say that book-type foldable phone resembles male long wallet in its design and usability, and that clamshell foldable phone is similar to common smartphones when it is open, and resembles female compact cosmetics when it is closed. Existing researches have proven that females are more interested in product design and portability than males. So, this study set the hypothesis that females will favor clamshell type excellent in design and portability more than males.



**Figure 1. Foldable Phone Types**

***H3. The effect of foldable phone product type on product attitude will be moderated by gender of consumers.***

***H3-1. Male consumers will favor book-type products more than females.***

*H3-2. Female consumers will favor clamshell-type products more than males.*

#### 2.4. Product attitude and purchase intention

Product attitude is the tendency of consumers to continuously favor or not favor a specific product[27]. Purchase intention is tendency to purchase a product or service. Attitude coming from consumer's emotion affects purchase intention[28]. Under the assumption that consumers make decisions rationally and systematically, product attitude is emotion or thought on a specific product. Beliefs and attitudes of consumers constructed based on information and knowledge affect consumer behavior, and intention to purchase product or service is influenced by beliefs and attitudes of consumers[29].

Purchase intention of smartphone is a variable predicting acceptance of innovation, and can be viewed as active willingness to purchase specific smartphones in the future[30]. In their research on smartphone product attitude, Kim and Lee (2012)[29] find that both design typicality and product innovativeness has positive (+) effects on product attitudes, which then has positive (+) effects on purchase intention. There are other researches showing positive relationship between product attitude and purchase intention. Based on such findings, this study set the following hypothesis.

*H4. Product attitude on foldable phone will have positive (+) effect on purchase intention.*

### 3. Research Methods

#### 3.1. Research model

The aim of this study is to examine whether product attitudes on foldable phone can vary depending on phone types (book-type/clamshell-type), and whether it will be moderated by benefits pursued and gender of consumers. Accordingly, this study developed two virtual advertisements depending on foldable phone types, and measured product attitudes of consumers focusing on pursued benefits and gender of them. [2 (type: book-type vs. clamshell-type) × 2 (pursued benefits: symbolic vs. functional) × 2 (gender: male vs. female)]. And, this study constructed the research model as Figure 2.

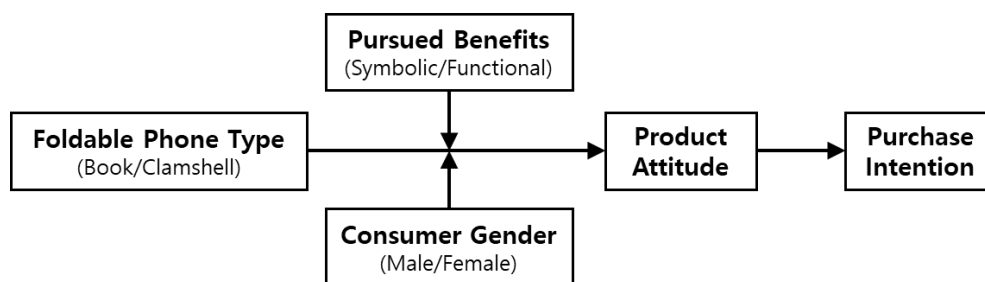


Figure 2. Research Model

#### 3.2. development of stimuli and experimental procedure

Experimental stimuli for this study were print advertisements for 1 kind of book-type foldable phone and clamshell-type one. To control the effects of exogenous variables on existing brands and products, this study created new brands and product names.

To measure product attitudes and purchase intentions for both book-type and clamshell-type products, this study

made 2 kinds of questionnaire, because there are two kinds of products. In each questionnaire, To control the order effect, this study showed the book-type foldable phone first in one questionnaire, and clamshell-type phone in other questionnaire first.

This study conducted the survey to university and graduate school students and common people in Daegu City and Gyeongbuk Province from November 20, 2020 to January 21, 2021. Due to the limitations for face-to-face survey caused by the Covid-19 pandemic, this study used both offline survey and online survey using the Google website together. 509 copies of questionnaire were collected. Excluding 15 copies which were filled out insincerely or had many missing values, this study used 494 copies for final analysis. To induce sincere responses and active participation, this study gave small gifts to participants. Demographic characteristics of respondents are shown in Table 1 below.

**Table 1: Demographic characteristics of respondents**

		Male	Female	Total
Age	10s	0	8	8
	20s	66	64	130
	30s	87	34	121
	40s	101	72	173
	50s~	41	21	62
Total		295	199	494

### 3.3. Manipulation check

To control exogenous variable effects before measuring variables, this study did manipulation check. There should be no difference in familiarity to two products (book-type / clamshell-type) perceived by consumers. Referring to Kent & Allen (1994)[31] and Park (2019)[32], this study measured familiarity of them with 3 items (I have heard of; I know it well; I feel familiar with it), and used 7-point Likert scale to measure them (1=Definitely no ~ 7=Definitely yes). Manipulation check using 40 smartphone users showed no big difference in familiarity to book-type foldable phone and clamshell-type one as shown in Table 2 ( $M_{Book}=5.100$ ,  $M_{Clamshell}=5.275$ ,  $p>.05$ ).

**Table 2: Familiarity to stimuli**

	Type	N	Mean	S.D.	t	p
Familiarity	Book	40	5.100	1.6016	-.481	.632
	Clamshell	40	5.275	1.6502		

### 3.4. Measurement of variables

Foldable phone types in this study were suggested as nominal variable (1=book-type, 2=clamshell-type). Referring to Ajzen (1980)[27] and Yim (2018)[33], product attitudes were measured with 5 items (favor, goodness, quality, trust, and usefulness) using 7-point Likert scale to measure them (1=Definitely no ~ 7=Definitely yes). (Product attitudes: Cronbach's alpha= .937). Referring to Fishbein and Ajzen (1974)[34] and Park (2019)[32], purchase intention was measured with 5 items (purchase desire, purchase intention, purchase hope, purchase efforts, and recommendation to others) with the same method (Purchase intention: Cronbach's alpha= .964).

The Effects of Foldable Phone Types on Product Attitude and Purchase Intention: Moderating Effects of Pursued Benefits and Gender

Referring to Eastman, Goldsmith, and Flynn (1999)[35], Voss, Spangenberg, and Grohmann (2003)[36], and Han (2014)[19], pursued benefits of consumers which was used as the moderating variable consisted of the followings: 6 items for symbolic benefits (luxury, trend, pride, social status, personality, and image) and 6 items for functional benefits (convenience, easiness, excellent performance, usefulness, needs, and life) (Symbolic benefits: Cronbach’s alpha= .915, Functional benefits: Cronbach’s alpha= .897). By checking average scores in two types of foldable phone respondents gave, they were divided into two groups – symbolic benefit-pursuing consumers and functional benefit-pursuing consumers. In other words, if the average score in items regarding book-type foldable phone a respondents gave was higher than the score to those regarding clamshell-type phone he or she gave, the respondent was regarded as belonging to the book-type foldable phone. Gender of respondents were measured with nominal variable (1=male, 2=female).

**4. Hypothesis test**

**4.1. Test of hypothesis 1**

Hypothesis 1 is that consumers will prefer book-type product to clamshell-type one. Therefore, this study did t-test by using foldable phone type (book-type vs. clamshell-type) as independent variable and product attitude as dependent variable. The results are summarized in Table 3.

**Table 3: The relationship between foldable phone type and product attitudes**

	N	Mean	S.D.	t	p
Book	251	5.045	1.3059	2.524	.012
Clamshell	243	4.733	1.4407		

Table 3 shows that preference score of book-type product is higher than the corresponding score for clamshell-type one ( $M_{Book}=5.045$ ,  $M_{Clamshell}=4.733$ ,  $t=2.524$ ,  $p=.012$ ). Thus, hypothesis 1 that the former will be preferred to the latter was accepted at significance level 0.05.

**4.2. Test of hypothesis 2**

Hypothesis 2 is that the effect of foldable phone type on product attitudes will be moderated by pursued benefits (symbolic vs. functional). That is, it is hypothesized that consumers pursuing symbolic benefits will favor book-type product (H2-1). To test these hypotheses, this study divided pursued benefits into symbolic benefits and functional benefits, and did two-way ANOVA using foldable phone types as independent variable and product attitudes as dependent variable. In addition, to examine whether there is any difference in product attitudes depending on pursued benefits per product type, this study did t-test.

**Table 4: Product attitude dependent on product type and pursued benefits**

Dependent Variable: Product Attitude

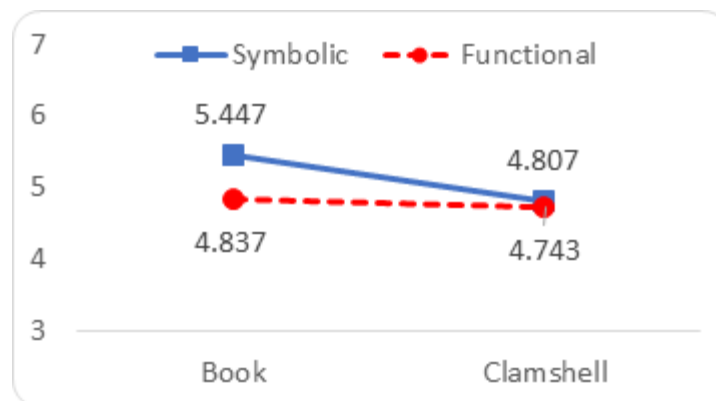
Source	Type III Sum of Squares	df	Mean Square	F	p
Corrected Model	27.463a	3	9.154	5.012	.002
Intercept	10132.448	1	10132.448	5547.669	.000

Product Type(A)	13.905	1	13.905	7.613	.006
Pursued Benefit(B)	11.724	1	11.724	6.419	.012
A*B	7.670	1	7.670	4.199	.041
Error	818.242	448	1.826		
Total	11723.720	452			
Corrected Total	845.705	451			

a. R Squared=.032 (Adjusted R Squared=.026)

**Table 5: Product attitude dependent on pursued benefits**

Type	Pursued Benefits	N	Mean	S.D.	t	p
Book	Symbolic	76	5.447	1.2150	3.373	.001
	Functional	156	4.837	1.3293		
Clamshell	Symbolic	84	4.807	1.3272	.330	.742
	Functional	136	4.743	1.4592		



**Figure 3. Product attitude dependent on pursued benefits**

As shown in Table 4, interaction effect of foldable phone type and pursued benefits was significant ( $F=4.199$ ,  $p=.041$ ) at .05 significance level. Therefore, we can say that product attitude on foldable phone types varies depending on pursued benefits. As shown in Table 5 and Figure 3, product attitude score on book-type product was higher among those pursuing symbolic benefits than among those pursuing functional benefits ( $M_{\text{Symbolic}}=5.447$ ,  $M_{\text{Functional}}=4.837$ ,  $t=3.373$ ,  $p=0.001$ ). The results were statistically significant ( $p<0.05$ ).

While product attitude score on clamshell-type product was higher among consumers pursuing symbolic benefits than among those pursuing functional benefits ( $M_{\text{Symbolic}}=4.807$ ,  $M_{\text{Functional}}=4.743$ ,  $t=.330$ ,  $p=.742$ ), it was not statistically significant ( $p>0.05$ ). Thus, hypothesis 2 that the book-type product would be preferred by consumers seeking symbolic benefit was adopted, and the hypothesis that the clamshell-type product would be preferred more by those seeking functional benefits than those seeking symbolic one was also adopted.

### 4.3. Test of hypothesis 3

Hypothesis 3 is that the effect of foldable phone type on product attitude will be moderated by gender of consumers.



The Effects of Foldable Phone Types on Product Attitude and Purchase Intention: Moderating Effects of Pursued Benefits and Gender

That is, male consumers will favor book-type product (H3-1), and females will do clamshell-type one (H3-2). To test the hypothesis, this study divided respondents into male and female respondents, and did two-way ANOVA using foldable phone types as independent variable, and product attitude as dependent variable. To examine the difference in product attitudes dependent on gender, this study did t-test.

**Table 6: Product attitude dependent on product type and gender**

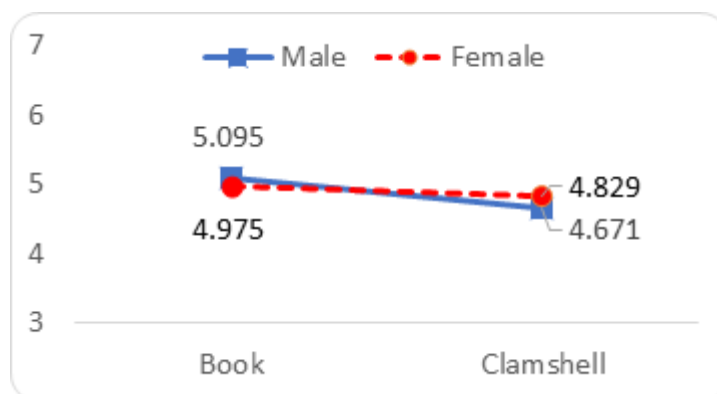
Dependent Variable: Product Attitude

Source	Type III Sum of Squares	df	Mean Square	F	p
Corrected Model	14.355 <sup>a</sup>	3	4.785	2.531	.056
Intercept	11368.786	1	11368.786	6013.850	.000
Product Type(A)	9.626	1	9.626	5.092	.024
Gender(B)	.044	1	.044	.023	.879
A*B	2.299	1	2.299	1.216	.271
Error	926.313	490	1.890		
Total	12762.440	494			
Corrected Total	940.668	493			

a. R Squared=.015 (Adjusted R Squared=.009)

**Table 7: Product attitude dependent on gender**

Type	Gender	N	Mean	S.D.	F	p
Book	Male	148	5.095	1.2667	.714	.476
	Female	103	4.975	1.3633		
Clamshell	Male	147	4.671	1.4777	-.837	.403
	Female	96	4.829	1.3844		



**Figure 4. Product attitude dependent on gender**

As shown in Table 6, interaction effect of foldable phone type and gender ( $F=1.216$ ,  $p=.271$ ) was not significant at  $p=0.5$  level. While preference of book-type product was favored more by males than by females ( $M_{\text{Male}}=5.095$ ,

$M_{\text{Female}}=4.975$ ,  $t=.714$ ,  $p=.476$ ) as shown in Table 7 and Figure 4, it was not significant ( $p>.05$ ). Consequently, the hypothesis that the effect of foldable phone type on product attitude will be moderated by gender was dropped at significance level .05.

#### 4.4. Test of hypothesis 4

Hypothesis 4 is that product attitude on foldable phone will have positive (+) effect on purchase intention. So, this study did regression analysis using product attitude as independent variable and purchase intention as dependent variable.

**Table 8: The effect of product attitude on purchase intention**

Model	Unstandardized Coefficient		Standardized Coefficient	t	p	Adjusted R <sup>2</sup>	F	p	
	B	S.E.	B						
1	(Constant)	-.789	.160		-4.920	.000	.663	973.033	.000
	Product Attitude	.984	.032	.815	31.193	.000			

a. Dependent Variable: Purchase Intention

As Table 8 shows, the explanatory power of the regression, R<sup>2</sup>(R Square) was 0.663, quite a high value, and F value was 973.033, significant at significance level .05. In summary, product attitude positively affects product attitude. Thus, hypothesis 4 that product attitude on foldable phone would have positive (+) effect on purchase intention was adopted at significance level .05.

## 5. Conclusion

This study examined the effect of foldable phone type (book-type vs. clamshell-type) on product attitude and purchase intention, and, also, identified moderating effects of benefits pursued by consumers (symbolic vs. functionary) and gender.

The findings can be summarized as follows. First, it was found that respondents prefer book-type product to clamshell-type one. Second, there was moderating effect of benefits pursued by consumers. Those seeking symbolic benefits prefer book-type one more to clamshell-type one. Third, there was no moderating effect of gender. Fourth, product attitude on foldable phone positively affects product attitude.

The findings of this study offer following theoretical and practical hints. First, this study is timely in the sense that a number of flexible display smartphones equipped with various form factors are being released and spread across the world. So, it is expected that the findings of this study will give some hints in establishing marketing strategies by smartphone makers and mobile phone companies. Second, in the situation where foldable phone advertisements and PPL are performed through various broadcasting media and print media, the findings can be used by smartphone makers and broadcasting companies to select and attack target customers.

Despite such hints this study might provide, there are some limits in this research. First, two types of foldable phone advertisements offered as stimuli in this study were actually photos of products released in the market. So, there were some possibilities that images on existing products and brands and attitudes on them could have worked as exogenous variables. Second, while this study examined product attitude and purchase intention, such things

cannot automatically lead to actual behavior of consumers because of specific characteristics of foldable phone such as price, weight, and functions, etc. Third, In the sense that, in addition to book-type and clamshell-type products, various other new type foldable phones such as wing-type, stretchable-type, and rollable-type products have been released or are expected to be released to the market, there are needs to do further researches on smartphone products equipped with various form factors.

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