Influential Factors of Digital Customer Experiences on Purchase in the 4th Industrial Revolution Era
– Focusing on Moderated Mediating Effects of Digital Self Efficacy–

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Abstract

In the era of the 4th Industrial Revolution customers living began to come out, not inside the purchase funnel. Due to the diversity of product selection and the increase in digital channels, the way customers search for information and purchase it is changing innovatively.

So, the customer journey in the digital age is much more complicated than the traditional funnel model suggests. Unlike many previous studies, this study was conducted for 1,200 customers in four product groups of fashion, automobile, cosmetics, and online shopping malls.

As a result of the study, we investigated how digital self-efficacy plays a role in purchasing in a series of processes in which digital experience affects customer satisfaction and finally affects purchase. As a theoretical implication, as a result of introducing and testing digital self efficacy as moderated mediation effect. the digital self-efficacy between customer satisfaction and customer loyalty were determined to play a moderated mediation effect role.

As a practical implication, it was necessary to actively utilize digital marketing for customers with high digital self-efficacy, but it was suggested that customers with low digital self-efficacy need to be careful about digital marketing fatigue.

■ **Key words**: Fourth Industrial Revolution, Digital Customer Experience, Digital Self efficiency, Moderated mediation effect.

Ⅰ. Research purpose

In traditional marketing, we looked at customer journeys as a funnel model. It has been seen that the process of thinking about many brands in mind, and reducing the number through

marketing, and eventually buying one of their brands, is a funnel.

Customers living in the fourth industrial revolution were not inside the purchasing tunnel, but began to come out. Coupled with the advent of smart, information-armed customers, the breadth of product choices and the explosion of digital channels are making it impossible to explain the key buying factors in the customer journey with this model. The way information is explored and purchased is changing radically(Chung and Jung, 2018).

The customer journey in the digital age has become much more complicated than the traditional funnel model suggests. Nonlinear and sophisticated approaches to various interactions, not linear, are required(Court et al.,2009).

There are three main characteristics of previous research on digital customer experience: first, most studies have been conducted in a specific industry or product line(Kawaf and Tagg, 2017). Second, the attributes that affect the customer's journey have also been studied only for certain attributes(Heskett et al.,1994). Third, devices that affect digital experience are often limited to specific devices, such as the Internet or mobile(Daurer et al.,2015).

Chung and Jung (2018) derived digital experience attributes while studying the relationship between digital experience and purchase and tested them in four product categories(Chung and Jung, 2018). Based on their research, this study also analyzed the effects of digital customer experience on loyalty and purchase among fashion, automatons, cosmetics and online shopping mall users In addition, the analysis focused on the role of customer satisfaction between digital customer experience and loyalty, and whether digital self-efficiency between customer satisfaction and loyalty plays a role.

The purpose of this study is as follows.

First, analyze how digital customer experience has a relationship with loyalty and purchase in the customer journey. Second, the role of intermediaries of customer satisfaction and the moderating effects of digital self-efficiency in their relationship is analyzed. Third, based on this, theoretical and practical implications are presented.

Ⅱ. Theoretical background

2.1 Digital customer experience

Digital customer experience means customer's emotions, reactions and behaviors that occur in the process of online communication (eg, search, question, review, evaluation, change of personal information) or trading (eg, purchase and payment, return, charge and gift, open a bank account, transfer, etc.) with companies using digital devices (eg, smartphones, tablets, PCs, etc.) that customers have. In other words, digital customer experience is a collective term for customer's emotions, reactions, and behaviors in the process of communication and trading using digital device[7]. The study of customer experience has mainly focused on assessing service quality and analyzing the impact of this quality on customer behavior. A typical example is the SERVQUAL model(Zeithaml et al.,1990,1996). However, Verhoef et al (2009) said that it is very important to

focus on a brand because it can have a competitive advantage through its customer experience, and that customer experience should be more than a service quality assessment.

In other words, the biggest difference between customer experience and quality of service is that customer experience implies customer sentiment(Verhoef et al.,2009). On the other hand, the quality of service has been largely focused on the customer's cognitive assessment, which has ignored the customer's emotional role.

In the study of digital customer experience, Hoffman and Novak (2009) viewed digital customer experience from a cognitive perspective that interact digitally(Hoffman and Novak, 2009).

However, Rose et al. (2012) emphasized the importance of customer emotion in digital experience (Rose et al.,2012). Still, understanding of the customer's behavior under the digital environment is still in its infancy(Trevinal and Stenger, 2014).

Table 1. Constructs and Attributes of Digital Experiences

Constructs	Attributes	Explanation
Presonalized Service Factor	uniqueness	confirm that I am different from the others and my personality
	recommendation	recommend things I want before I realize
	involvement	forcing me to involve in brand experience
	personalization	build customization process by identifying what I prefer
	hedonics	things that make me feel happ
Quality Factor	security	high level of safeness and security
	privacy	does not infringe my privacy
	Information Quality	able to retrieve exact information
Function Factor	anywhere	communicate anywhere using the devices
	experience compatibility	compatibility in all online and offline experiences including smart phones, PCs, and tablet PCs
	convenience	easy to operate
	aesthetics	beautifully designed pages

Based on the preceding study of these digital experience attributes, Chung and Jung(2018) derived into 12 categories and analyzed them by applying them to four product groups. As a result, 12 items can be grouped into individual service factors, quality factors and functional factors. Their findings are as shown in Table 1. In this study, the attributes of customer experience were based on their findings.

2.2 Service Profit Chain(SPC)

This study analyzes the impact of digital customer experience on a series of processes ranging from digital customer experience to brand loyalty and purchase, so the Service Profit Chain model that theorizes this series of processes is first shown below. In 1994, Heskett et al. established the

relationship between Quality of Service (SQ), Customer Satisfaction (CS), Customer Loyalty (Customer Loyalty: CL) and the Company's Financial Performance (SPC) model in Harvard Business Review.

As seen in Fig.1. the Service Profit Chain (SPC) model implies the assumption that increasing quality of service increases customer satisfaction, increases customer loyalty, and ultimately increases the company's profits. Since then, many scholars have been working on the various relationships between the components and have been testing.

2.3 Digital self efficiency

Self effectiveness is not a common cognitive mechanism that mediates behavior change, but rather a judgment as to how much a person can implement the technology he or she owns(Bandura, 1997). Meanwhile, digital self-efficiency is a belief in one's ability to use digital(Estin and LaRose, 2000). That is, the subjective self-assessment and confidence that users have in using information technology.

Therefore, this study aims to define digital self-efficiency as a confidence level in solving problems using digital technology. Looking at this prior study of the relationship between digital self-efficacy, customer satisfaction, and loyalty, the following are: Vishwanath(2007) saw self-efficiency as a personal judgment of its ability to engage in information-seeking behavior, separating it into information efficacy and relationship efficacy. The users said that they needed the ability to cook and select information that was appropriate to them among other information, and that the more efficient this information was, the more satisfied and loyal they would be(Vishwanath, 2007).

According to Thakur(2018), who studied the role of self-efficacy and customer satisfaction as the building factor of loyalty in mobile shopping, self-efficacy and customer satisfaction have a positive impact on loyalty(Thakur, 2018). In particular, Yi and Gong (2008) focused on the control role of self-efficacy.

Studies have shown that self-efficacy plays a role in strengthening the relationship between customer satisfaction and customer loyalty(Yi and Gong, 2008). Mohammadi (2014), who studied the loyalty of Iran's Internet banking, also found that self-efficacy plays a role in controlling attitudes and loyalty(Mohammadi,2014). Lee, Choi and Kang (2009) also noted the role of controlling the self-efficiency of the computer for factors that shape e-satisaction and willingness to repurchase(Lee et al.,2009). Therefore, based on these prior research, digital self-efficacy will play a role in controlling customer satisfaction and loyalty.
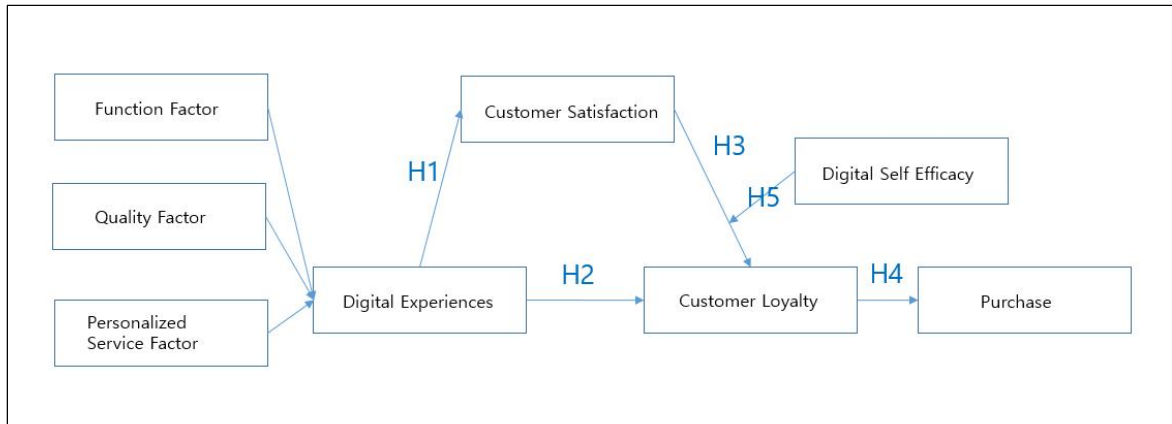
Ⅲ. Research model and hypothesis

3.1 Research model

This study focused on identifying the role of customer satisfaction, customer loyalty, and digital self-efficiency in relation to digital customer experience and purchase.

Therefore, the following research models were set up to identify the role of customer satisfaction and digital self-efficiency in a series of processes leading to digital customer experience, loyalty and purchase based on prior research. Function factors, quality factors, and personalization service factors of the digital experience retained the attributes used by Chung and Jung (2018).

Unlike many previous studies with "Purchase Intention" as the final dependent variable, "Actual purchase behavior" was used as the final dependent variable. In addition, customer satisfaction level was used as a mediator, and digital self-efficacy was used as a moderator between customer satisfaction and loyalty.

<Fig. 1> Research Model

3.2 Hypothesis

Based on the preceding study, the hypothesis of this study was set up as follows. If customers experience positive digital customer experiences, the result is increased satisfaction, reliability, revisit, willingness to buy, willingness to buy again and loyalty(Verhoef et al.,2009). Brodie et al. (2011) said that digital customer experience affects customer satisfaction(Brodie et al.,2011). Meanwhile, Luo et al. (2011) said through empirical analysis that digital customer experience in online games improves customer loyalty.

In this study, the following hypotheses were established in relation to the digital customer experience attributes, customer satisfaction and customer loyalty.

H1. Digital customer experience will have a positive impact on customer satisfaction.
H2. Digital customer experience will have a positive impact on customer loyalty.
H3. Customer satisfaction will have a positive impact on customer loyalty.

Thus, digital customer experience is an opportunity for businesses to increase their brand involvement and is a key to developing customer relationships in the long term(Wirtz et al.,2013).

According to Liang et al. (2018), who researched Airbnb's relationship with customer satisfaction and repurchase, their relationship has a positive impact(Liang, 2018).

Chung and Jung(2018) also said that their willingness to use, recommend and buy has a positive effect on their purchase. Thus, the following hypotheses were established in this study:

H4. Customer loyalty will have a positive impact on purchases.

On the other hand, for digital self-efficiency, a study by Yi and Gong (2008) found that self-efficiency acts as an adjustment to strengthen the relationship between customer satisfaction and customer loyalty(Vishwanath, 2007). Thus, the following hypotheses were established in this study:

H5 Customer Satisfaction and Digital Self-Efficiency will serve as a regulated medium between digital experience and customer loyalty.

IV. Research design and hypothesis test

4.1 Research design

In this study, four product groups were selected to compare and analyze the impact of customer satisfaction and digital self-efficacy on loyalty and purchase in digital customer experience.

In other words, they are fashion, automobiles, cosmetics and online shopping malls. A random sample of 300 people from each product group was obtained and analyzed with 1,200 valid surveys. Statistical analyses required for hypothesis testing were performed using SPSS 24 and AMOS 23 and Process 3.3.

In particular, Process 3.3 developed by Professor Hayes was used to analyze the mediated adjustment effects.

4.2 Hypothesis test

4.2.1 Characteristics of research group

The characteristics of the sample are as shown in Table 2. Of the total 1,200, 54.3 percent of men and 45.8 percent of women showed similar denominations. The age range is 31 percent for those in their 30s and 27.3 percent for those in their 40s, 19 percent for those in their 50s and 10 percent for the rest. Academic background accounted for a majority of the respondents, with 71.3 percent of the respondents including college and university graduates.

Table 2. Demographic Characteristics of the Respondents

		Frequency	%	Accumulated %
SEX	male	651	54.3	54.3
	female	549	45.8	100.0
	total	1,200	100.0	
AGE	20's	150	12.5	12.5

	30's	372	31.0	43.5
	40's	328	27.3	70.8
	50's	228	19.0	89.8
	60's	122	10.2	100.0
	total	1,200	100.0	
Education	Graduated High School	170	14.2	14.2
	College Student	60	5.0	19.2
	Graduated College	150	12.5	31.7
	Graduated University	705	58.8	90.4
	Graduated Graduate School	115	9.6	100.0
	total	1,200	100.0	

4.2.2 Confirmatory factor analysis

A confirmation factor analysis was performed to test the validity of the concentration between the measured items. The results of the verification factor analysis are as shown in Table 3. Judging the structural equation model, the model with values $x2$ = 674.208, p = .000, RMR = .025, GFI = 0.536, AGFI = 0.950, NFI = .96, IFI = 0.962, CFI = = 62.92, and CFI = = 62.95, is an absolute index criterion is met. However, the test value of the Chi-square(x^2) is p=.With 000, the model is shown to be unsuitable, and usually larger samples can show that the model is unsuitable, so when the sample size is large enough and the study model has significant theoretical support, the Chi-square test and P values do not have a serious effect on the model's adequacy determination (Choi, 2017). For this study, this may occur with 1,200 samples.

Nevertheless, the adoption of this model is not problematic because all the remaining fitted indices meet the acceptance criteria. The criteria for the test values of convergent validity are 0.7 or higher. In addition, the C.R. value is greater than 1.965 for significance, the concept reliability is greater than 0.7, and the AVE (average variance extraction) is greater than 0.5(Wu, 2017). Also, the reliability of the Cronbach alpha was also higher than .7. In light of this criteria, Research model was fitted

Table 3. Confirmatory Factor Analysis and Reliability Analysis

Construct	Variables	standardized regression weights	t	C.R	A.V.E	Cronbach α
Function Factor	aesthetics	.766	Fix	.994	.972	.875
	convenience	.782	28.887***			
	experience compatibility	.772	28.427***			
	anywhere	.742	27.122***			
Quality Factor	Information Quality	.798	29.602***	.991	.974	.850
	privacy	.754	27.650***			
	security	.765	28.130***			

Presonalized Service Factor	hedonics	.771	28.401***	.988	.974	.860
	uniqueness	.691	24.969***			
	personalization	.757	27.770***			
	involvement	.703	25.453***			
	recommendation	.708	25.697***			
Customer Satisfaction	quality satisfaction	.834	Fix	.947	.975	.810
	total satisfaction	.817	29.055***			
Customer Loyalty	switching intention	.255	Fix	.792	.966	.707
	recommendation intention	.722	8.434***			
Digital Personal Traits	information searching confidence	.809	Fix	.886	.963	.802
	online transaction confidence	.828	18.279***			
Purchase	purchase cost	.823	Fix	.866	.959	.873
	purchase frequency	.942	12.225***			

χ^2 = 674.208, df = 160, p = .000, χ^2/df = 4.214, RMR = .025, RMSEA = .052, GFI = .936, AGFI = .916, NFI = .950, IFI = .962, CFI = .962

4.2.3 Correlation analysis

The correlation analysis for testing the discriminant validity of the factors that have been identified through the he factor analysis showed that the number of correlations between each of the factors, as shown in Table 4, was less than.8, thereby satisfying the discriminant validity.

Table 4. Correlation Analysis

	Digital Experience	Customer Satisfaction	Digital Personal Traits	Customer Loyalty	Purchase
Digital Experience	1				
Customer Satisfaction	.566**	1			
Digital Personal Traits	.405**	.330**	1		
Customer Loyalty	.486**	.555**	.314**	1	
Purchase	.152**	.211**	.178**	.324**	1

4.3 Results of hypothesis test

4.3.1 Results of hypothesis test

The index related to the suitability of the model showed that the model was suitable, with χ^2 = 32.542, p = .000, RMR = 1.016, RMSEA = 0.051, GFI = .991, AGFI = .9766, NFI = 9.993, CFI = 0.993 and CFI = 0.93.

According to the hypothesis test, digital experience had a positive (+)influence on customer satisfaction, and customer satisfaction had a positive(+) influence on loyalty.

Meanwhile, digital experience has had a positive(+) influence on loyalty. Customer loyalty also had a positive(+) effect on purchases. Thus hypotheses H1, H2, H3 and H4 were adopted.

Table 5. Results of Hypothesis Test

path			regression weights	standardized regression weights	S.E.	C.R.	P	results
Customer Satisfaction	←	Digital Experience	.727	.602	.031	23.455	***	supported
Customer Loyalty	←	Customer Satisfaction	.742	.382	.058	12.800	***	supported
Customer Loyalty	←	Digital Experience	.675	.288	.073	9.195	***	supported
Purchase	←	Customer Loyalty	.195	.324	.016	11.873	***	supported

x^2 = 32.542, df = 8, p = .000, x^2/df = 4.068, RMR = .016, RMSEA = .051, GFI = .991, AGFI = .976, NFI = .991, IFI = .993, CFI = .993

4.3.2 The moderated mediation effect of digital self-efficiency

The moderated mediation effect of digital self-efficiency played a role of controlling the digital self-efficacy in the process of reaching loyalty through the medium of customer satisfaction was analyzed.

As a result, it was analyzed that there are controlled medial effects as shown in Table 6.

Table 6. Results of moderated mediating Test

path		coeff	t	LLCL	ULCL	statistics	results
Customer Satisfaction	const	-2.379	-23.326	-2.579	-2.179	R^2=.321 F= 565.495 P=.000	
	Digital Experience	.845	23.780	.776	.915		
Customer Loyalty	const	5.285	22.556	4.825	5.744	R^2=.399 F= 198.689 P=.000 △R^2=.041 F= 81.228 P=.000	supported
	Digital Experience	.623	7.567	.461	.784		
	Customer Satisfaction	.765	14.339	.661	.870		
	Digital Self Efficacy	.280	5.355	.177	.382		
	Interaction (CS * DSF)	.433	9.013	.339	.528		

Digital experience (independent variable) had a positive influence on customer satisfaction (parameter) and customer satisfaction also had a positive influence on loyalty (subsequent variable). Meanwhile, digital self-efficacy also affected loyalty by +. The interaction term of digital

magnetic effect, which is a parameter of customer satisfaction and modulating variable, was also found to have had a positive effect, indicating that there was a controlled medial effect overall.

The increase in explanatory power was 4.1 percent. The results of the verification of the effects showed that the direct effect of the digital customer experience to loyalty was .623 and the indirect effect of the digital customer experience to loyalty through customer satisfaction was .647; therefore, the indirect effect is greater than the direct effect, and hence has a mediated effect. The interaction term multiplied by the indirect effect and the modulating effect, i.e. the moderated mediation effect, was .366.

Note that the statistical formula for testing effectiveness is as follows..

Conditional indirect effect of X on Y through M = a (b1+b3*V)

X : Digital Customer Experience

Y: Customer loyalty

M: Customer satisfaction

a : Digital Customer Experience-->Customer Satisfaction Coefficients

b1 : Customer satisfaction-->Customer loyalty factor

b3 : Customer satisfaction*Digital self-efficiency->Customer loyalty factor

V: Digital self-efficacy

Table 7. Effects of moderated mediation

path		effect	LLCL	ULCL
Direct effect (Digital Experience → Customer Loyalty)		.623	.461	.784
Indirect effect (Digital Experience → Customer Satisfaction → Customer Loyalty)	-1SD	.361	.246	.478
	.000	.647	.529	.771
	+1SD	.933	.763	1.104
Moderated mediation effect (Digital Experience → Customer Satisfaction → Customer Loyalty) * Digital Self Efficacy		.366	.246	.471

V. Conclusion

5.1 Summary of research

In this study, we focused on the moderated mediation effect of digital self-efficiency in analysing the effects of digital experience attributes

On digital experience attributes, we utilized research by Chung and Jung (2018b) and Brodie et al. (2011) to identify the role digital self-efficacy plays in purchasing in a series of processes that affect customer satisfaction and ultimately affect purchasing.

The research targets were users of fashion, automobiles, cosmetics and online shopping malls.

Each valid questionnaire was analyzed for 300 people. The results of the study are summarized as follows. First, both customer satisfaction and customer loyalty had a positive(+) impact relationship.

And customer satisfaction has had a positive impact on customer loyalty. In addition, it was analyzed that customer loyalty has a positive(+) influence on purchase.

Second, the analysis results of the adjusted medium effect of digital self-efficacy showed that the customer satisfaction and digital self-efficacy between digital experience and customer loyalty play a moderated mediation effect.

5.2 Discussion and implications

Academic and practical implications for this study include: First of all, if you look at it at the academic level,

First, in this study, digital customer experience affects loyalty and this loyalty affects purchases. It also tested the role of mediator variables for customer satisfaction.

This supported existing studies of the service profit chain model, a series of processes ranging from quality of service, customer loyalty and purchase.

In particular, it differentiates itself from previous research in that it is a test of the influence of a digital-based customer experience variable. Second, unlike many previous studies, this study was conducted on 1,200 customers of four product groups in fashion, automobile, cosmetics, and online shopping malls, deriving and testing digital customer experience attributes that can be applied generally regardless of product group. Up to now, most of the digital experience-related studies have been focused on specific industries and product groups(Kawaf and Tagg, 2017), and the impact properties have also been limited to specific attributes(Shobeiri, et al.,2014).

In this study, digital experience has been analyzed to influence brand loyalty and purchase, thus supporting the study of the existing Chung and Jung (2018b).

Third, digital self-efficacy was adopted and tested as a moderated mediation and the customer satisfaction and digital self-efficiency between digital experience and customer loyalty were certified as moderated mediation role.

While some of the previous studies have described the role of self-efficacy in the relationship between customer satisfaction and loyalty, this study may be meaningful in identifying the relationship with moderated mediation effects through digital self-efficacy.

The practical implications are as follows: First, it is necessary to actively utilize digital marketing to customers with high digital self-efficacy. In the digital economy, Korea already has the highest smartphone ownership rate in the world at 95%(Lee, 2018).

The web log analysis tool, which is one of the digital technologies, enables the aggregation of customers' visits to a site, how much they worry about, how much they buy, and how much they react to events and promotions, which can lead to a high conversion rate if they actively utilize personalization marketing and context marketing.

Second, customers with low digital self-efficiency need to watch out for digital marketing fatigue. Explosive growth in digital advertising marketing has led to the digital projection of 44

percent in 2017 and more than half of the ad market in 2019, which could result in indiscriminate overlapping marketing messages attacking consumers with continuously diverse digital channels, which could adversely affect purchases for customers with low digital self-efficiency.

In particular, social media fatigue has emerged in Korean society(CIOkorea,2019). Customers with low digital self-efficiency are familiar with traditional analog methods, or the use of information search, coupons and promotions utilizes digital, but purchases need to make appropriate use of traditional O2O methods made in stores.

5.3 Limitations and future research

The limitations of this study and the direction of future research are as follows.

First, without agreed attributes related to digital experience attributes, a number of prior studies were derived and used for analysis.As the generalization of the results of this study requires a variety of tests in the future, it is necessary to expand the product line to a variety of product groups (or brands) in addition to the four. Second, with respect to purchases that are subordinate variables, the actual data were not utilized and were dependent on the respondents' self-categorizing

So it failed to eliminate the data bias that could come from a self-declared method.

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4차 산업혁명시대의 디지털 고객경험과 구매간 영향관계
- 디지털 자기효능감의 조절된 매개효과를 중심으로-

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국문 요약

4차 산업혁명시대를 살고 있는 고객들은 구매 깔때기 안에 있는 것이 아니라 밖으로 나오기 시작했다. 풍부한 정보로 무장한 현명한 고객의 등장과 맞물려 제품 선택의 폭과 디지털 채널의 폭발적인 증가로 인해 정보를 탐색하고 구매하는 방식이 혁신적으로 변화되고 있는 것이다. 디지털 시대의 고객여정은 전통적인 깔때기 모형이 제시하는것보다 훨씬 복잡하게 되었다. 그래서 직선형이 아닌 다양한 상호작용을 하는 비선형적인 정교한 접근이 요구되어지고 있다. 기존의 많은 연구와 달리 본 연구는 패션, 자동차, 화장품, 온라인 쇼핑몰의 4개 상품군 이용고객 1,200을 대상으로 진행된 것으로 상품군에 상관없이 일반적으로 적용할 수 있는 디지털고객경험 속성을 도출하고 검정하였다. 디지털경험이 고객만족에 영향을 미치며, 최종적으로 구매에 영향을 미치는 일련의 과정 속에서 디지털 자기효능감이 구매에 어떠한 역할을 하는지를 규명하였다. 이론적 시사점으로는 디지털 자기 효능감을 조절된 매개변수로 도입하여 검정한 결과 고객만족도와 고객 충성도 간 디지털 자기효능감은 조절된 매개역할을 하는 것으로 검정 되었다. 실무적으로는 디지털 자기효능감이 높은 고객에게 디지털 마케팅을 적극적으로 활용할 필요가 있고다, 그러나 디지털 자기 효능감이 낮은 고객에게는 디지털 마케팅 피로도를 조심해야 할 필요가 있다는 시사점을 도출하였다.

중심어: 4차 산업혁명, 디지털 고객 경험, 고객충성도, 디지털 자기효능감, 조절된 매개효과

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