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The factors influencing consumers' perceived complexity of online apparel mass customization service usage

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Abstract

Mass customization is a marketing strategy to meet consumer needs for variation and uniqueness of products. Although there are quite a few studies quantitatively investigated the options provided by mass customization process, scholarly work related to mass customization has provided mixed results on consumer perception of complexity and their responses. The purpose of the study is to derive the factors that influence consumer complexity perception in online apparel mass customization process and consumers' needs to enhance mass customization services. Data were collected by conducting focus group interviews of which 29 participations in 4 groups. The results of the study suggested that consumers perceived complexity through mass customization process due to too many choice options. However, the effect of number of options on respondents' complexity perception was different depending on consumer characteristics such as consumer expertise and fashion involvement, and the characteristics of consumer preference development. Shopping context such as shopping purpose is another moderating factor. This study also suggests that a variety of marketing strategies which can enhance mass customization services affect the relationship between the number of options and consumers' complexity perception. The findings of the study provide academic and managerial implications.

Keywords: online mass customization, perceived complexity, number of choice options

I. Introduction

Mass customization (MC) is a strategy to notice the change of environment that consumer's needs for the variety and the differentiated uniqueness of product type increase and respond to it (Pine, Victor, & Boyton, 1993). Accordingly the initial studies for the mass customization asserted that corporations can provide various and customized products to the consumer by introducing a flexible production system called as mass customization and that they can raise the consumer's benefit perception by allowing the consumer to select its own products (Ansari & Mela, 2003; Fiore, Lee, & Kunz, 2004; Ulrich, Anderson-Connell, & Wu, 2003). However, most studies were

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only concentrated on the consumer's satisfaction or benefit aspects for MC product itself and thus studies for the consumer's perception of the MC purchase process were extremely limited. Besides, although there have been some studies notifying that reducing the complexity of the MC process was an important factor for executing MC service, most of them were also performed within the limit of presentation of strategies to overcome the complexity of a corporate organization or the production system that could be derived by introduction of a MC system (Blecker & Abdeklfi, 2006; Piller, Moeslein, & Stotko, 2004; Silveira, Borenstein, & Fogliatto, 2001). However, in order to suggest the strategies for the product customization that the consumer can actually accommodate, the strategies for executing the product customization considering costs from the perspectives of consumer view are required.

According to studies on the consumer's perception of the MC process, the consumer can get benefits through customization but there are also costs or efforts that the consumer must suffer (Bardakci & Whitelock, 2004; Pine, Perppers, & Rogers, 1995). Dellart & Stremersch (2005) asserted that the consumer's usefulness perception of the mass customization was determined by the recognition for the complexity of the decision process of product purchase as well as usefulness of the customized product, and it implies that strategies to reduce the complexity as well as to raise the benefit perception in providing MC services are important. Studies that consumer satisfaction for the shopping process entails the satisfaction for the whole shopping result (Bei & Chiao, 2001; Parasuraman, Zeithmal, & Berry, 1994) and studies that choice difficulty entails the postponement of purchase (Greenleaf & Lehmann, 1995) also emphasize the importance of the complexity perception in the shopping process. However, the studies on the consumers' complexity perception in the process of using MC services were limited for those examining computers or bicycles (Dellaert & Stremersch, 2005; Ong, Lin, & Nee, 2006; Randall, Terwiesch, & Ulrich, 2007).

Considering the hedonic characteristics of apparel product, online apparel shopping mall offers relatively high number of alternatives reflecting the consumer's needs for various designs. In addition, the variety of MC options given to the consumer increases as the number of options for the partial design increases, and consequently the level of difficulty of the online apparel mass customization (OAMC) process is relatively high comparing with other product types. For example, the online shopping mall developed in the recent study performed by Lee, Damhorst, Campbell, Loker, and Parsons (2011) provided only 2 or 3 options for 6 partial design parts of 3 apparel items suggested, but the number of total combinations reached to 756. In other words, consumer might feel that the online apparel mass customization (OAMC) process is more complicated and difficult than other products. Some recent studies for the mass customization report that consumers' satisfaction of and interest in MC reduces as the number of provided options increases (Godek, Brown, & Yates, 2004; Piller, 2003; Lee et al., 2011). However, considering that satisfying the consumer's needs for the privatized product and the product diversity is one of core benefits of MC service, the development of online mass customization (OMC) service to minimize the consumer's complexity perception at the same time of providing the diversity of design alternatives to the consumer will be important. Especially individual preference is directly reflected on consumers' apparel choices and thus the need for customized apparel products is very high (Franke, 2004). Thus, the establishment of strategy to reduce the consumer's complexity perception while providing various options is needed. In-depth examinations for the factors to have effect on the consumers' complexity perception of the MC process are required.

There are a few studies examining the effect of number of MC options on the MC service process, but the results are inconsistently reported (Godek, Brown, & Yates, 2004; Kamali & Locker, 2002; Piller,

2003). A recent study performed by Lee et al. (2011) also reports inconsistent results about the impact of the number of options. The level of evaluation increases as the number of options increase, while the purchase intention appears low. The reasons for the inconsistent results would be fragmentary examination on the effect of the diversity of options provided in the MC process without including possible effects of moderating variables. Thus, the present study intends to examine the influencing factors of consumers' complexity perception of the OAMC process in an expansive approach by performing a focus group interview of consumers that mainly use the online apparel shopping mall. Especially, this study will use the three factors widely known as having effect on the consumer's behaviors -marketing factor, consumer characteristic factor, and situation factor- as a framework of analysis (Engel, Blackwell, & Miniard, 1995). This study intends to suggest OMC strategies maximizing benefits as well as minimizing the negative effect of the provision of design options increased by OAMC services. This study will contribute to literature by identifying influencing factors of consumers' complexity perception in the context of OAMC and by practically providing the strategic implications necessary for the development and application of MC services for the online apparel shopping mall in future.

II. Literature Review

1. Consumer's complexity perception of online apparel mass customization process and the effects of marketing factors

Consumers' complexity perception is a concept mainly introduced in the studies on the consumer choice complexity (Bettman, Johnson, & Payne, 1990; Johnson & Payne, 1985; McFadden, 1986) or that is related to the consumer's risk aversion behavior (Tversky & Kahneman, 1991). Since complexity perception is based on uncertainty of situation (Hobday, Rush, & Tidd, 2000), complexity perception occurs due to difference between information necessary for completing tasks and information currently held in the situation (Schrader, Riggs, & Smith, 1993; Galbraith, 1973).

As firms' interests in mass customization increase, Concerns about which level of mass customization service the consumer will perceive useful is more important than questions about whether or not the consumer will adopt mass customization service. Since the higher level of customization provided to satisfy the consumer's needs for the product diversity and differentiation can be achieved by the consumer's active participation in the product design and manufacturing process, the high level of consumer's participation and efforts and time investment is required. Besides, the consumer's complexity perception of OMC process would be higher than the case of selecting finished product (Dellaert & Stremersch, 2005). Especially as shown in the concept of complexity and uncertainty, the complexity that the consumer feels in the OMC process will further increase where information or means necessary for completing the tasks is limited. Valenzuela & Dhar (2004) reported that it was required to identify the optimal customization level to improve ease of use and consequently maximize the perceived usefulness by reducing the consumer's cost recognition in the MC process and that the one in the shopping process was closely related with increase of the complexity perception.

In this way, reducing the complexity perception level in the consumer's selection process of MC products is very important. Accordingly, studies to identify the factors of complexity perception were performed (Dawidson, Karlsson, & Trygg, 2004; Hobday et al., 2000; Wang & von Tunzelmann, 2000). Hobday et al. (2000) suggested that number of components, customization of component and system, number of design combination methods, and the scope and depth of knowledge and technology required in manufacturing process are factors having effect on the complexity perception of product manufacturing task. While consumers do not participate in the production process

of actually manufacturing products in the use of MC services, the effect factors of the complexity that the consumers recognizes in the OAMC process would be related to those factors that Hobday et al. (2000) suggested.

It can be noted that the complexity of product manufacturing increases as the number of components and the number of design methods. Number of the partial design provided by the OMC services for the apparel products increases the number of design methods as well as increase the number of components among these effect factors. It is because methods of combining every partial design also increase as number of the options of the partial design increases. Accordingly, studies on the usefulness of MC services attempted to examine the effect of the number of options on the consumer's interests, satisfaction and adoption intention. While some of studies reported that the consumer's interests in and satisfaction for the MC services increases as the number of options suggested by the MC services increases (Kamali & Locker, 2002), recent studies reported that too many options reduce or interrupt the consumer's interests in product customization (Godek, Brown, & Yates, 2004; Piller, 2003). Like this, contradictory results for the effect of the number of options on the use of product customization services are reported. This might be because that the difficulty of selection may differ depending on the product types, as the level of knowledge and technology required for OMC participation differs (Hobday et al., 2000). In other words, it is necessary to examine the effect of product types, as typical marketing stimuli, on the complexity perception of the OAMC process. In addition, the effect of service factors provided in the OAMC process must be considered together. Thus, this study intends to extend the influencing factors of complexity perceptions suggested by Hobday et al. (2000) considering the high level of diversity of partial design of apparel mass customization process. Both the effects of product and service factors would be included as possible marketing factor that have effect on the consumer's complexity perceptions of OAMC process.

2. Effects of consumer characteristic factors

The conditions that the consumer can search for his own preference without being overwhelmed by the diversity of options provided in MC services so that the consumer recognizes the usefulness of OMC services must be given in the MC shopping process (Huffman & Kahn, 1998). Consumers 'response to the difficulty or complexity of MC process is decided by methods that MC services are provided in but may be affected by the consumer's characteristics as well. In other words, it may be decided by composite effects of benefits that the consumer desires to get in the MC process and time or efforts that the consumer desires to input (Huffman & Kahn, 1998).

A typical benefit that the consumer desires to get through MC services is to purchase products most close to own preference. To purchase products with a high preference fit in the MC process, the consumer must clearly know own preference, and have ability to make and evaluate products that own preference is reflected in the process of combining many partial design options at the same time. Namely, consumer's complexity perception in the MC process will significantly reduce, where benefits to get through MC process are clear and the ability to get the benefits is equipped with. For the characteristics of the consumer's preference, Simonson (2005) asserted that the consumer who had a stable and clearly developed preference could have a high level of insight for the preference and that the adoption level for the customized suggestions got high (Kramer, 2007; Simonson, 2005). Randall et al. (2007) asserted that the consumer's unclear preference may result in a cause of design defect of final product. Thus, the consumer who fails to clearly recognize own preference and has an insufficient capacity to find out goods satisfying the preference may not recognize benefits of MC process (Bettman et al., 1990).

Yang (2005) asserted that the consumer must have appropriate knowledge necessary for participation to ensure that customer's participation brings in a positive result to consumers as well as corporations. The consumer's product knowledge is related with their education level, experience, technology, and appropriate attitude (Dellaert & Stremersch, 2005; Franke et al., 2009; Mills & Morris, 1986). Insufficient preparation for the role of participation due to lack of knowledge would be perceived as stressful experience to consumers and may result in negative performance and the OMC process (Mills & Morris, 1986).

Finally, consumer involvement means a degree of interest for specific products or situation on the base of individual needs, preference and interest (Zaichkowisky, 1985). Since the consumer whose level of involvement in products and shopping is high inputs more efforts to derive preferred products, threshold value for the degree that number of options increase or the decision process gets complicated will be also high. In addition, it was reported that consumers with a high level of involvement prudently perform information searching and evaluation of alternatives to purchase products mostly close to their own preferences and that the purchase intention for the customized products is high (Gordon, Mckeage, & Fox, 1998). Therefore, the consumer's involvement in fashion products is expected as a variable to have effect on the complexity perception of the OAMC process.

3. Effect of shopping situation factor

Fashion product is a typical product type, where basic purchase needs for product exist even in usual time and the consumer frequently performs information search without clear purchase purpose. Thus, shopping context of fashion products can be classified into shopping versus browsing context. The consumer in the shopping context has particular purpose to purchase products, whereas the browsing context is status without clear purchase purpose. Where purchase purpose is clear, the consumer's participation level for the shopping status is high, whereas it is low if not so (Wells, Williams, & David, 1996).

III. Methods

Since online mass customization is in the initial stage yet, interview respondent may fail to experience the product customization services. Unlikely the quantitative study, the focus group interview is usefully applicable even where there is almost no prior preliminary knowledge of the participant for the subject and is suitable for getting more comprehensive and in-depth opinions for the subject. Hereupon, this study performed the focus group interview after allowing the interview participants to directly experience the existing online shopping malls of apparel and fashion products which are providing mass customization services in order to provide minimum of exposure and experience for the product customization to them. Three types of product customization services were provided. For the purpose of examining the effect of product type, various types of fashion product customization services were selected. They are online apparel shopping mall (www.indicustom.com) providing product customization services to choose various partial design options for jeans, Nike ID (www.nikeid.nike.com) for sportswear and shoes, and online bag shopping mall (www.freddyandma.com) providing customization services to change or choose material of bag and design of grip part.

The focus group interview was performed by dividing participants into 4 groups for the 20s women who were relatively familiar with online apparel shopping and resided in Seoul and Daejeon. Since recognition or needs for the online product customization may vary depending on the level of involvement and knowledge for the apparel products, this study attempted to comprehensively understand the needs for the product customization by classifying participants into 2 groups of fashion related people and 2 groups composed of non-fashion related peoples.

〈Table 1〉 Interview participants by FGI group

Group	Criteria	Number of participants	Composition of groups
A	Fashion related & Seoul	8	5 Undergraduate students, 3 office worker (A1-8)
B	Fashion related & Daejeon	8	4 Undergraduate students, 4 office worker (B1-8)
C	Non-fashion related & Seoul	5	3 Undergraduate students, 2 office worker (C1-5)
D	Non-fashion related & Daejeon	5	5 Undergraduate students, 3 office worker (D1-8)

Questions such as needs for MC services in the use of online apparel shopping mall, benefit perception in the use process of MC services, recognition of inconvenience and risk in the use process of MC services, and particular needs for improvements for the overall MC services were included. Approximately one and half hours was required for interview by group and all interview contents were used as data for analysis via the process of recording them in language of the interview respondents after obtaining prior consent. We performed an open coding by analyzing meaning between lines and the analysis results were cross-validated by three researchers.

A total of 29 of interview participants of four groups answered that they performed online shopping more than twice per month. The respondents' ages ranged from 20 to 27. Composition of interview participants by group was suggested in 〈Table 1〉.

IV. Results and Discussion

1. Effects of number of options on complexity perception

There were many cases of mentioning negative aspects of increase in the number of options and it was appeared that number of options given in OAMC process of selecting and combining design options had effect on the perceived complexity level of MC process. Consumers perceived the process of making the preferred design as difficult and complex when too many options were given in the OAMC. Moreover, consumers perceived too many options as a barrier in getting the final product. That is because consumers feel the combination process of various partial design options in the OMC process complex and somewhat confused and there were concerns in various aspects for the decision-making. The concerns are whether combinations of various partial designs are suitable and harmonious, how the final design results are consistent with what the consumer prefer, and whether the consumer has sufficient ability to directly perform own design.

I don't know which clothes will be suitable to me or which clothes will be suitable with my body. Problem may occur if completed clothes come in case of randomly changing clothes to my desire. My head will have a bad headache and I will be confused if options to select are too many. Because there is possibility of failure that unsuitable products will likely come in spite of various combinations… (C2, 23 years old)

If a person without basic knowledge has many colors and designs like Nike ID, the final product likely seem childish… I doubt that final products properly come out with a suitable combination. (C5, 23 years old)

As number of options increase, complexity perception can be enhanced. It was appeared that the participant recognized the complexity of process as the time required in the process of attempting various design combination increase. In addition, it seems that too many options itself makes consumers recognize the complexity of options search in the process of comparing and evaluating options. Overall, consumers

who recognized that the final results of MC process might vary depending on various methods of combining partial designs seems like to become uncertain about their own decision when the number of options increase. Thus, consumers' perceived control over OMC process as well as ease of use perception decrease with the increase of options. These results support the study results stating that too many options reduced the consumer's interests in product customization (Godek et al., 2004; Piller, 2003). It should be noted that strategies in response to the complexity perception and the reduction of control that consumers might experience in the use of OMC services must be established, as well as expanding variety of selection in order to effectively apply product customization.

The more options, the more time is taken to purchase and it is hard to do. I will not likely purchase again. Also fed up. In fact, MC is a type of entertainment but it has no meaning if irritated by … It will be better give only key options not to irritate. (B6, 26 years old)

Generally people somewhat worry about variations of color, etc. that they selected. People has a fear of them and thus balance must be likely taken to a degree that several basic styles exist and the parts personally adjustable exist somewhat. (A6, 23 years old)

Um, I think that any mistake of making absurd products will occur if giving too many options. On the contrary, giving only several options suitable will be good. (B7, 25 years old)

However, some participants stated that the increased number of options increased the utility of MC shopping process. These results are identical to inconsistent results of previous studies about the effect of option numbers, thus the effect of other variables must be considered together.

Even if we want any options, it will be impossible to give all the possible options. But I think it will be better to give many options as possible. If so, the possibility of placing order to my taste will increase. (A2, 25 years old)

For the present, fashion (MC) products have no difference from ready-made clothes since options are not so much. I hope that many options exist. (B4, 27 years old)

2. Effects of consumer characteristic factors

1) Difference depending on the consumer's product knowledge and involvement

Generally consumers' complexity perception increased as number of options increased. In particular, it seems likely that consumers with low level of product knowledge and involvement perceive the OAMC process more difficult and feel burdens of selection. While most participants enjoyed the process of combining various partial designs and changing details of design through the OMC services of apparel products, some participants had a fear about whether they had sufficient knowledge and ability to create design with best quality. They recognized that product knowledge was required in the process of combining various partial designs and thought that relatively high level of product knowledge was required in order to complete the process of selecting and combining the partial designs without fear. The results mean that consumers' product knowledge or high level of involvement may have effect on the uncertainty for the performance or complexity related to participating in the design process of OMC services. This results are consistent with Hobday et al. (2000)'s suggestion, which included width and depth of knowledge and technology required to complete task as influencing factors of complexity of product manufacturing.

Professional peoples can properly select styles to their body type, unconditional colorful clothes since

they have basic knowledge… If a person without basic knowledge, the final product likely seem childish … (C5, 23 years old)

Then, clothes are somewhat difficulty. Clothes seem pretty to see with a wide area but general peoples who are not expert are not aware which clothes are suitable to them when actually wearing them. They would feel fear when purchase clothes as long as they are not fashion expert. (A5, 22 years old)

They are likely not sure when purchasing clothes since they are not fashion expert. They do not know about that completion degree is high. (C2, 23 years old)

2) Difference depending on the consumers' preference development

Since the major purpose of OMC services for apparel products is to provide customized product most suitable for the consumer preference, it is no exaggeration to say that success of OAMC introduction depends on the derivation of the consumer preference and the presentation of the suitable products. As result of study, it was appeared that the characteristics of consumer preference development also had effect on the response to the OMC process. It was appeared that only a person who has the capacity to particularly knowing and evaluating the property of own preferred product can attempt to participate in the MC process, and that the person recognized that he could get results most consistent with the desired product through the OAMC process. Since final output that consumers desire to get by selecting and combining the partial designs is more particularly, the recognition of the uncertainty of the final products and the complexity of process are reduced as suggested in the study performed by Hobday et al. (2000). These results support the previous study results stating that the consumer who has a stable, clear and developed preference has the high possibility of having a high level of insight for the preference and consequently that adoption for the customized suggestion becomes high (Kramer, 2007; Simonson, 2005).

And nowadays, for consumers, especially people with much interest in fashion so as to purchase fashion products on the MC base, I think they sufficiently know which options to select in order to make what they want. There are many cases where their sensitivity is more excellent than a professional designer in a way… (D5, 24 years old)

3. Effects of shopping context factor

1) Difference depending on shopping purpose

Consumers recognized the OAMC shopping process of satisfying the expression needs and searching for own style, whereas negative response also appeared in terms that the consumer must invest time and effort in purchase decision depending on the consumer's shopping purpose. In other words, consumers think the process of choosing various types of design options and changing them pleasant in the browsing context, which is not purpose-oriented purchase situation. However, they recognize the difficulty in respect of decision-making in the context of actual purchase.

Process of selecting clothes will be likely very merry. Then, concern will start when just buying them. I don't know which clothes will be suitable to me or which clothes will be suitable with my body. But if changing clothes much, I tend to follow my taste unconditionally. (C2, 23 years old)

I think that searching for clothes by myself to my style is a pleasure. Trying to design is interesting and fun, but I may be disappointed when delivered in a form of final product. (D2, 24 years old)

2) Difference depending on the certainty of purchase plans

However, it was appeared that the consumer was willing to suffer complexity and burdens of the OAMC

participation process when property of product to purchase was particularly decided even in the purchase context. These results are related with clarity of preference, and it is considered that the degree of complexity actually recognized reduces in case of the purchase context where property of product to purchase is clear. Therefore, the consumer's preference development has effect on consumers' complexity perception in the OMC process not only as consumer characteristics, but also as context variables which may vary depending on the purchase situation (Goodman et al., 2012).

I would not use MC very often, because it is a somewhat hassle… I would visit MC store when I have to go to some place for special occasion, but it is difficult to find the right item and when I can't find the right coordi item… When it seems like to find something I want if I change somewhat… in this way, I would like to use the (MC) stores taking a risk. (A5, 22 years old)

4. Effects of MC marketing factors

It was found that the effect of increase in the number of options on consumers' complexity perception varied depending on product types to purchase and service factors provided in MC process.

1) Effects of product factors: Difference depending on importance of purchase item

There was difference in the level of diversity of options that the consumer demands depending on the apparel product items to purchase. The possible reason for this is that consumers are more involved when they makes a important purchase decision such as wedding dress purchase, thus they are more willing to endure complexity of the OMC process. In other words, the threshold value of complexity that the consumer experiences in the MC process may get high in case of purchasing products with the high level of product involvement and the negative effect of too many options may reduce. This result implies that optimal level of option diversity that the consumer requests may vary depending on the level of involvement of apparel product type and that related consideration is required.

If I would purchase my wedding dress on the MC base, I think that as many option as possible must be provided as option for me to make detailed choice. I am willing to choose products even for a week. (B3, 23 years old)

2) Effects of service factors: Difference depending on the presentation format of options

The needs for the option categorization supporting the consumers' selection process of MC design existed. Particular needs included categorization by material type, body type, and image pursued. This result implies that needs for product arrangement through classification of option types by every stage that the consumer selects partial design is high to ensure that the selected partial designs can match each other. In other words, consumers perceive that the process of getting the final design reflecting own preference is easier and more secure when the partial design options are presented categorized according to their tastes or needs. Especially, categorization according to fashion image were frequently mentioned as criteria for categorization, and the needs for method of classifying and suggesting the partial design options by using fashion image expressed in various terms such as style, feeling, type, trend and mood as criteria of type classification were high. This might be due to the fact that non-language properties such as image evaluation are important for fashion products in the purchase decision process.

Consumer's needs for the presentation format of classifying MC design option can be explained by using a categorization theory (Suk, 1996). Categorization explains the phenomena that the consumer simplifies the information processing process and makes it easy

by efficiently recognizing outside stimuli. Categorization is major means to simplify and understand the environment and important recognition process to effectively adapt to the environment. The capacity for performing categorization enables for us to react with the environment without being overwhelmed by the complexity of environment. Thus, it is considered that suggesting options in a form of categorization may become a method to reduce consumer burdens and cost perception and simplify perception process.

We usually respond by style when choosing clothes. If clothes are classified into any trend or in this pattern by style, I think that choose styles first and then choose clothes sorted by styles… is convenient (A4, 23 years old)

If selectable options get many, I prefer option presentation by dividing them as per feeling of material. (C1, 26 years old)

When showing clothes… such as this is a casual style and that is feminine style… even when peoples wear a tracksuit, they sometimes would find a tracksuit of formal suit style. So, show all the options according to styles first… When entering into the store to buy necessary clothes, people can choose from the styles. (D4, 24 years old)

There are also peoples who select the whole moods of the outfit and then particulars. I prefer to select the whole design mood and then particulars to enter one by one. (B3, 23 years old)

It means to select by type instead of one by one. For example, I think that if allowing the consumer to select one of slim type, tall type and… (D3, 24 years old)

3) Effects of service factors: Difference depending on the decision-making support service

The needs for recommendation opinion of seller or other consumers were high in order to reduce complexity that consumers feel in process of selecting the desired partial designs among a lot of option given in the MC process and completing apparel product suitable for own preference. Particularly, the needs for recommendation based on other consumers' response such as best MC product, recommendation suggested by experts such as designer, and the recommendation system reflecting the consumer's preference existed. These results are consistent with the result of previous studies suggesting that provision of product recommendation service supporting the information search and the process of product purchase process to ensure that the consumer could select products close to own preference is an important fact to perform a successful online MC services (Zhang and Jiao, 2007; Salvador et al., 2009).

Since there are many cases that peoples are uncertain about product in MC, I think that more detailed information and suggestion must be provided… such as popular MC item styles that people order often… this is a recent trend, in this way. (A3, 25 years old)

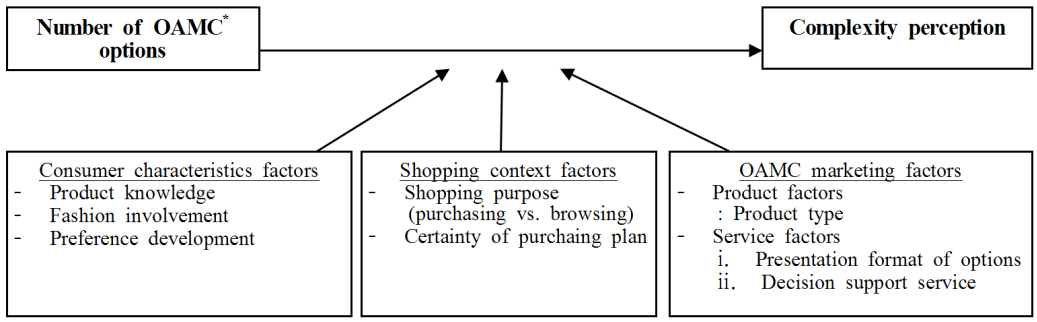
I think that types of product must be suitably prepared. To the end, seller's capacity is likely needed. It is better to reflect seller's opinion. (C-2, 23-age)

Since the consumer is a professional design, nowadays Psy skin is designed to create mini-room or skin directly. Psy proposes suitable ring or character type. (B-7, 25-age)

I think that a guideline is to propose that doing in this way is pretty. 'Yes', underwear shows a pretty sample or message of making with alphabet as sample. I would frequently follow to see them. (A-4, 21-age)

5. Research model suggestion

As result of study, it was appeared that consumers recognize the pleasure aspect of the use of MC services in terms of pursuing their individuality and uniqueness in the MC process of apparel products, whereas they felt concern about complexity of customization process and output of customization. Thus, it is considered that the consumer's initial attempt to use the online MC services may be entailed



* OAMC = online apparel mass customization

〈Fig. 1〉 Suggested research model

to abandon of purchase due to the complexity of the OMC process. This study intended to derive effect factors of the complexity recognition in the OMC service process of apparel products. As the result, the effect of increased number of options on the consumer's complexity recognition might vary depending on effect of consumer characteristics, shopping context, and MC marketing factors. The relationships between the identified factors were presented in 〈Fig. 1〉.

V. Conclusion

This study examined the effect of number of options and other variables on the complexity perception that the consumer recognizes in the MC process. OMC is a service relatively recently developed and is in the initial accommodation stage. Accordingly, this study attempted a qualitative approach through the focus group interview method for the purpose of suggesting strategies to minimize negative aspects of OMC services and maximize the benefits by examining consumers' responses and opinions. This study is meaningful in that it identified the influencing factors of consumers' complexity perception based on the framework of three major factors of consumer behavior such as consumer characteristics factor, situation factor, and marketing factor. Moreover, the present study extended the results of previous studies on the effects of choice option variety by suggesting moderating roles of the three influencing factors on the relationship between the number of options and consumers' complexity perception of the OAMC process.

As Piller (2003)'s and Godek et al. (2004)'s study suggested, excessively many options reduced the consumer's interest, control feeling, and perceived usefulness of OMC usage if there were no support systems provided in the process of OMC. However, consumers did not present only negative opinions for the increased diversity of selection. The level of complexity perception of MC process might vary depending on the consumer's product knowledge or involvement and characteristics of preference development. In addition, in case of purchasing an important apparel item, the expectation for the various options that the consumer wanted might increase. Thus, the suggestion of the options must be made by simultaneously considering the consumer's characteristics, type of MC product and purchase context, rather than judging by one aspect such as more or less numbers of options that the consumer wanted. These results comprehensively identified the factors affecting the complexity that consumers perceive in the OMC process by expanding dimensions such as number of components, number of combination methods of design, and scope and depth of knowledge and technology required in the manufacturing process suggested by Hobday et al. (2000)'s study. Thus, it is important to notice the need for inclusion of various consumer characteristics

and purchase contexts as moderating factors of the relationship between the number of OAMC options and complexity perception.

Besides, this study attempted to suggest basic information to establish the strategies to alleviate the consumer's complexity perception by examining the effect of MC marketing factors. Firstly, this study could find that number of suitable options might vary depending on the types of product in terms of customization needs. Next, requests for classified presentation format of choice options to help the consumer's selection process of design were identified in aspects of service provision. In addition, it was found that consumers depend on various product recommendation services for the purpose of reducing uncertainty of final product. As neighbor consumers' opinions were useful in general online shopping setting, suggestion of recommendable MC products for the reference in the OMC process could be helpful to reduce consumers' complexity perception.

We intend to provide following strategic implications for the online apparel MC shopping mall to minimize consumers' complexity perception in the MC process on the base of results of this study. First, increase in the degree of complexity perception or needs for the diversity of partial design options for apparel products provided in the OMC process vary depending on product type. For most MC shopping mall, types of product are limited to few categories such as dress shirts, jeans, or bags, and it is hard to find differential competitive advantages in terms of presentation format of options. Consumers want appropriate balance point considering both diversity of design options and control over shopping process. Moreover, given that the appropriate balance point may vary depending on product, the OMC retailer should identify the optimal diversity level of options for each product type. For example, for the product category in which consumers have high level of differentiation needs and importance in purchase decision such as apparel items for special occasions. Second, it will be more effective to classify and present options by considering evaluation criteria that the consumer consider important when purchasing apparel products than to present partial design options randomly. For example, it will be helpful for consumers to classify options by image or style that the consumer pursues or by consumer's body type. The consumer can combine various partial design options within specific image type or style type and is sure that own options can achieve harmony each other. In other words, it is expected that the increased diversity of partial design options within categorized image types will satisfy the consumer's needs for diversity that desires to pursue uniqueness and individuality through OMC without increasing the complexity perception in the OMC process. Finally, considering the fact that the consumer expresses concern about the limit of product knowledge or ability required for design in the process of participating in the MC process, the uncertainty will be able to reduce in the OMC process while supporting the process of selecting appropriate options in every stage by providing recommendations. Especially since modification options that the consumer must select for apparel are various, methods of suggesting recommendation options by stage will be also helpful to reduce the consumer's complexity perception.

This study utilized qualitative study method considering that OMC service for apparel product is in the initial stage, thus has some limitations such as the generalization of the results. Thus, follow up studies should be performed in order to verify the moderating effect of consumer characteristics, and marketing and shopping context factors on the relationships between number of options and complexity perception of OMC process as identified in this study. Especially, since it was appeared that the appropriateness of diversity is differently recognized depending on the consumer's participation level by product type, a further study for how diversity of appropriate options vary depending on consumer characteristics or product type should be performed.

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