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The Antecedents of the Sources of Value of Mass Customization According to Different Categories of Products: Individual and Contextual Variables

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Abstract
This research has for main goal the identification of the individual variables (involvement product, expertise and perceived risk) and contextual variables (level of complexity and perceived level of personalization) ac-cording to different categories of products and their relationship with the sources of value of mass customiza-tion (MC) (mass customized product value and co-design process value). Through analysis of a netnography of 200 comments left by people who have customized three different categories of product corresponding to private/public consumption (swimsuit, shoe, game controller), we have demonstrated that the individual and contextual variables influencing the perception of value differ from one customizable product to another, and the sources of value of MC are not identical for all products. We have shown that involvement product can have an effect on the utility value but not on the value of interpersonal differentiation. We have also shown that perceived expertise can have an impact on the values related to MC experience, such as hedonic value. When we live a MC experience several times, it will be more fun to customize the product. In addition, we found that the level of perceived complexity can have an effect on the value of interpersonal differentiation. The easier the MC process is to use, the more the individual tends to spend time customizing the product to make it unique. This uniqueness value is also related to the perceived level of customization. In other words, the more choices we have, the more we will create a unique product.

Keywords: mass customization (MC), sources of value, individual variable, contextual variable, private/public consump-tion.

JEL classification: M31

1. Introduction

To reconcile the maximization of profits via mass production and willingness to meet the diverse expectations of consumers, firms are increasingly offering mass customization (MC) programs. In MC "the same large number of customers can be reached as in mass markets of the industrial economy, and simultaneously treated individually as in the customized markets of pre-industrial economies" (Davis, 1987). Several marketing studies have sought to understand the motivations and brakes associated with MC. They were studied *via* contextual and individual variables: such as the involvement product, the perceived risk or the perceived expertise for the individual variables; perceived level of customization or perceived level of complexity for contextual variables. No research has been interested in studying the antecedents of the valuation of MC according to the products concerned. However, Franke et al., (2010) in their study on the effect of 'i designed it myself' on the valuation of the MC, raises the question of the generalization of their results on categories of utilitarian products such as computers or private consumer products such as mattresses. According to these authors, the relationships studied might be somewhat smaller in such product categories. They also highlight the importance to analyze whether constructs such as product category involvement, a person's desire for unique products, or more generally their level of extroversion as individual

variables influence the MC process.

The purpose of our study is to determine which motivation, for which product category, is likely to influence the consumer's interest in participating in a MC program and to purchase the customizable product accordingly. Previous studies in this field of research (Merle et al., 2010, Franke and Schreier 2010, Franke et al., 2010) show that interest in MC is influenced by the mediation of the perceived value of MC, composed of a value related to the product (utility, expression of its individuality and interpersonal differentiation (uniqueness) and a value related to the experience of MC (hedonic and creative). The contribution of this research lies in the identification of motivations and obstacles to the purchase of a customizable product within the framework of categories of products corresponding to public versus private consumption and hedonic versus utility product.

After presenting the theoretical and methodological framework, we will analyze the main results and draw the necessary academic and managerial conclusions.

2.Theoretical framework

2.1. Individual variables related to the relationship to the product category

There are three individual variables related to the category of products that may have an impact on MC's sources of value (Merle, 2007): the product involvement, the perceived expertise and the perceived risk in the product category. In addition, Rivière (2009) shows that individual variables have an impact on perceived characteristics (eg perceived price, perceived learning cost, perceived functional advantage, perceived complexity, etc.) that are influenced by product information elements (price, place of purchase, design ...) and are themselves susceptible to the formation of the perceived global value.

2.1.1. Product involvement

According to Roerhrich (2001), the involvement is the central variable of the relation between a person and a category of products. It is defined as "an unobservable state of motivation, excitement or interest. It is favored by external variables (situation, product, communication) and by internal variables (ego, values ...)"(Rothschild, 1984). Involvement is considered by Fiore et al (2004) as a two-dimensional variable composed of "development of one's individuality" and "experience of one's appearance". These authors show that product involvement has a significant link with the willingness to use the MC to obtain a unique product. In the same vein, Biedron and Anderson-Connell (1999) show that there is a significant link between involvement and interest in MC. In contrast, Ulrich et al. (2003) validate a non-significant correlation between involvement and comfort in the co-design process, satisfaction with the co-designed product, and ease of decision-making. However, studies on the link between involvement and interest in MC are not all based on the same scales of measurement. For example, the measurement scale of Laurent and Kapferer (1986) takes into account the perceived risk, a dimension considered as distinct from the product involvement by other authors (Merle, 2007). Guilabert and Donthu (2006) suggest that perceived risk may affect the level of personalization desired by individuals. Similarly, according to Rivière (2009), the perceived risk refers to the perception of uncertainty about the negative consequences potentially associated with an alternative of choice and may have a negative influence on the adoption of a new product.

2.1.2. The perceived risk in the product category

The principle of perceived risk is that consumers are sensitive to both the likelihood and the extent of the potential loss associated with a purchase (Macintosh, 2009). Moreover, it is generally accepted that individuals are motivated to reduce risk by different strategies, such

as doing more research (Beatty and Smith, 1987) or being more loyal to brands or products. Sensitivity to personalization may be related to the perceived risk in the sense that it may be an antecedent of sensitivity to personalization. Perceived risk associated with the purchase and use of customized products could affect the way consumers can customize these products.

2.1.3. Expertise in the category of products

It is defined as "the ability of the consumer to successfully perform tasks related to the product" (Merle, 2007). Aurier and Ngobo (1999) distinguish subjective expertise defined as "the subject's perception of his ability to perform tasks in relation to the product" of objective expertise. According to Dellaert and Stremersch (2005), the more the consumer is expert in the product category the less he finds the MC program complex. They also identify a moderating effect of expertise in the product category on the relationship between the perceived complexity and the utility of the product. Godek et al. (2002) show from a study of two different product categories (pizzas and travel) that consumers are more satisfied with the customized product if they perceive that they have the capacity to modify it themselves. In addition, most MC research suggests that users of this type of program are lead users (Merle, 2007). One of the characteristics of these individuals is their expertise in the product category (Becheur and Gollety 2006).

2.2. Contextual variables related to the product category

Such as individual variables, contextual variables are related to the product category. They have different names according to the authors. We note the MC toolkits or online sales configurator, the variables related to the offer or software of co-design. Merle (2007) studies the impact of two contextual variables on the value of MC: the level of perceived complexity and perceived level of customization. These two variables have an impact on the value of the product and the value of the experience of co-design.

Otherwise, according to Dellaert and Stemesch (2005), the level of complexity is not considered as a variable linked to the product but rather a mediator between the contextual variables (related to the co-design software) and the utility of the product. The complexity is considered here at the same level as the usefulness of the customized product and is close to the ease of use of the Technology Acceptance Model (TAM) considered as a belief influencing the intention to adopt a new product. Dellaert and Stremersch (2005) have studied the influence of several contextual variables on the utility of the customized product (measured by the probability of purchase). The independent variables integrated into their experimental design are the level of customization, the level of heterogeneity, the existence of a default version and finally the integration of the price of each module. Rivière (2009) distinguishes two types of complexity: the complexity of use and the complexity of understanding the operating principle of the new product. Works show that a minimum degree of complexity is better for the adoption of a new product. Conversely, too much complexity can cause misunderstanding and possible rejection of the product. Sandrin et al (2017) empirically show the existence of an effect of the co-design software on the valuation sources of the MC. Apart from the two factors identified by Schreier (2006), these authors highlight three other factors that play a key role in improving the perceived value of MC: the ease of comparison, communication about costs and benefits and finally assisted navigation.

3.Methodology

This research adopts an exploratory approach in order to identify the antecedents of interest at MC according to different product categories (private vs public consumption). We made a netnography of the discussions on the internet of people having made a purchase of a

customizable product and giving their opinions on this experience. Netnography was developed by Robert Kozinets (2002) to study individuals in a non-intrusive natural community. By choosing different product categories and brands, we want to show that consumer behavior towards MC may differ depending on the buying context. The brands selected are in the shoe markets (Nikeid), swimwear (Surania) and video game controllers (Xbox and Scuf). Reviews on Nikeid were collected via the website «igraal». Reviews on Surania have been collected via several fashion forums (Ex: femmes-référence.com or lesfillesduweb.com). The comments on Xbox were collected on a geek forum. And finally, the comments left on the official site of "Scuf" and a video of a YouTuber, presenting the customizable video game controllers, served as a basis for netnography on this brand. A total of 200 comments were analyzed using NVivo software with thematic analysis. The interpretation of the comments is based on the dimensions of our variables previously defined in the literature to provide an objective reading of the studied corpus (Robert and Bouillaguet, 1997).

Table 1. Variables and prescribers selected

Variables	Prescribers	Occurrences
Product involvement	According to Roerhrich (2001), involvement is the central variable of the relation between a person and a category of products. It is expressed in comments with prescribers such as "it interests me, suits me, gives me pleasure, who we are, be sure" (Becheur et al., 2006)	50
Perceived expertise	It is defined as "the ability of the consumer to successfully perform tasks related to the product" (Merle, 2007). It is expressed in comments with prescribers such as "I know more, I know the latest innovations, I have experience" (Laurent and Kapferer, 1986)	9
Perceived risque	According to Bauer (1960), perceived risk describes a consumer who develops decision strategies and ways of reducing the risk that enables him to act with confidence. It is expressed in comments with prescribers such as "time, price, delivery time, being afraid that size/quality is not appropriate" (Forsythe et al., 2006)	40
Perceived complexity/ Ease of use	Individuals attach greater utility to simple MC programs (Dellaert and Stremersch, 2005). Complexity is expressed in comments with prescribers such as "difficult, complicated, complex/easy to use"	11
Level of personalization	According to Dellaert and Stremersch (2005), the level of customization increases the utility of the customized product and does not influence the complexity of the program. The level of personalization is expressed in comments with prescribers such as "great choice / limited choice, free, autonomous, customize everything you want"	24

4.Results and discussion

4.1. Individual variables according to the product category

4.1.1. Product involvement

Individual variables influencing the perception of values differ from one customizable product to another. In addition, the sources of value of MC are not identical for all products.

For example, the value of interpersonal differentiation is not perceived by people who customize the video game controller unlike the two other products studied (swimsuit and shoe). This is because geeks do not feel the need to feel different when they play alone in front of a console at home. People who have customized video game controllers care about the ergonomics of the controller and usually choose a customizable model based on a more powerful feature offered by the brand: "*It is especially in a FPS that it will do the job. The difference, allowing the player to win those few tenths of seconds that make the difference between life and death. For the other games, where the reflexes are perhaps a little less put to the test, it will offer at least the comfort of having two keys comfortably in the hollow of the hand under the pallets*". This result corroborates the results of Fiore et al (2004) who consider involvement as a two-dimensional variable composed of "development of one's individuality" and "experience of one's appearance". These two components are not felt by consumers of game controllers. The customization of game controllers is curiously considered here as a non-involving purchase. Non-existent involvement in a product category, therefore, precludes any desire to feel different and unique or to have a MC experience. Nevertheless, we can suppose that the less we are involved the more we perceive the utility value linked to the customizable product.

4.1.2. Perceived risk

The cost of uncertainty is greater for customizable swimsuit corresponding to private consumption. People who left comments about their buying experiences say they had a hard time choosing the exact measurements and some of them claim that the received product was "*too small*" or "*too big*". It has been proven in the literature that the perceived risk in the product category influences the sources of valuation of MC and their antecedents such as the price: "*buy a swimsuit without trying it, I admit, it's a bit risky! Basic models are really cheap, but I'm not going to hide it, prices go up easily depending on the options you choose*" The perceived risk can be linked to the fear that the quality is not good but also the fear that the size does not correspond "*I would like to know if it enhances the breast and does not crush it, because that makes me this effect when I look at the photos of the coup I hesitate to order mine"* . In addition to the difference in values / costs perceived according to the category of product to be customized, we can cite the tendency to offer a customizable product that seems to be present only in comments about customizable shoes Nikeid corresponding to public consumption. To offer, the buyer must know the exact measurements or sizes of the person to whom he will offer. It is, therefore, easier to know the size of shoes than a swimsuit where measurements are considered more "personal". As a result, consumers perceive a high risk when they customize a swimsuit to offer it. Conversely, offering customizable shoes does not present a perceived risk and can positively influence the intention to purchase the product. The perceived risk and intention to offer did not appear in the game controllers comments probably because of the expertise felt by the user and the very individualistic nature of its use. However, it would be appropriate to explore this behavioral intent related to offering a product that hitherto was ignored by marketing work on the MC.

4.1.3. Perceived expertise

Note that previous research has shown that the more the consumer is expert in the product category the less he finds the MC program complex. It even turned out that the perceived expertise is likely to influence the values related to the MC experience as the hedonic value. "*I work in the swimsuit field and I, therefore, find this concept funny*". In other words, the more comfortable the consumer is with the co-design process, the more he perceives the hedonic value. By repeating participation in a MC program, the consumer will find the process

less complex and appreciate the level of personalization of the product: "*I started 4 years ago to order on this site. The only big lie: deadlines! Do not count 2 weeks but rather for 1 month! Otherwise, they are nice :) I like the fact of choosing colors for every detail*". Conversely, a lack of expertise leads to a lack of confidence in his creativity and a frustration in the MC experience. In addition, perceived expertise is not mentioned in comments about game controllers.

4.2. Contextual variables according to the product category

According to thematic content analysis, people who have customized shoes or swimsuits express their perception of the benefits of the customized product through the ease of use of the MC website and tools: "*The site online is very well composed, it navigates very easily, the various elements are well set up to easily and quickly create the swimsuit for his holidays, and thus no longer look like the neighbor on the beach*". The ease of navigation on the site, therefore, has a direct effect on the value of interpersonal differentiation (source of valuation of the MC). This result corroborates with the results of Sandrin et al. (2017) validating a research model linking the benefits of MC and a number of MC toolkits.

These authors show that the "user-friendly product" tool has a positive impact on the utilitarian, social, interpersonal differentiation and expression of its individuality benefits. Franke and Piller (2003) also identify three MC tools: (1) a configuration software presenting the different possible variants, and guiding the user through the customization process, (2) a feedback tool to represent visually the product that the individual customizes in real time, particularly useful in case of uncertain choice, and (3) an analysis tool that transcribes the consumer's order into a list of materials, plans of construction (...) sent by the following production (Merle et al., 2010). The link between the experience of the product and the ability to customize appears a dozen times in the comments on swimsuits and shoes. According to Merle (2007), the contextual variable "level of personalization" also has an effect on the sources of valuation of the MC: "*And that does not go only by the choice of the fabric, which by the way offers a wide choice of 'printed and fluorescent colors, but also by the model and accessories that will make your swimsuit a unique piece. Because everything is possible! The mismatched jersey, with floral print. From headband style to one-piece swimsuits"*. Based on this verbatim, we can suppose that the higher the level of personalization is, the more the consumer perceives a value of uniqueness and value of interpersonal differentiation.

The table below summarizes our results in this study about links between contextual/individual variables and MC valuation sources (utilitarian, hedonic, creative, uniqueness, price and quality). We also identified a new consequence of the perceived value of the MC : the intention to offer.

Table 2. Identification of associations between variables by product category

Variables	Link with another variables	Comments	Category of product	Occurrences
Product involvement	-Valeur d'unicité -Valeur utilitaire	-Value of uniqueness is not perceived when the customer is not involved. -Utility value is perceived when the customer is not involved in the category of the product	Swimsuit Shoess Game controller	26 40
Perceived expertise	-Hedonic value -Creativity value	-The more the consumer is an expert in the MC process, the more he perceives a hedonic value. -The value of creativity is not perceived when the individual lacks experience in the MC.	Swimsuit Swimsuit Shoes	6 5
Perceived risque	-Price -Quality -Intention to offer	The higher the price is, the higher the perceived risk will be. It is easier to offer a customizable product when there is no perceived risk.	Swimsuit Swimsuit Game controller Shoes	15 30 9
Perceived complexity/ Ease of use	-Value of uniqueness	-The easier the process of MC is to use, the more one perceives a value of uniqueness.	Swimsuit	6
Level of personalization	-Value of uniqueness	-The higher the level of personalization is, the more the consumer will perceive the value of uniqueness.	Swimsuit Shoes	14

Conclusion

Our research objective is to study the individual (product involvement, expertise, and perceived risk) and contextual variables (level of complexity and perceived level of personalization) and their relationship with the perceived value of the MC according to different categories of products in private consumption versus public consumption or hedonic versus utilitarian product. We have shown that product involvement can have an effect on the utility value but not on the value of interpersonal differentiation, as opposed to the perceived

risk that seems to have a direct link with it. We also showed that perceived expertise can play a role in the values related to MC experience, such as hedonic value. When one has lived a MC experience several times, it will be more fun to customize the product. In addition, we were also interested in contextual variables and found that the level of perceived complexity has an effect on the value of interpersonal differentiation. It seems that the easier the MC process is to use, the more the individual tends to spend time customizing the product to make it unique. This uniqueness value is also related to the perceived level of customization. In other words, the more choices we have, the more we will create a unique product. Otherwise, there is a multitude of MC contextual variables that are not present in the sample of products studied in this paper. It would, therefore, be interesting to study in future research the relationship between MC toolkits and the perceived values of MC in other programs offering a wide range of tools. For example, the feedback will probably reduce the uncertainty that arise from the perceived complexity and thus increase the perceived functional benefit (utility value), price acceptance or the perceived global value of MC (Rivière, 2015). From a managerial point of view, the understanding of the sources of value of MC and their relationship with the individual and contextual variables permits to identify values that have not been exploited until then by the brand. For example, it would be appropriate for a firm proposing customizable products for public consumption to highlight the act of offering in its advertisements. From an academic point of view, the contribution of this paper lies in its originality to apply the theoretical framework of the value of MC in order to identify the sources of valuation of MC according to products corresponding to public versus private consumption. It has been shown that some sources of value have greater effects depending on the category of the product concerned. Finally, a quantitative study with an experimental nature highlighting both types of consumption would reinforce these results.

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