Mass Customization of Products Based on E-commerce

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Abstract—(MC), i.e. offering customers exactly what they want without losing in operational efficiency, has been positioned as a viable business strategy in ecommerce for many years. Still, many companies have failed in implementing profitable MC. We explain these failures by the lack of strategic capabilities in these firms and examine their effect on firm performance, drawing on a survey of 115 firms offering customized consumer goods on the internet. We build on complementarity theory and examine how multiple core elements of a MC strategy enhance company performance. We find that successful MC is based on the integration of various different organizational elements. Methodologically, we develop a set of valid and reliable instruments to measure three sub-dimensions of MC capability. We give advice to managers how firms pursuing MC can build all three capabilities complementarily to attain strategic differentiation and competitive advantage.

I. INTRODUCTION

Mass customization is a system that uses information technology, flexible processes, and organizational structures to deliver a wide range of products and services that meet specific needs of individual customers at a cost near that of mass-produced items. It aims to deliver product and services that best meet customers’ needs with near mass production efficiency. Mass customization — where customers can tailor a product’s appearance, features or content to their own specifications — has been the “next big thing” for a long time. Mass customization proactively manages product variety in the environment of rapidly evolving markets and products, many niche markets, and individually customized products sold through stores or over the internet. Earlier methods has found that for MC it involves a toolkit for implementation to fulfil customers’ demands. To the best of our knowledge this system can be used to customize product in many forms.

II. LITERATURE SURVEY

A. Nike ID

The ID Studio Finder allows the user to find out exactly where the NIKEiD Studios are located, and how to book an appointment with a design consultant. Users could also save their designs to their Locker accounts. The app has sense been discontinued and replaced with a Mobile Builder engineered to allow for full customization from any modern mobile device running either the iOS or Android operating system. By taking a picture with their mobile a consumer can send an image to Nike where newly designed software will then analyse the picture for its two main colours and then go about designing a shoe based on it. The consumer will then receive reply with an image of their desired shoe. From this stage they can either save the image, send it to someone else or even purchase the new design. But it only customizes shoes and for no other product. NIKEiD is a service provided by Nike allowing customers to customize clothing purchased from Nike. The customer becomes the designer as they change and add a personal look and feel to a selected item.

B. Zazzle

Zazzle is an online retailer that allows users to upload images and create their own merchandise or buy merchandise created by other users from participating companies. It was founded in 2005 by Robert Beaver and his sons. Zazzle.com offers digital printing, and embroidered decoration on their retail apparel items, as well as other personalization techniques and items. It provides various options along with toolkit to fulfil the demands of the customer.
III. APPROACHES TO MASS CUSTOMIZATION

There are four basic approaches to mass customization, depending on customization of the product itself or its representation.

A. Collaborative Customization
Collaborative customizers talk to the clients to help them recognize what they need, to recognize factors that will fulfill those needs and to create customized products following those guidelines. This approach falls under mass customization and is primarily meant for businesses with highly-customization-centric clientele. Moreover, this approach seeks to help clients who struggle to spot exactly what they want and find themselves confused between a huge varieties of options. Through decreasing options for an individual client, a collaborative customizer helps to understand the needs of the customers and strives to make it clear to them.

B. Adaptive Customization
Businesses that follow the approach of adaptive customization offer one standard product to the customers along with a few customization options. This approach makes sure that the product is designed in a manner that it can be customized by the end client with absolute ease. This approach is ideal for a client-base that has different expectations from the product in different situations and occasions. With the availability of technology, clients can easily customize the products on their own.

C. Cosmetic Customization
Cosmetic customizers advertise a standard product differently to different groups of clients. This approach works well when clients use the same product but want them to be presented differently. Such products are not customized but instead they are packaged differently to suit different kinds of customers. For instance, the benefits and attributes of a product are advertised in a different manner, it is displayed in a different way, promotional programs are communicated and designed differently, and the product mostly carries the client’s name. Although this type of customization is, as its name suggests; cosmetic, it offers great value to a lot of clients. Each year, clients spend billions of dollars on products such as named sweatshirts and T-shirts. The Planters Company, a unit of Nabisco, chose cosmetic customization when it retooled its old plant in Suffolk, Virginia, in order to satisfy the increasingly diverse merchandising demands of its retail customers. Wal-Mart wanted to sell peanuts and mixed nuts in larger quantities than Safeway or 7-Eleven did, and Jewel wanted different promotional packages than Dominick’s did. In the past, Planters could produce only long batches of small, medium, and large cans; as a result, customers had to choose from a few standard packages to find the one that most closely met their requirements. Today the company can quickly switch between different sizes, labels, and shipping containers, responding to each retailer’s desires on an order-by-order basis.

D. Transparent Customization
Transparent Customization deals with providing customized products to individual clients without telling them that the products are exclusively produced for them. This approach works in cases where the customer does not want to repeat what she/he needs incessantly or when client needs are predictable or obvious. Businesses that deal in a transparent customization examine client’s behaviour without direct communication with them and then discreetly customize their products for them. Ohio’s ChemStation has successfully recognized the needs of its customers and has presented
them with amazing, standard products. Its industrial soap that can be used for commercial uses like a factory floor cleaning and car washing was whole-heartedly accepted by the market when it launched. ChemStation also analyses the washing requirements of each customer and produces suitable detergents for them.

IV. ARCHITECTURE OF MASS CUSTOMIZATION

There are three strategic capabilities of Mass Customization:

1. Solution Space Development (SSD)
2. Robust Process Development (RPD)
3. Choice Navigation (CN)

- Solution Space Development (SSD): Mass customizer must first identify the idiosyncratic needs of its customers, specifically, the product attributes along which customer needs diverge the most.

- Once that information is known and understood, a business can define its “solution space” clearly delineating what is will offer and what it will not.

- The first is to provide customers with a software design tool like a CAD system but with an easy to use interface and a library of basic modules and functionalities. Using so-called innovation tool kits, customers can by themselves translate their preferences directly into a product design, Highlighting unsatisfied needs during the process.

- The resulting information can then be evaluated and potentially incorporated by the company into its solution space.

- After company has collected data about its customer’s needs it has to interpret and render that information in the form of product concepts that customers can then review.

Robust Process Development (RPD): MC originally has conceptualized the possibilities of advanced, flexible manufacturing systems (Pine 1993). But robust processes are more: A MC fulfilment strategy must ensure that increased variability in customers’ demand does not incur significant lead time or cost penalties along the entire supply chain (Ahlstrom and Westbrook 1999). MC companies implement stable but still flexible processes to achieve “mass production efficiency” in their operations and supply chains (Tseng and Jiao 2001). Consider the example of Zazzle, an established MC start up from the US that enables the personalization of dozens of items from t-shirts via cups and skateboards towards postal stamps with user-designed graphics or pictures. The firm has built a fulfilment system that efficiently handles more than 200,000 new product designs per day, shipping thousands of items to its global customer base. RPD for Zazzle not only includes its manufacturing system, but also managing configuration, order handling, shipping, and customer service in a highly efficient and automated way, despite the fact that not one order is the same. Concluding, RPD is the ability of an organization to reuse and/or recombine its resources along the value chain to address variability in customers’ requirements, while avoiding any deterioration in the Performance of the organization’s processes compared with a mass production system.

Choice Navigation (CN): It supports customers in identifying their own solutions while minimizing complexity and the burden of choice. It is important to remember that when a person is exposed to countless choices, the cost of evaluating those options may be cumbersome. The resulting syndrome is called “paradox of choices” in which too many options can reduce the interest of customer in it. Co-design activities may also induce perceptions of greater complexity, effort, and risk among
customers. In consequence customers might postpone their buying decisions, opt for a standard product alternative, or reassign their budget to a different vendor. To avoid such problem we use Choice Navigation to simplify the ways in which people explore its offerings. The corresponding CN capability thus is the ability of an organization to support customers in identifying their needs and creating their own solutions, such that choice complexity is minimized and enjoyment of the configuration process is maximized.

V. IMPLEMENTATION OF COST FUNCTION

OMProduct.xls = excel document of the cost of the base product CC = Connection Configuration NP = New price
Steps of Algorithm for Cost Estimation
1. Click on the base product model
2. Extract the base cost of the model
3. Download the cost of the model and check CC
4. If (CC==0)
5. Fix the CC
6. Return 8
7. Else if (CC==1)
8. Download the prices of the changes made to the model
9. NP= base cost + price of the changes
10. Store the new price in the database
11. Display it to the customer

The cost obtained or displayed to the customer will be the final cost of the product customized by the customer. It will be the addition of the cost of base product and the changes made by the customer to modify the product as per his/her needs. The OMProduct.xls file will be containing the base product cost. It is an excel file. If the customer does not edits the base product and confirms it the cost present in the excel file will be stored in the database and it will be displayed to the customer.

VI. METHODOLOGY

Customer-toolkit dyad should be expanded to user communities. Self-designing: Excessive strain on the individual novice customer (Toolkit should offer high levels of freedom). Novice users might not be able to generate a product for their wants and needs, which will reduce their willingness to pay. Experienced users access external sources of information, such as consulting the literature or asking peers for advice. Most customers find it difficult to develop an initial idea because of their limited insights. Novice users can benefit from external sources in all three major phases:

1. Development of an initial idea.
2. Generation of a (preliminary) design.

Earlier studies showed that experienced users are willing to support others with regard to efficient toolkit use. This peer-based help improves individual problem-solving.
During a design process, a designer repeatedly checks whether or not the solution meets his/her own preferences and external requirements. Evaluating the preliminary design reduces uncertainty about the quality of solution generated. Feedback is a valuable resource in identifying the weaknesses of a potential solution and in gathering useful information on how to enhance the solution. Providing an MC toolkit user with peer-based feedback on preliminary design solutions will stimulate the integration of external feedback into the individual customer’s MC toolkit self-design process. The more the individual customer integrates external feedback information on preliminary design solutions into the MC toolkit self-design process will be (measured in terms of perceived preference fit, willingness to pay, and purchase intention).

VII. CONCLUSION

Mass customization defies the contradiction between mass and customization and aims to deliver products and services that best meet individual customers’ needs with near mass production efficiency.

It is important that all parties concerned can engage in collaboration with sufficient trust and only then collaborative engineering can play a significant role.

The Economist: “Mass Customization a Result of the Third Industrial Revolution”

REFERENCES


