Responsive Business Model for Mass Customization Manufacturing Enterprise

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Abstract-- Mass Customization (MC) is a strategy that integrates customer into the supply chain in order to precisely produce what customer wants. This is particularly true for the automobile industry. It is most competitive market, having significant pressure for the cost cutting, in time delivery, government policies etc. Thus, it is appropriate to utilize the current Information & Communication Technologies (ICTs) and particularly the internet to gather the information and increase the market share. This article proposes a rigorous conceptual model of business model particularly for automobile industry. It includes the evaluation of enabler for the MC, limitations of the MC, preparedness of MC and creates a template for the automobile business. Ten elements are identified to create the business model for automobile industry. This approach will provide the foundation for new management tools in MC strategy.

Keywords-- Mass customization, Information & Communication Technologies, Business Model

I. INTRODUCTION

Mass customization refers to a business strategy that conciliates two different business practices, which are mass production and craft production. Mass customization is a hybrid manufacturing concept and it enables companies to achieve an important competitive advantage by joining product differentiation and cost efficiency. “The greater the market turbulence, the more likely that the industry is moving towards mass customization, and that the firm has to move in order to remain competitive” (Pine 1999[1]). As a business paradigm, MC provides an attractive business proposition to add value by directly addressing customer needs and in the mean time utilizing resources efficiently without incurring excessive cost (Pillar 2002[2]). Mass customization has attracted enormous attention from industry and academia in the last two decades (Silveria et al. 2001[3], Tseng and Pillar 2003[4]), and has been widely recognized as a viable strategy for companies to gain competitive advantage. Mass customization has been implemented by many firms like Dell, Motorola, Hewlett-Packard, and Adidas, etc and many companies are successful in implementing the MC while few of them are un-successful in certain areas of MC (Gilke et al. 2010[5]). According to Selladurai (2004[6]), mass customization is no longer an oxymoron but a reality and helps the industry to look as a tool to be competitive, redefine product mix and customer tracking.

To capture MC as a new opportunity for profits, a firm has to obtain a specific set of capabilities to address the challenges of such business. The basic challenge that the MC manufacturers face is, ‘How much variety to offer, and how much customization to put forward?’ Too much customization is not only expensive, but also complicates services and confuses the buyers (Koren 2010[7]). Implementing MC is not an easy task. One of the important challenges with MC is drastic increase in product with just a few product options which stretches companies own infrastructure, this also results in complexity to logistics and manufacturing processes. Thus, there has to be trade off between customer satisfaction and manufacturing cost. It is becoming necessary for many companies to develop anywhere, to sell anywhere, to manufacture anywhere (DASMASA), and to support their products anywhere in the world. The best example for this is the automobile industry as many of the car manufactures produce goods at certain location and sell the product at any part of the world. This not only demands an industry to be competitive in the market must also puts heavy pressure on the industry to be innovative in product development and marketing. In last few years the luxury and premium car market in India has registered a fair amount of growth. The various reasons for market growth are; rising economy, reduction of import tariffs by the government, IT growth in the country etc. According to (Chen. et al 2001[8]) with the popularity of internet and broadband the customers contribution in design will play a vital role, whereas Dewang et al. 2000 [9] suggest that companies can track the costumers by means of internet.

This article gives the emphasis on the MC applied for the Indian automobile industry, its preparedness and formulates the blue print to adopt the MC. The strategies, enablers and key differentiators are identified in context with Indian automobile industry. Initially, MC paradigm is discussed with identifying the strategies thereafter business models are outlined.
Once business models are outlined, proposed business-engineering model for mass customization & personalization of automobiles is presented in detail. Finally, the conceptual business model for MCME is proposed and conclusions are derived.

II. MASS CUSTOMIZATION PARADIGM

The four major manufacturing paradigms are: Craft Production, Mass Production, Mass Customization and Global Manufacturing.

Koren (2010 [7]) described the characteristics of MC paradigm as: large product variety, unstable market demand, computers as technology enabler, flexible and reconfigurable manufacturing system with lean operations, modular product architecture and Push-Pull type business model principal. The current market is turbulent and hostile. It has created challenges as well as opportunities for the manufacturing companies. Figure 1 shows the recent changes in the global business environment. The responsive business model is the one that can quickly adapt to these challenges.

Figure 1: Global Business Environment (Koren, 2010)

The manufacturing systems need to be aligned to Mass Customization Manufacturing Enterprises (MCME). MC will satisfy the needs and tastes of customers and will expand the potential market. It also enhances the productivity of enterprises with the help of technology driven practices and makes value addition to the product involved.

The dilemma for an established company is whether to invest in a new business strategy or not. The critical decision point for a company is illustrated in Figure 2. The performance of company with the MC business strategy may be worse than the existing status initially, however due to the technology enablers and the rapid developments in ICTs the MC strategy will actually surpass the existing status.
III. **BUSINESS MODELS (BM) FOR AUTOMOBILE INDUSTRY**

The business model for MCME must be designed to deal with following issues: product customization, potential market, global sales, location of manufacturing plants, location of R&D centres and strategic alliances. The study of few well-known examples clarifies the concept of business model. Table I describes the Indian Automobile companies and their competitive advantage based on which the BM of the companies are developed. It is observed that the Indian automobile industry progressed though there is stiff global competition.

Every industry identify the strong resource with it such as Maruti Suzuki India Ltd. produces a small cars with competitive price tag with better maintenance service after sales through good service center network. Whereas, Hero MotoCorp Ltd. produces bikes with higher mileage, while Bajaj auto Ltd in 3-wheeler segment is one of major brand providing better service and easy loan options for lower to middle income group. Tata Motors Ltd. produces the vehicles of large verity to suit the need of majority of the customers; they produce heavy duty vehicles with best in class along with passenger cars.

Table I: Indian Automobile Companies and their Competitive Advantage (Source: Respective websites) [10]

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<th>Company</th>
<th>Competitive advantage: Strategy to gain market advantage</th>
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| Maruti Suzuki India Ltd (MSIL) (Passenger cars) | ● Competitive price in small car segment.  
● Low maintenance.  
● Quality service in 1395 towns & cities in India with 2946 service centres.  
● Added services to customers via Maruti Finance, Insurance and Driving schools. |
| Hero MotoCorp. Ltd. (2 wheelers) | ● High mileage bikes.  
● Quality product.  
● High service quality with about 5000 centres including authorized dealers, service and spare part outlets. |
| Bajaj Auto Ltd. RE 2S & 4S models (3 wheeler passenger transport) | ● Until recent years was the sole manufacturer in this segment.  
● Branding and trust of customers attained due to manufacturing of these models for so long.  
● Low pricing of the product and economical spare parts.  
● Insurance and Finance provided by the company under Bajaj Allianz Ltd. |
| Piaggio Vehicles Pvt. Ltd. Ape Xtra LD (3 wheeler goods transportation) | ● Bigger carrier size (Higher load carrying capacity).  
● High on mileage.  
● Provides extra accessories at cheaper cost. |
| Tata Motors Ltd. Model :- SFC 407 EX Turbo , SFC 407 Turbo Truck, LPT 407 Turbo Truck, all models of Rigid trucks. (Light & Heavy commercial vehicle) | ● The company provides a warranty of 36 months or 300,000km whichever is earlier.  
● Tata motors have gained good reputation & Branding in the Indian market.  
● Spares are economical and available almost all over India. |
| Mahindra & Mahindra Ltd (Tractor Division) | ● Large production rate (approximately 150,000 units/year).  
● Assembly plants located in all regions in India.  
● Lesser delivery time.  
● Low maintenance.  
● Mahindra group has built a good reputation in the Indian market in the tractor segment. |
IV. BUSINESS-ENGINEERING MODEL FOR MASS CUSTOMIZATION AND PERSONALIZATION OF AUTOMOBILES

The mass customization era that started with automobiles around 1980, has blossomed so that today consumer products are produced by mass customization methods. The goal of mass customization is to increase customer’s value for a product by adding a range of product variations that fit specific consumer taste and need while maintaining low prices. Figure 3 describes the business-engineering model for mass customization and personalization of automobiles. The general product architecture and the basic product modules are designed prior to the sale; the business sequence is such that the sale precedes the personal design phase. The various phases in the BM are described below:

1. Many options are offered by the manufacturer with reference to the basic model of the car. The basic model can be produced in low-labor cost countries and shipped to the countries in which the product is to be sold, where the modification plants are established.

2. The customer selects and orders the basic model of the product (i.e. car) that fit their need and preferences. The basic model of the car is such that the degree of freedom in the product designs can be exploited by the customer to create individual product variants.

3. The manufacturer offers customers a huge number of customizable options and the customer selects feasible combination of features.

4. The customer finalizes an order (Basic model and its accessories). Each product is made only in response to a confirmed customer’s order. It is to be noted that financial transaction (Sell) is executed before the product is made.

5. The confirmed order along with the customized details is sent to the modification plants which delivers the customized automobile.

6. Ensuing availability of trained manpower will be of critical importance in successful implementation of MC. Manpower training would not only aid in the growth of MCME but also facilitate in meeting employment goals. Hence adequate steps should be taken to ensure availability of trained manpower. In this context it is proposed that a cell has to be setup which would coordinate training in disciplines related to MC. The cell will provide continuous and massive training to all segments of the business enterprise. It will also work as repository of data and knowledge to do business forecast in country as well as globally. It will also help in business policy formation.

V. PROPOSED CONCEPTUAL BUSINESS MODEL FOR MCME

The business unit of the Mass Customization Manufacturing Enterprise (MCME) is in charge of marketing and selling of customized products, and the business model actually drives the whole enterprise. The business model of MCME must be responsive to volatile markets and capable of rapidly taking advantage of market opportunities.

The flow chart of the proposed business model is shown in the Figure 4. In the first stage all the resources i.e. Key resources which will be required for the production and manufacturing of the customized product are collected. The Key partners will supply the additional resources that are not provided by the key resources. After collecting all the resources we further move to Key activities where the manufacturing and production of the customized product takes place. The final product (Value Proposition) is manufactured here and distributed to the end customer with the help of Distribution Channels. Also, the customers are informed about the various products and the product features that are manufactured by the firm through Customer Relation through the marketing department. Queries or complaints regarding the product are addressed by the customer relation department. Revenues are generated from the customers when the payments for the products are made. Revenues are also generated through the consultancy services provide to other product companies. Cost or expenditure is cleared from the revenues generated.

5.1 The Business Model for MCME:

Mass customization changes dramatically the company, product, the supply chain and the customer. MC provides flexibility and the ability of reaction to the customer’s requirements. Companies considering MC need several adjustments of the key elements for successful implementation. The BM for MCME shown in the Figure 5 has ten building blocks namely: business strategy, key resources, key activities, key partners, value proposition, distribution channels, customer relations, customers, consultancy services and revenue generated.

Block 1. Business Strategy: Defines goal of business model. It specifies how the company’s strategies are translated to create competitive advantage and generate economic value to company and its stake holders.

Block 2. Key Resources: Needed in order to sustain and support the business. They are necessary to create value for the customer. These resources could be human, financial, physical and intellectual. The BM includes following Resources: human, designers, developers & testers, material, original equipment manufacturer, machineries, ICT’s & suppliers.
Block 3. Key Activities: The most important activities in executing a company's value proposition. The activities performed during the manufacturing of the customized product are: study and analysis of the customer requirements, customization based on options provided by the manufacturer, design, prototype, credit approval, raw materials procurement, production, inspection & packaging.

Block 4. Key Partners: They include: Financial Institutions, Equipment Manufacturers, Web Designing Companies etc. Some of the key activities are outsourced and some resources are acquired through key partners.

Block 5. Value Proposition: Value proposition is the collection of products and services a business offers to meet the needs of its customers. Value proposition is the final product that is manufactured and is ready to be sold in the market.

Figure 3: Business-Engineering model flow chart: Mass customization and personalization of automobile
**Block. 6. Customer Management Segment:** Customer management segment is related to how an organisation deals with its valued customer and how the orders are placed. After the order is forwarded to the warehouse the invoice is generated and the generated invoice is then forwarded to the distribution channel when the item is ready for shipment.

**Block. 7. Channels:** Company can deliver its value proposition to its targeted customers through different channels. Effective channels will distribute a company’s value proposition in ways that are fast, efficient and cost effective. An organization can reach its clients either through its own channels (store front), partner channels (major distributors), or a combination of both.

**Block. 8. Targeted Customers:** Customer segments include all the people for which an organisation is creating a value. The customers finally receive their product.

If at all there are any queries or complaints related to the product they can get back to the company with the help of customer relation department which will be available for the service at their disposal.

**Block. 9. Consultancy Services:** The cell is established to extend the facilities developed by

**Block. 10.** the company to provide consultancy to the other product companies.

**Block. 11. Revenue Generated:** Value propositions successfully offered to customers results in revenues. Revenues are also generated through the consultancy services provide to the other product companies.

VI. CONCLUSIONS

The proposed BM is a conceptual tool that contains a set of elements and their relationships and allows expressing the MC business logic. It is the entire system for delivering utility to customers and earning a profit from that activity.
The proposed BM shall help to understand, describe and predict the mass customization activity of developing, manufacturing and selling customized goods and services and earning money. Within this research framework, the roles of mostly affected by MC within the company and what fundamental requirements MC posses on the manufacturing company in terms of individual competencies are evaluated. This article presents a systemic framework for business model reinvention, illustrates its key dimensions, and proposes a systematic operationalization process. Moreover, it also provides a tool that helps organizations to evaluate both existing and proposed business model for MCME.

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Figure 5: Business Model for Mass Customization Manufacturing Enterprise (OEM=Original Equipment Manufacturer, ICT=Information Communication Technology)
REFERENCES


