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CUSTOMIZED PRODUCTS: THE INTEGRATING RELATIONSHIP MARKETING, AGILE MANUFACTURING AND SUPPLY CHAIN MANAGEMENT FOR MASS CUSTOMIZATION

Assist. Prof. Dr. Süleyman BARUTCU, Pamukkale University, Faculty of Economics and Administrative Sciences, Department of Business Administration, sbarutcu@pamukkale.edu.tr

ABSTRACT

A customized product is a special product designed and manufactured for individual customers to meet their individual needs. Managers need to understand why customers demand and how companies supply customized products. The importance of this study is to highlight business, marketing and manufacturing strategies so as to supply customized products efficiently. It is expected from a manufacturer to successfully adopt relationship marketing, mass customization, agile manufacturing and supply chain management (SCM) strategies. This paper is prepared (1) to facilitate a basic understanding of customized products for especially scholars and executives, (2) to explain the importance of these strategies and (3) to illustrate how they might be combined for supplying customized products efficiently.

Key Words: Customized Product, Relationship Marketing, Mass Customization, Agile Manufacturing, Supply Chain Management

1. INTRODUCTION

Under highly competitive business environment, markets niches continue to narrow and individualization becomes increasingly important. Today's customers demand lower prices, higher quality and faster delivery. Besides, today's customers want individual products (customized configurations of products) and are enthusiastic to pay premium prices. Customized products (also known as personalized products or individualized products) can provide competitive advantage to companies. The ability to produce customized products requires further transformation within the business from marketing to logistics. Therefore, marketing and manufacturing paradigms are changing from

mass production to mass customization. In mass production process, all choices about the design and features of the product are being made by the managers. On the other hand, in the mass customization process, unique needs of customers are properly being handled and formed to satisfy as many of the customer's specific desires as possible. There are some business, marketing and manufacturing strategies relating to customized products. This study aims to highlight the role of relationship marketing, mass customization, agile manufacturing and supply chain management (SCM) to supply customized products and integrates of these business strategies to supply customized products perspectives. Thus, (1) customized products, relationship marketing, mass customization, agile manufacturing, SCM concepts are reviewed, (2) some examples for customized products are given, and (3) the integration of these concepts are explained to supply customized product efficiently.

2. CUSTOMIZED PRODUCTS

Emergence of global economy, characterized by intense international competition, fragmented markets of discriminating customers, low prices of standard products, and rapid technological change etc., has provoked a new industrial revolution. In this revolution, supplying customized products and services are very important. Customized products have been receiving increasing popularity in markets and offering a great potential for business growth. Some marketing managers are basing their relationships with customers on policies and procedures called either "individualization, customization, or personalization" (Goldsmith, 1999). Therefore, one of the new edges of competitiveness is supplying customized products (Huang et al., 2005) and the challenge to companies supplying customized products is to make and deliver high quality products that satisfy the unique needs of each customer.

A customized product is a special product designed and manufactured to an individual customer's needs and wants. Today's customers not only demand high-quality products at low cost, they also expect them in the customized variety that gives them precisely what, when and where they want it (Fitzgerald, 1995). In other words, customers demand products with lower prices, higher quality and faster delivery, but they also want customized products to match their unique needs. The essence of customization and personalization is to provide only and exactly what each customer wants at the right time (Gilmore and Pine, 1997). In some industries, many companies offer customized products. Products such as computers, cars, jeans, and t-shirts etc. are created, marketed, and sold not by forecasts of demand, but on order basis. Customers can order customized computers from Dell, custom jeans from Levi's, made to order sneakers from Adidas, made to order cars from Smart or Ford etc. For example, Levi's is offering more than 10,000 jeans variations according to customers' exact measurements, Dell sells many customized computers, Motorola can produce 29 million somewhat different pagers on the same production line, and Smart cars are built based on customers' orders and customers can design their own cars by just answering 15 questions and alter specifications with limited array of options (Gilmore and Pine, 1997; Peppers

and Rogers, 1998; Cox and Alm, 1998; www.smart.com). Moreover, designashirt.com presents customizable t-shirts, outerwear and athletic wears for its customers to order their customized. In their e-stores, customers can design their own t-shirts, outerwear, athletic wears and outerwear. After completing their design, they save their design by providing their email address, a name for design and creating a password. Then, they click on the buy now button. Once they are satisfied with their order details, they click submit and their orders are processed (www.designashirt.com). Ford Company that is one of the biggest automobile producers in the world also provides their consumers customized and personalized cars. Ford Company customized the entire vehicles manufacturing process based on a consumer's needs and preferences. There are four steps to build new Ford vehicles; (1) selecting the model, (2) defining preferences, (3) building the vehicle, (4) seeing transaction summary. In step (2 and 3), customers can define the features that they want in the new car such as the model, color, options, engine and transmission etc. The benefits of this step, customer accurately customizes, builds, and prices the car he/she wants (FordDirect.com).

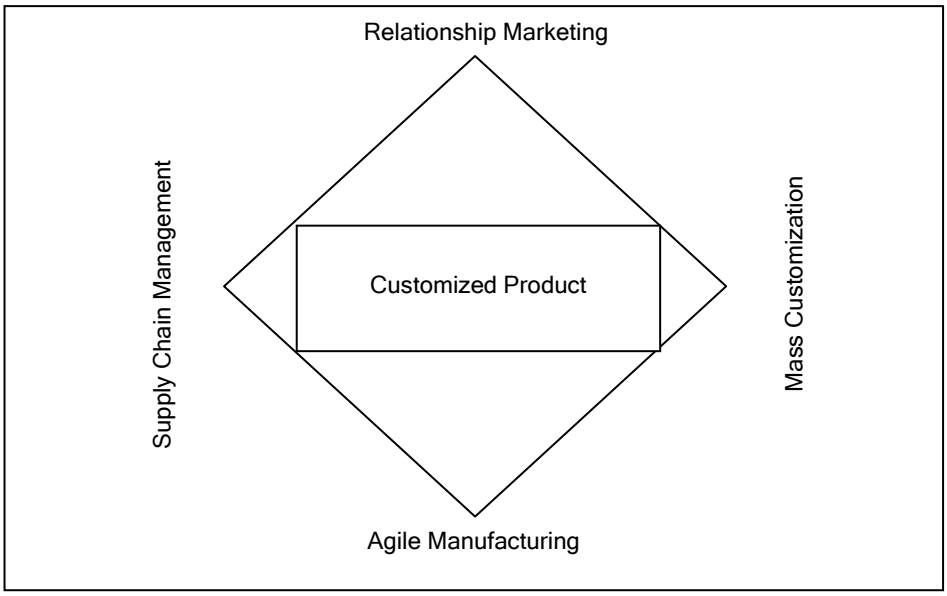
Eastwood (1996) emphasized that total customer satisfaction could mean embarking on customized products, in other words, giving every customer a product tailored specifically to his or her needs. Pine (1993) explained that dominating markets with a single product is increasingly difficult and instead many industries are evolving towards mass customization. Supplying customized products requires new thinking and strategies that break away from the traditional concepts of mass marketing and mass production.

3. MAIN BUSINESS STRATEGIES FOR CUSTOMIZED PRODUCTS

Customization is optimized to build a wide range of products at the lowest possible cost and deliver them quickly. This optimization task is accomplished by integrating different strategies to marketing, manufacturing, procurement, and logistics.

In Figure 1, four of these strategies are integrated as relationship marketing, mass customization, agile manufacturing and SCM. These strategies serve as a framework of the infrastructure for customized products.

Figure 1: Main strategies relating to supplying customized products



3. 1. Relationship Marketing

There has been a gradual move in marketing thought and practice: mass marketing, market segmentation, niche marketing, and relationship marketing. Relationship marketing is becoming increasingly important to the overall marketing strategies of many companies. Grönroos (1994) defined that relationship marketing is to identify, establish, maintain and enhance relationships with customers and other stakeholders, at a profit, so that the objectives of all parties are met. Perrien and Ricard (1995) defined relationship marketing as an asymmetrical and personalized marketing process. According to the authors, this process takes place in long run, results in some bilateral benefits, and rests on an in-depth understanding of customer needs and characteristics. Harker (1999) listed 26 relationship marketing definitions and defined relationship marketing as an organization engaged in proactively creating, developing and maintaining committed, interactive and profitable exchanges with selected the customers overtime. Goldsmith (1999) explained that managers must consider the extent to which they should personalize the product, making it unique for each individual customer.

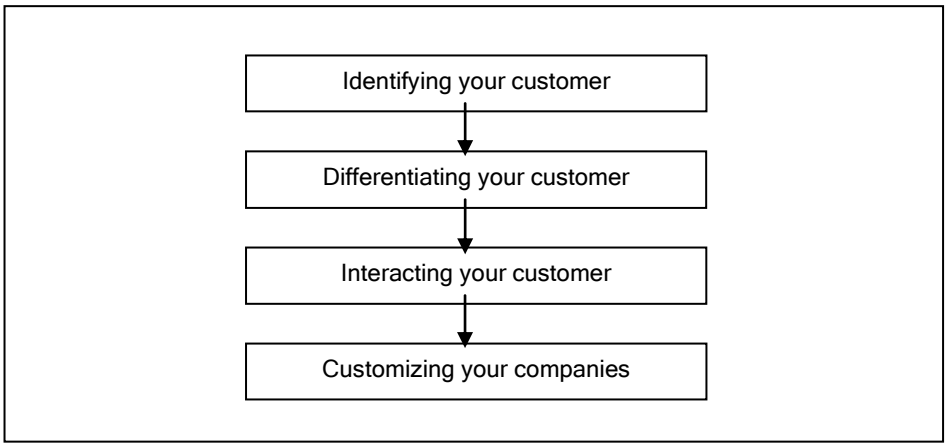
Companies from many industries are being forced to react to the growing individualization of demand. Marketers have sought to meet individual consumer preferences through line extensions, offering seemingly endless size, flavor, and package varieties of core brands side-by-side, so consumers have

greater choices while remaining customers of the same company (Goldsmith, 1999). Therefore, the challenge of product definition lies in how to assist marketing personnel and design engineers work together to elicit individual customer needs, organize and represent product specifications from both engineering and customer perspectives, and how to explicate the relationships between them. Powerful long lasting relationship~~s~~ with a valuable customer in relationship marketing (1) provides an opportunity to learn more about the customer's needs, (2) concentrates on providing products or services to one customer at a time by identifying and (3) alters their existing products or services to meet their changing individual wants.

According to Peppers et al. (1999), there are four key stages for putting a relationship marketing program to work: (1) Identifying the customers, (2) Differentiating them, (3) Interacting with them, and (4) Customizing your product or service to fit each individual customer's needs (Figure 2).

The first stage is to identify the customers and to understand their behaviors with attributes in order to understand their needs, habits, and desires. It's important to know customers in as much detail as possible. Companies have to apply the principles of relationship marketing to create better relationships with customers or partners in supply chains. The second stage is to differentiate customers. Differentiating customers will help companies to focus their efforts in order to gain the most advantage with the most valuable customers. Therefore, companies will be able to tailor their strategies to each customer in order to reflect that customer's value and needs. The third stage is to interact with customers. The effectiveness of interactions with customers is an important component of relationship marketing program. Directing customer interactions improves more automated channels. Every interaction with a customer should take places in the context of all previous interaction with that customer. The last stage is to customize the company's behavior. A company must adapt some aspect of its behavior to meet that customer's individually expressed needs. This might lead to mass customization. The production or service delivery of the company must be capable of treating a particular customer differently based on what was learned about that customer by the sales, marketing or any other departments.

Figure 2: Four key stages for putting relationship marketing program to work



The four stages can be used as a kind of general checklist to guide company's efforts in implementing relationship marketing. If the company can't identify its individual customers, The Company has no hope for differentiating their customer and much less adapting the company's behavior to address each customer's needs (Peppers et al., 1999). Therefore, for effective relationship marketing program, customized behavior of company or product is very important. Moreover, supplying customized products may require the improvement of customer, manufacturer and supplier relationships. The methods of significantly contributing to relationship marketing program from customized product perspectives are mass customization, SCM and agile manufacturing.

3.2. Mass Customization

Mass Customization of products and services was first anticipated in 1970 by Alvin Toffler and published in his book Future Shock. As technology advanced, Stan Davis delineated the concept of mass customization in 1987 in his book Future Perfect. Mass Customization was not fully defined until 1993 when Joseph Pine II wrote the book of Mass Customization (Gilmore and Pine, 1997). Mass customization relates to the ability to provide customized products or services through flexible processes in high volumes and at reasonably low costs. Pine (1993) defined mass customization as producing individually customized and highly varied products or services and finally a tremendous increase in variety and customization without a corresponding increase in costs. Hart (1996) defined mass customization as use of flexible process and organizational structures to produce varied and often individually customized products and services at the price of standardized mass produced alternatives. Silveira et al. (2001) defined that mass customization is a system using information technology, flexible processes, and organizational structures to

deliver a wide range of products and services meeting specific needs of individual customers at a cost near that of mass-produced items. According to Huang et al. (2005), mass customization means that customers can order and receive a specially configured product, often choosing from among hundreds of product options, to meet their specific needs at an affordable price. However, mass customization is the term used to describe the ability of manufacturers to make almost instant changes in the production process to individualize output in quantities as small as one (Rich, 2000) and can be described as enabling a customer to decide the exact specifications of a product or service, and supplying that product or service at a price close to that for an ordinary mass production (www.madeforone.com). Mass customization is expected to be the factor defining the leading organizations in the 21st century (Fitzgerald, 1995).
There are several studies on mass customization in the literature. Recently, Silveira et al. (2001) presented a literature review on mass customization to provide a framework to understand the several developments that emerged in the literature in the past 10 years. Feitzinger and Lee (1997) explained how Hewlett-Packard was able to implement mass customization in a way that was not only cost-efficient, but also delivered products to customers in a timely manner. International Journal of Mass Customization has been published since 2005 and main objective of this publication is to give a brief overview of the recent developments in mass customization research and practices (Huang et al. 2005).

3.2.1. Mass Customization Process

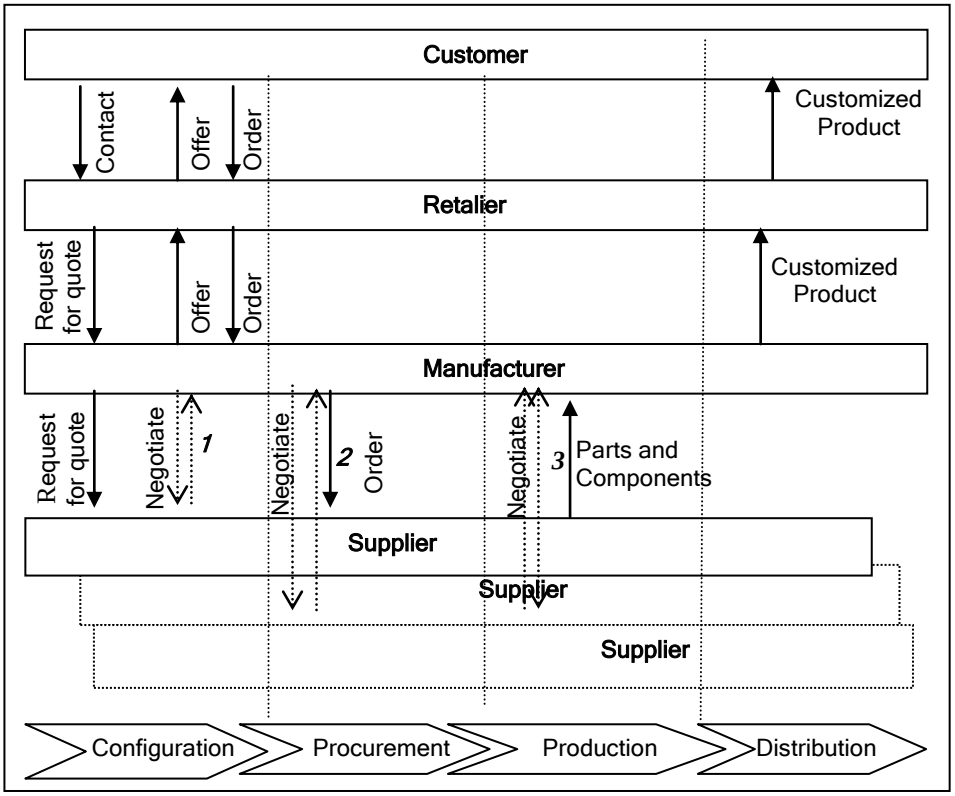
It is expected from manufacturers to increase flexibility through continuous innovation and shorter production runs that can accommodate changing and more specialized customer requirements together with shorter product life cycles. Mass customization will entail businesses tailoring product functionality to satisfy individual customer requirements, but making differentiated products at high speed and in high volumes in order to keep low unit costs. Mass customization involves intensive communication between suppliers and customers, in the course of which the customer's needs are clearly defined and fed into the product specification.

In Figure 3, mass customization process is illustrated. It shows the main interactions among customer, retailer, manufacturer, and suppliers sell, manufacture, and distribute a custom product (Turowski, 2002).

The mass customization process starts with a customer who is willing to buy an individualized product through a retailer. The customer, then (guided by the retailer) customizes the product. As soon as the product is individualized, the retailer sends an order to the manufacturer. With expensive products, or when time is critical, the customer may request an offer before giving the order. In this case, the manufacturer must be able to assure a certain delivery date, a certain

price and a certain quality. To do so, the manufacturer has to process the relevant data received from the retailer.

Figure 3: Mass Customization Process



Source: Turowski, Klaus. (2002) Agent-based e-commerce in case of mass customization, International Journal Production Economics 75 (1-2), p. 71

The manufacturer then plans and calculates the necessary parts to purchase and produce as well as the required time to fulfill the order. If the necessary parts are in stock, then real-time planning can occur and an offer, or a confirmation including delivery date, price, and quality details, may be generated and sent to the customer. This will not be possible if parts have to be ordered, especially, if these parts are not standardized. In this case, the manufacturer must negotiate with its suppliers (1) concerning whether or not demand could be covered in time. Thereafter an offer is sent to the customer. If the customer accepts the offer, the order is released, and the manufacturer may have to negotiate final details (2) before releasing the orders. The production can then take place. In case of a machine breakdown or general delivery problems, another negotiation between the manufacturer and some, or even all

of his suppliers (due to possibly nested production processes) may be necessary – the so-called coordination of production (3). After all parts are manufactured and delivered by the suppliers, final assembly can occur, and the individualized product can be delivered to the customer (Turowski, 2002).
Gilmore and Pine (1997) mention "four faces of customization"; collaborative (where designers working closely with customers), adaptive (where standard products are changed by customers during use), cosmetic (where packaging of standard products is unique for each customer) and transparent (where products are modified to specific individual needs). One of the most important tasks for customized products is modular products design. Unless modular products design, customized products would be time consuming, slow, and very costly. Feitzinger and Lee (1997) explained three basic organizational design principles so as to meet customers' orders at minimum cost; (1) a product design that consists of independent modules that can be assembled into different forms of the product easily and inexpensively (2) manufacturing processes that consist of independent modules that can be moved or rearranged easily to support different distribution networks (3) supply networks designed to provide two capabilities: the ability to supply the basic product to the facilities performing the customization in a cost-effective manner, and the flexibility and the responsiveness to take individual customers' orders and quickly deliver the customized goods.

3.2.2. From Mass Production to Mass Customization

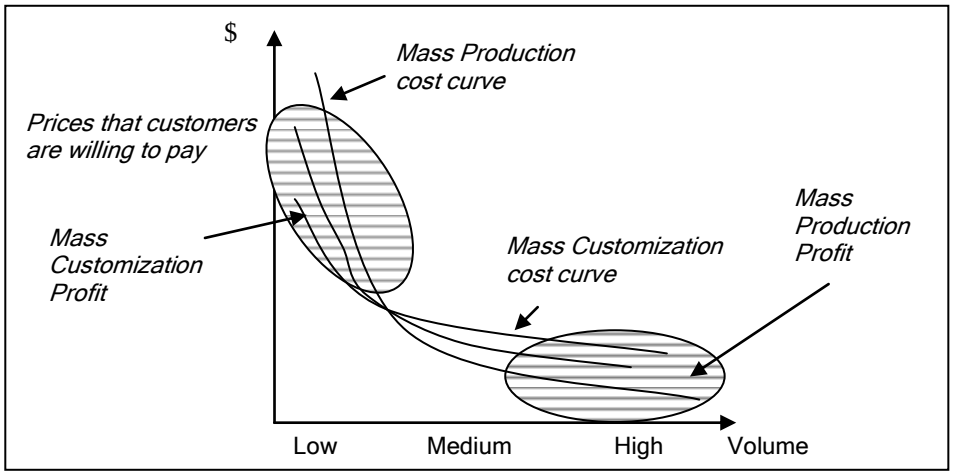
Some of the reasons that marketing and manufacturing paradigms are changing from mass production to mass customization in 21st Century as following; (1) customers and markets are becoming continuously more fragmented and specialized (2) customers' wants change very fast, and customers expect low volume, high quality and custom products (3) very short product life-cycles, development time, and production lead times are required and (4) customers want to be treated differently and individually. An emerging new strategic approach is called "mass customization" or "personalization" whereby elements of the marketing mix are individualized for each customer. This strategic approach involves tailoring the product differently for each and every consumer while retaining the principles of mass production (Goldsmith and Freiden, 2004). Mass production and mass customization have traditionally been at the two opposite extremes of the production continuum. The traditional methods of production used by manufacturing companies focused on mass production which used standardization principles. This type of a traditional production process leads to the manufacture of low-cost, standard goods and services (Selladurai, 2004). Mass production demonstrates an advantage in high volume production, low cost and more affordable price of products. On the other hand, satisfying each individual customer's needs often can be translated into higher value. However, low production volume is unavoidable and thus cannot justify the large investment. Mass customization is capable of reducing costs and lead time. Mass customization enables a better match between the companies'

capabilities and customer needs. As a result, mass customization can achieve higher margins and thus be more advantageous. With the increasing flexibility built into modern manufacturing systems and programmability in computing and communication technologies, companies with low to medium production volumes can gain an edge over competitors by implementing mass customization (Jiao et al., 2003).

The 20th century was an era of mass production. While manufacturers strove for productivity and quality, keen competition in the global market has redefined the way they do business in the 21st century. The new edge of competitiveness is total customer experience. One key dimension is to provide sufficient product variety to meet diverse customer requirements, business needs and technical advancements while maintaining economies of scale within manufacturing processes (Huang et al. 2005). Mass customization is the new paradigm that replaces mass production which is no longer suitable for today's turbulent markets, growing product variety, and opportunities for e-commerce. Using mass customization strategies, companies can customize products quickly for individual customers or for niche markets at better than mass production efficiency (Anderson, 2004) and satisfy a variety of market niches (Huang et al. 2005). Therefore, mass customization aims to satisfy individual customer needs while keeping mass production efficiency. To keep manufacturing costs low necessitates the appropriate development of production capabilities. The requirements of mass customization lie in three aspects: time to market (quick responsiveness), variety (customization), and economies of scale (mass efficiency). The oxymoron of mass customization depends on a leverage of these requirements (Tseng and Jiao, 1998). When Henry Ford developed the method to mass produce his Model-T, which rolled off the assembly lines at his plant at the rate of one every 24 seconds, and he dramatically changed the world's approach to manufacturing goods (Fitzgerald, 1995). By streamlining automation in his factories, Ford advanced an era of mass production that built his fortune and brought the automobile within reach of an emerging middle class. But while the miracle of mass production delivered the goods, it did not adapt easily, so all Model T's looked alike. Ford's approach can be summed up in what he said about the car's exterior: "The consumer can have any color he wants so long as it's black." (Cox and Alm, 1998, Selladurai, 2004).

Some customers want to be seen and treated as individuals and many of them are ready to pay premium price for customized product. If customers design their own products with design toolkits, they might be willing to pay premium prices. For example, Kamali and Loker (2002) found that users designing their own T-shirts are generally prepared to pay more for individualization. For example, Levi's customized jean was around $15 more than buying directly from retailers (Lee and Chen, 1999). In Figure 4, the economic implication of mass customization is illustrated. In mass customization process, companies can get high profit margin in low volume production.

Figure 4: Economic implications of mass customization



Source: Jiao, J., Ma, Q. T., Mitchell. M. (2003) "Towards high value-added products and services: mass customization and beyond", Technovation, Vol. 23, p.810

In industrial markets, customization and manufacturing strategies for mass customization have been significant. The ability of a company to respond quickly to customers' requirements, design, manufacture, and deliver a high quality product to the market is very important. In the past, manufacturing was usually characterized by keeping costs down with economies of scale. Mass customization can result in a challenging manufacturing environment typified by both high volume and an excellent product mix, where customers expect individualized products at the same price as they paid for mass produced items. Meeting this challenge requires profound changes in the manufacturing process and in organizational dynamics (Radder and Louw, 1999). In order to deliver customized products fast, companies need flow manufacturing to make products fast in small quantities and a spontaneous supply chain which can assure spontaneous availability of materials and make parts on-demand. Thus, companies must integrate agile manufacturing and SCM strategies for customized products.

3.3. Agile Manufacturing

Changes in the business environment are leading companies to adopt a new production model termed as agile manufacturing. Agile manufacturing is different from the traditional mass production paradigm and focuses on producing customized products. Agile manufacturing is an emerging technology for a company to achieve flexibility and rapid responsiveness to the changing

market and customers needs (Cheng et al. 1998). Agile manufacturing focuses on manufacturing highly customized products as and when customers require them (Radder and Louw, 1999). Agile Manufacturing sets out to identify and apply practical tools, methodologies, and best practices that enable companies to achieve manufacturing agility within a turbulent business environment (Ian et al., 2001). In order to adapt to the competitive environment, a manufacturer must be able to produce multiple and diverse products, upgrade and redesign its products in short life cycles, and execute efficient production changeovers simultaneously (Abdel-Malek et al, 2000).

The Iacocca Institute reported "21st Century Manufacturing Enterprise Strategy" introduced the term agility in an effort to define a new paradigm which the authors called agile manufacturing. Agile manufacturing was first introduced with the publication in the USA of a report entitled 21st Century Manufacturing Enterprise Strategy (Iacocca Institute 1991). Since then, it has been promoted as a way of gaining competitive advantage in response to increasingly competitive global markets. Its high potential for flexibility allows rapid and large changes in production volume, product mix, delivery dates and the range of products (Kidd, 1994). Spring and Dalrymple (2000) reviewed literature from manufacturing strategy, flexibility, agile manufacturing, and aspects of industrial marketing and highlighted fragmented and inadequate treatment of fundamental issues relating to product customization. Brown and Bessant (2003) explained the links between the role of manufacturing strategy and the emergent paradigms of agile manufacturing and mass customization.

The emergence of a new manufacturing paradigm for customized products is flexible/agile production. Flexibility is a key component in any agile manufacturing enterprise. In a competitive manufacturing environment a company must be able to simultaneously produce multiple and diverse products, upgrade and redesign its products in short life cycles, and execute efficient production changeovers (Abdel-Malek et al, 2000). To have total flexible production system, company should have six important characteristics. Three of them; (1) staying close to the customer, (2) closer relations with suppliers, reduction of their number, improvement of quality and delivery time, participation in the design of the product, etc. and (3) using technology for strategic advantage (Duguay et al., 1997).

Oleson (1998) presented a practical, step-by-step guide for developing and implementing agile manufacturing in mass customization processes. Using examples from some of America's largest manufacturing companies, including John Deere, Levi Strauss, GM, and Chrysler, the author demonstrates the many ways in which agile manufacturing methods can be adapted and incorporated into companies of any size to help insure their continued growth and success. Moreover, changing customer and technological requirements force manufacturers to develop agile supply chain capabilities in order to be competitive. Therefore, several companies are stressing flexibility and agility in order to respond, real time, to the unique needs of customers and markets

(Yusuf et al., 2004). In order to use agile manufacturing, companies apply SCM system for manufacturing customized product efficiently.

3.4. Supply Chain Management

By 1990s, companies recognized the necessity of looking beyond the borders of their own company to their suppliers, suppliers' suppliers, and customers to improve overall customer and consumer value. This movement often called as supply chain management (SCM) or demand chain management, changed companies' focus from internal management of business processes to managing across companies (Duclos et al, 2000). SCM has been considered as a competitive strategy for integrating suppliers and customers with the objective of improving responsiveness and flexibility of companies. The Global Supply Chain Forum defines SCM as the integration of key business processes from end user through original supplier that provides materials, products, services, and information that add value for customers and other stakeholders (Lambert, 1998). SCM refers to the entire network of companies that work together to design, produce, deliver, and service products.

The trend of increasing product customization provides many challenges for supply chain designers (Su et al. 2005). Companies that manufacture customized product have lead to the need for far greater cooperation within supply chain. No company can have all necessary skills and knowledge. Customers, supplier, and other third-party companies can be brought into the cooperation to design a product or develop a value-added service. In some cases the company will need to seek out specific partners with special skills or attributes and create a virtual corporation from several companies to focus on meeting the needs of a customer. Supporting a mass customization needs to integrate operations of multiple companies. Companies need more than traditional supply chain model and need a Customized Leagile Supply Chain model (Childerhouse and Towill, 2000).

Childerhouse and Towill (2000) indicate four step models to analyze supply chain evaluation; however, only two steps are analyzed so as to indicate the differences between Traditional Supply Chain and Customized Leagile Supply Chain. Over the past 20 years supply chains have evolved from traditional product orientated push to fully consumer oriented pull systems. In the 1980s, traditional uncoordinated supply chains had long lead times and functional silos resulting in multiple decision points, a lack of information transparency, and minimal synchronization. In 2000s customized leagile supply chains provided a new model to produce customized product and has short lead times and supply more customized products. Individual customer demands are responded in a few weeks, whereas their demands responded in a few months in traditional supply chain. The suppliers either deliver assembly components to the final assembly plant, or direct to the distribution centers in the case of finished components such as monitors or keyboards. All these factors contribute to the

reduction of the delivery lead time to one week, from when an order is placed and the electronic product is delivered. The lead times have once again been dramatically reduced. As a result of all these improvements the front end of the supply chain is truly agile and customized providing individual consumers with specific electronic products made and delivered to order within a week. In this process, internet information system is very important to share information about customer demands and enable companies to supply customized product faster. In the 2000s customized leagile supply chain, companies, suppliers and suppliers of suppliers operate as lean/agile as possible (Childerhouse and Towill, 2000).

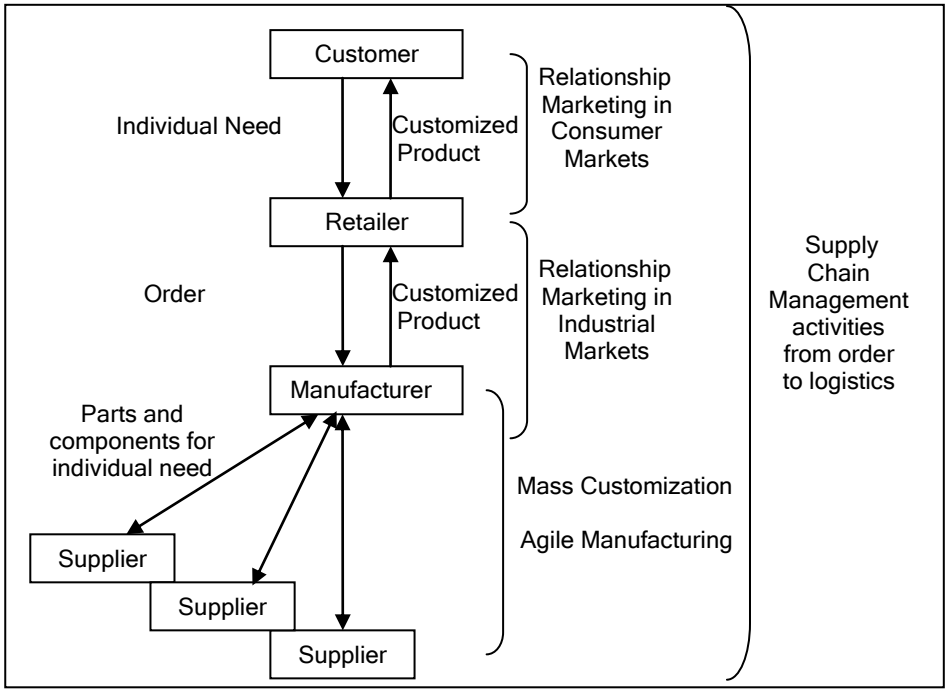
In customized leagile supply chain model, internet, internet information system or internet-based SCM are very important. Effective mass customization requires an internet-based SCM that can provide information to all members of the supply chain in real time. The growth of the internet has given the manufacturers a platform for taking orders online from a mass market audience for customized products such as cosmetics, shoes, bicycles, clothes, vitamins, computers and computer related accessories, at very minimal costs. The Internet allows companies to provide high customization at low cost and has displaced to a large extent the traditional and more expensive method of highly skilled and trained salespeople interacting with customers. The familiar story of the tremendous success of high-tech companies especially Dell have caused many other companies to seriously consider mass customization strategies in their production systems so that they too may be effective and successful (Selladurai, 2004).

Internet-based SCM can support a mass customized business model and allows the manufacturer and its suppliers and subcontractors to quickly and efficiently produce and deliver products. This system supports dynamic sourcing, in which an exception in a supplier's order is automatically sent to other participants for immediate resolution. Real-time availability of order and production data to all members allows them to lower their inventory holdings to minimum levels. Availability of efficient e-marketplaces results in production efficiencies that lower production costs for both production-to-stock and production-to-order business models (Ghiassi and Spera, 2003). Manager of companies must understand that this production process of customized products involves the extended supply network or internet-based SCM. As a result, the companies must look to its suppliers and understand that they are part of the overall performance. This is becoming increasingly important as each product consists of an increasing number for supplied components and brought competencies (Svensson and Barfod, 2002). Therefore, internet-based SCM enabled information flow among supply chain is very important for companies using mass customization system. To achieve effective mass customization, internet-based SCM should be used actively in all companies supplying customized products (Barutçu, 2005). Moreover, leagile supply chain (Childerhouse and Towill, 2000) or agile supply chain in internet are important to respond the unique needs of customers and markets (Yusuf et al., 2004).

4. INTEGRATING RELATIONSHIP MARKETING, AGILE MANUFACTURING AND SUPPLY CHAIN MANAGEMENT FOR MASS CUSTOMIZATION

Presenting customized product process will necessitate greater cooperation among the participating members from customers to suppliers. According to Ghiassi and Spera (2003), companies offering customized products should (1) reduce time-to-market for product development, enhancement and customization, (2) directly tie order-entry and manufacturing planning systems to speed up the availability of demand requirements, (3) intelligently and selectively communicate with a manufacturer's strategic trading partners, (4) respond expediently to orders, changes in order configuration, and level of demand, and (5) provide flexibility and reliability in a manufacturer's component supply.

Figure 5: Integrating strategies relating to effective supplying customized products



As explained before, there are some strategies to meet individual customer's needs with near mass production cost. Offering customized product requires personalized marketing mix, production and distribution flexibility, a significantly greater relationship and synchronization of business strategies related to

relationship marketing, mass customization, agile manufacturing and SCM. As seen in Figure 5, first, offering personalized product begins relationship marketing strategy. In a relationship marketing strategy, companies identify their customers, establish long term and interactive relationship with them, and customize their product or service to fit each individual customer's needs. Mass customization would further drive relationship marketing with its associated demands for greater understanding of each customer. The emphasis on relationships and the resulting customization of product and services to meet very specific needs of individual customers is altering the manufacturing requirements (Peppers et al., 1999; Rich, 2000). Moreover, this strategy is used not only in consumer markets but also industrial markets in order to present customized products. Second, manufactures should have a mass customization system using information technology, flexible processes, and organizational structures to deliver a wide range of products and services meeting specific needs of individual customers. In this system, they can order and receive a specially configured product, often choosing from among hundreds of product options, to meet their specific needs at an affordable price (Hart, 1996; Silveira et al., 2001; Huang et al., 2005). Third, companies presented customized products should also have agile manufacturing system to achieve flexibility, agility and rapid responsiveness to the changing markets and deliver high-quality product tailored to each customer wants because it focuses on manufacturing highly customized products (Duguay et al., 1997; Cheng et al. 1998; Radder and Louw, 1999). Forth, in presenting customized product process, SCM system plays very important role and provides a network of material and information that flows from suppliers, manufacturers, distributors, retailers to customers so as to produce customized product. This system also reduces lead times and supply more customized products. After all parts and components of customized products are manufactured and delivered by the manufactures and suppliers, individual customer demands are responded in a few weeks with using effective Internet-based SCM and logistics systems (Gooley, 1998, Childerhouse and Towill, 2000; Turowski, 2002; Barutçu, 2005).

Consequently, supplying customized product depends on these strategies and companies should integrate them. Especially, relationship marketing can contribute to develop long term relationships with customers and learn individual needs, agile manufacturing can contribute manufacturing process of customized products, SCM allows the coordination and integration of the materials and information in supply chain. All these strategies can contribute significantly to the implementation of mass customization.

5. CONCLUSION

Today's customers want to be seen as individuals and demand customized products to match their unique needs. Many of them are ready to pay premium price for customized products. Customized products have been receiving increasing popularity in markets and offering a great potential for business growth. Therefore, companies are being forced to respond to the growing

individualization of demand, have the ability to change the product to meet individual customer's needs and finally respond customized products. In this point, how customized products can be supplied by companies is very important. Analysis of the literature points to the existence of main business concepts relating to how to supply customized products. For example, Duguay et al., (1997), Owen and G. Kruse (1997), Cheng et al. (1998) and Radder and Louw, (1999) analyzed the role of agile manufacturing, Eastwood (1996), Gooley (1998), Childerhouse and Towill (2000), Turowski (2002) and Barutçu (2005) analyzed the role of SCM or internet-based SCM for mass customization and Hernandez et, al. (2006) analyzed different design techniques for customized products and offered new design of a line of custom-made hand exercisers. This study integrates main business concepts for customized products. Therefore, supplying customized products program can be succeeded if a company integrates relationship marketing, mass customization, agile manufacturing, SCM, efficient logistics operations and information systems. In other words, companies can truly identify their customers' wants by relationship marketing, determine components of customized product by mass customization, bring together components of customized product by SCM and rapidly be reconfigured to produce different products or product variations with minimal changeover time by agile manufacturing.

Consequently, the integration of these strategies is proposed for offering customized product because these strategies are needed marketing, designing, manufacturing and delivering of customized products. If the companies fail to integrate these business concepts successfully in order to supply customized products, they can not present them and can not get higher profits. Further researches could be conducted to determine the role of information technology, internet, and customer-driven design for designing customized products and give examples and case studies for how to integrate these business concepts for different product groups and industries.

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