



MASS CUSTOMIZATION NEARSHORING PROGRAM FOR CLOTHING MANUFACTURERS

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Abstract: *Mass customization offers considerable potential for increasing the notoriety of a brand, acquiring new markets and generating significant profits. But, before reaching or exceeding customer expectations, important steps must be taken. We discuss in this paper a nearshoring approach to more effectively implement a mass personalization program. Agility and flexibility remain essential to this concept because the demand is more and more volatile. Nearshoring is an interesting avenue for allowing manufacturers to adapt and transform their business practices and manufacturing strategies in a context of fast prototyping. To succeed, this approach must implement automated processes that also create new tradeoffs and challenges in terms of structure, operating model, sustainability and supply. The biggest challenge now is to procure raw materials in optimal quantities and on time. In addition to this challenge, available technologies are taking more and more space and allow a more intelligent mass personalization approach in terms of productivity and digitization via automation, thus making the supply chain more efficient, agile and customer-focused.*

Key words: *Clothing Industry, Mass Customization Program, Nearshoring, Automatization.*

1. INTRODUCTION

The fashion and clothing industry, although strongly affected by globalization, is still trying to reinvent and restructure itself with new business models and new ways of operating. For several years now, in order to gain a strong competitive advantage, a large majority of major brands have turned to Asia to expand their manufacturing strategies focused on reducing costs and volume. This allowed clothing manufacturers to provide mass-produced products for consumers at attractive and highly competitive prices. However, a series of factors have changed this business strategy in recent years by forcing brands to market new products and collections more quickly without necessarily considering trends, cycles and seasons. This has had the effect of disrupting distribution and thereby making competition more aggressive than ever. Globalization and Internet shopping have the clothing industry competing with social networks and thus destabilizing supply and demand, while at the same time creating significant market stagnation.



2. MANUFACTURING SITUATION

One of the problems highlighted by this situation is the management of inventories and unsold products caused mainly by high-volume production methods. The vast majority of manufacturers is trying to reduce batch size and replenish, but often without success, as this affects among other things, the productivity of subcontractors who require large batches of manufacturing to be more efficient. Without guaranteed volume, it becomes almost impossible to maintain and develop a long-term synergistic relationship with foreign producers. Companies must put forward pull-level methods, focus their business models on demand, and reduce the ecological footprint of external sourcing. In order to do this, they must also integrate technologies to optimize and digitize processes and review all logistical principles, which sometimes require a complete reorganization of processes already in place. The main challenge the proximity of manufacturing. At the moment, the salary increase abroad, besides the emergence of new taxes, customs and transport fees, cause serious headaches for clients, in a context where production in Asia is not as profitable as it was the last 10 years. In addition to this mass production, there is the pressure coming from consumers who are aware of overproduction, waste and above all, the environmental impact of producing in this way. The fashion and apparel industry faces the urgent need to rethink and strengthen its strategy and identify alternative avenues for sustainable growth.

2.1 Major shift

For manufacturers in the fashion and apparel industry, it has become increasingly difficult to offer distinctive products and services and to meet the specific needs and wants of customers. The globalization effect saturated, in some cases, the supply of fashion products thus creating a lack of interest in the consumer. There is constant pressure on the markets to seduce consumers with new tempting offers equally based on style, price and origin. This results in a major shift in the marketing and merchandising approach for manufacturing companies. They can no longer spread trends because their influence is no longer determined by the companies themselves, but through consumers and users of branded products. Aware of traditional marketing methods, consumers are increasingly reluctant to mass consumption, but still want to get closer to the manufacturers and their know-how. For the consumers, the value of the proposition lies in the expertise of the manufacturers. This confirms that the fashion sector must add real value to previously standardized products, in the form of customer-specific services, in order to better meet the demand for authenticity, individuality, traceability and connection with the customer. It is in this regard that mass customization is discussed in this text and that several key implementation strategies can be put forward for the manufacturers in the sector.

3. THE CUSTOMIZATION OF THE OFFER

Mass customization is defined as “the mass production of individually customized goods and services” [1], specifically aligning customized design and manufacture with mass production efficiency and speed. By postponing production to a late stage, mass customization can provide with more accuracy what customers want [2].



The examination of the literature on this topic tells us that the fashion and clothing industry is focused on the unique and distinctive character of personalization in the context of mass production. In search of authenticity, consumers are increasingly demanding and desiring quality products. The success of mass personalization relies primarily on the successful integration of the value chain. To increase responsiveness to customer demands, it is critical that manufacturing systems offer custom parts features and standards for a flexibly assemble [3]. To implement this approach, the manufacturer must consistently be able to offer consumers affordable, attractive, well-fitting products, and deliver them as quickly as possible. Previous researches have shown that it is important to understand the mass personalization approach that forces fashion and apparel players to review their organizational strategies to better perform in this increasingly competitive market. They need to develop new manufacturing strategies by directing local production to a flexible, agile and responsive system to handle several specific and unique types of orders. Producers will have to adapt capacity and short-cycle production (quantities, short lead times, skilled labor, etc.) and focus on the adaptability and traceability of their production in time [4].

3.1 Manufacturing strategy

According to Tseng et al [3], mass customization implies a shift of design and production paradigm from "made-to-stock" to "made-to-order". It challenges the conventional product development and supply chain management, calling for adopting mass production approaches to accommodate "high-variety-low-volume" production. In order to support the paradigm shift derived by the customization process, the enterprise should reconsider the entire value chain to leverage upon three pillars: time-to-market, variety, and economy of scale [3]. Mass personalization must be seen as a long-term integrative manufacturing strategy, with the aim of reinventing itself and finding new ways to satisfy customers. To introduce new customizable products, the company sometimes has to test the market and even expect to lose some money in the first year of operations. And this is what discourages manufacturers on average to keep and push the model of mass customization. The volume remains the key in this approach and without manufacturing volume there is no profit. Manufacturing for mass customization also relies on the availability of flexible manufacturing system. In addition, the system should be incorporated with the advent of modern Information and Computer Technology (ICT) as well as the flexible or reconfigurable manufacturing tools, to reduce the response time from designing a new product to the production ramp-up [5]. According to a study we made with 10 manufacturers in 2016, it takes an average of more than two years to implement a mass customization program at a manufacturer. During this period, six months serve as a pretest for the market and a whole year is devoted to the adaptation of production to the control system. This is also the time to measure the profitability and efficiency of the business model. To introduce this new practice, the manufacturer must commit to sustainable development with as clear a vision and strategic direction as possible. The development of the program must respond well to the market and thus adequately satisfy the customers so an operational level for the business model can be profitable as quickly as possible. A new manufacturing strategy in this approach is to rethink logistics to optimize the garment production model. Here (figure 1), the trend towards nearshoring and the automation of just-

in-time (JIT) process and personalization allow for a better manufacturing integration of mass customization.

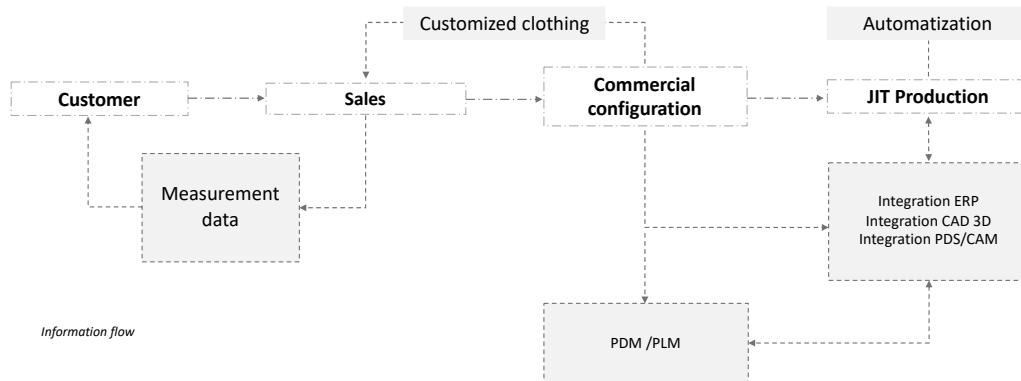


Fig. 1: Mass Customization Nearshoring Program

Requirements specifications by the configuration can avoid communication problems between the producer, the supplier, the buyer, and the retailer. Digital technologies available on the market allow small manufacturers to distribute their products more easily and to spread their offer at a low cost. Social networks can be organized later to push the rest of the brand and make the commercial experience known. Currently, we are finding new players on the market as pure-play online start-ups that can produce garments in rapid prototyping and deliver efficiently. One of the important manufacturing strategies in the mass customization approach is the nearshoring. The nearshoring perspective can be economically feasible if it is applied appropriately and if it is planned with a clear goal of customer satisfaction and value creation that translates into the margin delivered to partners. By reducing time to market, companies can produce more in line with demand. There is still a need to review supply management, transportation costs and tariffs while reducing excess raw material inventory and increasing full-price sales, but still with shorter turnaround times. The real benefits of mass customization nearshoring program for clothing manufacturers are: proximity, cost-savings in labour and freight spending, better access to skills, quality control, greater speed to market and quick response, improved control over the supply chain and improved control over the intellectual property and customized service.

4. DISCUSSION

If the vision of Industry 4.0 is to be realized, most business processes must become more digitized. A critical element will be the evolution of traditional supply chains toward a connected, smart, and highly efficient and agile supply chain ecosystem. But to succeed in this shift, it is necessary to consider the needs for production capacity at the outset and take into account the expertise of the workforce creating a huge operational performance challenge, and this directly affects the organizational structure. As a result, the intelligent configuration and mass customization production become a more complex and demanding task as the customer requirements increase and options and components multiply. When the



configuration requires many variations, the possibility of errors also increases, which can lead to production delays. Mass personalization creates a variety of technical challenges that must be overcome before custom mass clothing can be produced.

The critical element remains the supply of materials and components to serve the production quickly and flexibly so it can remain nimble for logistics and mass production. By implementing a mass customization program, this optimizes the co-localized value chain. Today, consumers, customers, collaborators and partners expect you to have an enhanced and especially different experience. On the other hand, from the outset, we must review the potential of automation and encourage employees in this chain to become partners and invest in capacity building while aiming at medium-term volume.

In recent years, we have been working with manufacturers on configuration and automation for product manufacturing. Our goal was to develop clothing mass customization tools integrated into the apparel industry using computerized numerical information systems, which could be used to analyze and decode measurement data from devices to identify information necessary to produce a well-fitting garment. To date, the apparel industry is lagging behind in automation and mass customization as automation presents significant challenges for this sector (one of them evidently being accessibility to a competitive labor force that needs to remain “economical”) The consequence being that the undertaking of automation does not become a priority. What is often misunderstood, is that automation of processing plants can also be beneficial to employees who do not have to focus on repetitive, less rewarding tasks. Notwithstanding the later, techno-scientific development, automation becomes more and more possible. And it is in the quality and speed of the information and the transformation in real time that this approach is played out. We are currently seeing nearshoring approaches to mass customization for the preparation of standardized parts for jackets, pants and dresses. But, the fact remains that the knitting and additive manufacturing sector is getting stronger. These results should encourage the players that make up this industry to readjust to the difficulty of recruiting the workforce. We find that automation can reduce work time by an average of 50%, and fully automated smart factories should be available soon. At a time when innovation and technological developments are playing an increasingly critical role in countering the effects of lower wages in other countries, the purpose of this paper is to explain the importance of mass personalization and rapid manufacturing systems adapted to the needs of all actors in the garment industry. In order to realize the industry's vision, most business processes need to be further digitized.

A key element will be the evolution of traditional supply chains towards a connected, smart, highly efficient and agile supply chain ecosystem. Access to talent will be a major success factor in creating the supply chain of the future. At present, the largest talent gap is likely to be in digital or advanced manufacturing and smart procurement decision management in the more complex value chain of clothing. To succeed in having a sustainable, competitive advantage, the company has no choice but to build high-quality collaborations, because partnerships will be essential. The basic rule is to invest responsibly in mass customization because nearshoring and automation go hand in hand. We must understand that the more we automate, the more skilled employees, technicians and



engineers will be needed to make the transition in the manufacturing process. After discussing and meeting with industry experts, we are able to say that a company must demonstrate its ability to adapt in terms of creativity, production, quality, synchrony and price. But, to position themselves to succeed, they must take four steps: define their future sourcing and production strategy, develop new skills and capabilities, create an ecosystem of partnerships, and commit to accelerated learning.

5. CONCLUSIONS

In summary, the specific context of some companies in the fashion-clothing sector has meant that they have suffered over time from failures in the implementation of mass customization, due to a lack of long-term vision. It is therefore important to better understand how a manufacturer could more specifically meet the needs of their customers, while focusing on the nearshoring approach, automation and sustainability. Nearshoring and automation could create a true circular value chain for companies in this sector. Manufacturers will have to adopt efficient and effective processes using the best technologies available to them. By bringing their production closer together, and investing in advanced manufacturing, manufacturers will become more sustainable and, above all, less wasteful by reducing overproduction. For mass customization to succeed in a market that constantly demands swift results, it becomes essential to focus more on flexibility and consequently, on speed which is key to nearshoring. The manufacturer must commit to sustainable development with strong leadership. The coming upheavals are so profound that the companies who are making big changes and enjoying the benefits of nearshoring and automation will have a huge advantage as first-tier players. Business models in this industry should drive growth and be more distinctive and integrated into their supply chain. The potential from an application perspective will directly target a consciousness towards lean manufacturing process, innovation approach, inventiveness methods, design thinking and know-how of its workforce and sustainability.

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