

## Mass Customization in Central Europe – Industry Research

© R. J. Freund

Finkenweg 6, D-35099 Burgwald, Germany

E-mail : [info@RobertFreund.de](mailto:info@RobertFreund.de) Tel : +49 6451 71290

© M. Piotrowski

University of Information Technology and Mangement

ul. Sucharskiego 2, 35-225 Rzeszow, Poland

E-mail : [mpiotrowski@wsiz.rzeszow.pl](mailto:mpiotrowski@wsiz.rzeszow.pl) Tel : +48 604 600883

### Abstract

European manufacturing industry has great potential as a part of a sustainable EU economy, but its success will depend upon continuous innovation in products and processes. It was affirmed at the Manufuture 2004 conference that it is essential to combine European Commission efforts with those of the European nations and their regions to develop a common vision on manufacturing - starting at the industrial level but going much further in addressing technical, environmental and social issues. The necessity for European companies to introduce new, innovative business strategies like mass customization is unquestionable. Introduction of this strategy creates new opportunities for manufacturers in Central Europe region due to the low cost of labor force, closeness to Western European markets as well as gradually improving production and logistic infrastructure. Some experts consider these factors as a potential source of competitive advantage over Non-European manufacturers supplying various products to European markets.

This paper discusses research activities focused on Central European manufacturers with a goal to assess the potential for introduction of new business strategies, including mass customization. The paper concludes with a list of threats and opportunities for successful introduction of mass customization strategy in Central Europe. The research outcomes will be discussed in the context of the European Commission supported report MANUFUTURE – a Vision for 2020 concerning the future development of manufacturing sector in Europe.

Keywords: mass customization, Central Europe, MANUFUTURE, factors

### 1 INTRODUCTION

Standing still means moving backwards. This is particularly true for manufacturing and production. The production sector, as the mainstay of the European economy and employment, must continually confront new challenges in order to survive in competition. An active and foresighted technology development and a quick response to social and economic change are indispensable for this[1].

Global comparisons show that Europe has been, and continues to be, successful in maintaining its leadership in many sectors – but this position is challenged on two fronts. On the one hand, EU industry faces continuing competition from other developed economies, particularly in the high-technology sector. On the other, manufacturing in the more traditional sectors is increasingly taking place in the low-wage economies, some of which are already looking towards higher-value-added segments[1].

For example today, the textile/clothing industry is in crisis with up to 30 million jobs under threat in the World scale. Europe alone is losing one thousand jobs a day (...) since the trade liberalization began from January 2005[2]. Representatives of other industries in Europe, e.g. automotive, electronic appliances, sport equipment as well claim that their business is at a standstill. These problems result from the constantly growing competitiveness on global markets. The emergence of a number of Asia-Pacific countries as key sources of final products or components are increasing competitive pressure. Manufacturing facilities in these countries

operate with very low overheads and, as a result, facilities in Western Europe find it almost impossible to compete on price.

In order to overcome the current problems threatening European industry, a group of leading executives and scientist formed High Level Group and Expert Group under the support of the European Commission. Their expertise and insights led to a shared vision of the way ahead for European manufacturing. 'MANUFUTURE – a vision for 2020' provides a synthesis of those views.

### 2 MANUFUTURE INITIATIVE – THE NECESSITY FOR NEW BUSINESS MODELS

MANUFUTURE is a vision presented in the form of a report encompassing the complex network linking human and societal needs (demand) to both the industrial and education systems (supply). It is intended as a tool to guide the development of foresight into the strategic future of manufacturing to achieve success in the world economy. In the next paragraphs some postulates from this report are listed and discussed.

It is argued that an economy based on service industries alone will not survive in the longer term. Each job in manufacturing being linked to two jobs in services, 'the EU cannot continue without a competitive manufacturing sector'[2]. The report proposes to prevent mass production in disappearing at a fast rate to countries with lower wages outside Europe[5]. It is agreeable, that mass production can not be completely replaced by other manufacturing forms like mass customization, however new business models should be strongly supported. This

is reflected in the further part of the report. The current structure of manufacturing industries is a complex web of interdependent inputs and outputs that includes various individual sectors, as well as common enabling technologies. The challenge is to move towards a new structure, which can be described as 'innovating production' founded on knowledge and capital. This implies a move from an economy of 'quantity' to one of 'quality', from an economy of 'use and waste' to a 'sustainable' economy[4]. The report identifies the necessity for[1]:

- Much closer coordination between the demand and supply sides.
- Self-sustaining innovation to uptake of new technologies in parallel to the development of new products – thereby reducing time to market.
- Transforming supply chains to the form of flexible collaborations, networks of specialized small and medium-sized enterprises (SMEs) and 'virtual enterprises'.
- Introducing solutions that will be holistic, identifying multiple perspectives and linkages between novel approaches to customization, customer response, logistics and maintenance.
- Avoiding competition based purely on production cost. European industry needs increasingly to concentrate its capabilities on high-added-value products and technologies offering a broadened service range that fulfils customer requirements.

All the above postulates are in line with mass customization paradigm, and therefore a question about the introduction perspectives is legitimate. The further part of the paper will discuss the perspectives for mass customization in case of Central European Countries (e.g. Poland, the Czech Republic, Slovakia, Hungary). Because of the labor cost, considerably lower in comparison to West European countries and the closeness to major European markets, this region seems to be an attractive for investments in manufacture. This is as well reflected in the MANUFUTURE vision. Transferring labor-intensive production to the Central and East European Countries (CEEC) could help to redress their present situation, while preventing the migration of employment opportunities beyond Europe's boundaries[1].

### 3 RESEARCH OBJECTIVES AND METHODOLOGY

#### 3.1 Objectives

The following part of the article discusses research activities undertaken in order to assess the perspectives of introduction mass customization in Central Europe countries for selected industries. The goal of these activities was to identify opportunities and threats, as well as critical factors influencing mass customization implementation.

In order to achieve these goals and to verify the hypothesis a three stage research was carried out in the period October 2004 – June 2005 (including preparation of research tools). The research concept was partially based on the EuroShoe project (conceptual framework and research questions)[4].

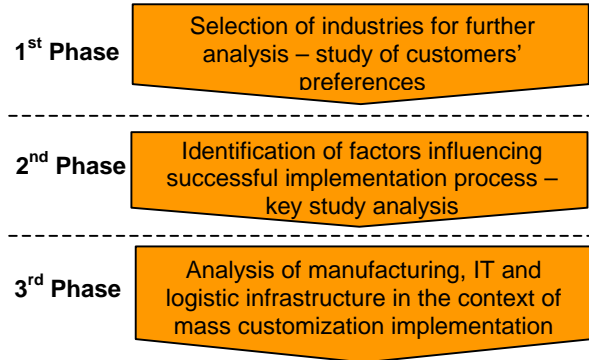


Figure 1: Research phases.

#### 3.2 Research methodology

The goal of the first phase was to identify the products, for which, potential customers might be interested in purchasing customized products. A pilot paper based questionnaire was carried out, on a group of university students (n = 140) and later on a larger group of adults (age 15 – 65, n = 294). Participants were presented the principles of mass customization strategy together with its advantages and disadvantages in an objective manner and asked to indicate products from the list, most suitable for customization. Thus five general groups were identified, for which customers would be the most interested in buying customized products (textiles, jewelry, music CDs, furniture and computers).

During the second phase for the chosen industries authors made an attempt to identify key factors influencing the implementation process. This was carried out through various activities including: literature research, key study analysis and expert interviews. The group for expert interviews consisted of manufacturers, retailers, journalist and researchers (replies from eighteen people were collected).

The recorded interviews were summarized which included extraction of contents as well as first steps of interpreting the data. Further analysis was based on the methodological background of the grounded theory. Comments given by the interviewer were analyzed in different steps, including the systematic deconstruction, categorization and new combination of data while constantly reviewing the emerging findings. The topics and aspects developed were compared to other sources of information afterwards (literature research, key study analysis) in order to keep in line with the theme centered and data based theory. Process orientation is a main characteristic for this kind of step by step data retrieval and analysis which demands flexibility as well.

As a results of these activities, over 50 factors were identified (including general ones and industry specific) and divided into five categories (details in the next chapter). The findings were used during the third phase to prepare the research questions and afterwards the interview questionnaire. The goal of this phase was to study the present state of the Central European companies and their readiness to adopt new business strategies, through interviews with managerial staff.

The interview questionnaire addressed the following research areas:

- Market position, competitors.
- Product characteristics and customization opportunities.
- IT infrastructure and Internet connection.
- IT supported business processes and Internet usage.
- Supply chain management.
- Production automation.
- Knowledge, attitude of managerial staff about/toward new business strategies.

The interview questionnaire was designed problem centered and methodically open in order to guarantee the freedom of the interviewer to approach the different topics as unbiased as possible. The interviews followed a semi structured interview guideline which allowed the interviewer to focus on specific aspects but also helped to standardize interviews and made them comparable.

Due to the budget and time restrictions authors did not attempt to carry out interview on a representative sample. Instead again the grounded theory postulates were used. The initial sample was chosen randomly from a database of Polish enterprises in order to discover and identify data which was relevant to the research areas.

As the first findings emerged, the sample was extended to increase diversity in useful ways. The purpose was to strengthen the emerging finding through locating data which confirms, elaborates and validates relations between categories or limits their applicability[6] As a result, in the interview participated 46 manufacturers representing all of the chosen industries.

#### 4 RESEARCH SUMMARY

The analysis of the influencing factors (results of the second phase) made it possible to divide them into two groups (outer and inner factors), and afterwards into five categories.

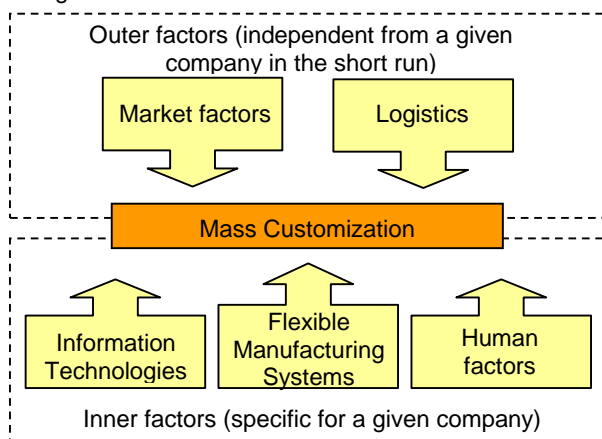


Figure 2: Groups of factors influencing implementation.

Factors independent from the manufacturer in the short run. In the long run manufacturer might attempt to influence these factors through e.g. marketing activities – these factors, if fulfilled might justify the shift from mass production to mass customization. Some of them include:

- Market factors – market homo/heterogeneous, market size, turbulence factor, product lifecycle, level of competition.

- Logistics – transportation cost and the availability of fast and cost-effective ways of delivering products from factories to customers.

Inner factors, specific for a given company:

- IT technologies – all processes along the value chain should be supported by efficient IT architecture enabling: acquiring customers requests, web-based product configuration, information flow management, production scheduling and planning, purchasing and procurement, delivery logistics of both components and finished products, Customer Relationship Management[7].
- Flexible manufacturing systems – the use of automated production lines integrated with information system.
- Human factors – the readiness of top management and company owners to implement the mass customization strategy (includes the proper knowledge and attitude toward change).

The proposed list of factors is a general one, and might vary depending on the industry considered.

At the third phase, on the basis of these factors a questionnaire was developed and used to interview representatives of a chosen industries. Due to the low sample, authors focused further analysis on a qualitative basis. To obtain reliable quantitative results representative for Central Europe, a sample should be considerably extended. Nevertheless the quantitative outcomes obtained so far were useful to prepare an executive summary, from which key findings are listed below:

- Majority of the interviewed manufacturers (nearly 85%) represents microenterprises (according to the EU definition – which employ fewer than 10 persons and whose annual turnover and/or annual balance sheet total does not exceed EUR 2 million)[8]. This might be considered as an opportunity for introduction of mass customization due to the flexibility of SMEs and its overall development impact.
- There is a huge competitive pressure on Polish manufacturers due to the constantly increasing import of products from abroad. Managers perceive a chance to remain competitive on the market within the next three years through offering higher quality products, building customers' loyalty and focusing on a niche segments.
- 43% of surveyed companies have an Internet access, a slightly higher percentage of them – 54% use computers to support business processes. Computers are used mainly to handle finance and accounting (48%), other applications like managing relations with customers, processing orders, managing stock control and production are considered by managers as important, but still not supported sufficiently by IT. Inversely in case of Internet connection, still the large group of managers do not see its practical use and potential benefits. The opportunities are obvious for suppliers of accounting packages, online ordering, stock control and customer relations systems to target organizations which have not yet adopted IT within this area.
- Only few companies made an attempt to introduce supply chain management (mainly these assembling computers from parts) to eliminate inefficiencies, facilitate rapid communication, to minimize inventory

and to minimize delivery time. Managers (especially in case of microenterprises) do not see legitimate investing in expensive SCM solutions.

- Flexible manufacturing systems and production automation were used only by very few enterprises. Dominating are still basic machinery and an extensive use of labor, which resembles 'craft production' discussed by Charles Sabel[9]. One of the few advantages of this situation is that this form of manufacturing seems to be more flexible compared to mass production. Moreover in case of microenterprises the ability to adapt to the market requirements and available niche segments is a crucial competence.
- The knowledge of managers about the opportunities offered by the new business strategies is bad and obviously insufficient. Together with a strong risk aversion these is a major limiting factor for a broad implementation of mass customization. There is a necessity to increase the training and dissemination activities.

The current findings support the thesis that the market environment and competitive pressure make the implementation of new business strategies, including mass customization legitimate and desirable. Unfortunately due to the lack of the proper knowledge among managers, as well as poor IT and production infrastructure, only few companies on Polish market adopted mass customization paradigm.

## 5 CONCLUSIONS AND FURTHER WORK

The future of mass customization seems to depend highly on the interest of customers in buying customized products. In the last decades that's just the customers forced manufacturers to increase constantly the quality of products and to offer more and more diverse range of products. In developed societies, like in Western European countries and in the US a pressure is put on manufacturers to offer products better matching individual and diverse customers' preferences and expectations. Introduction of mass customization seems to be the best solution to changes happening on markets.

However the shift from mass production to mass customization might seem for many companies questionable (especially in Central European countries). The decision for such a change should be preceded by the analysis of potential advantages/disadvantages but also by the analysis of the factors which can influence the implementation process.

The activities undertaken by the authors aim at the improvement of knowledge on the Central European industry and its potential (strength and weaknesses). The results obtained until now will be used to develop guidelines for local entrepreneurs on the opportunities and threats related to the introduction of new business strategies (e.g. mass customization). All findings will be published at the website: [www.mass-customization.pl](http://www.mass-customization.pl) and disseminated through a newsletter.

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