

Mass Customization : A Research Report on Textile Industries in India

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Abstract - Many years ago mass customization was introduced in India, in some different areas of industries, but textile industry is very largest area and much contribution in GDP. India has number of small, medium and large scale industries. Few of them hesitate to adopt MC in easy way. In this paper, a market survey report and views about MC paradigm adoption are discussed. Problem in mass customization is also state. With the help of a questionnaire survey of textiles industries find the adoption capability, economic level, why company are hesitate to adopt MC. For finding all the parameters of MC use the SPSS software, find factor analysis, regression, correlation and reliability of MC for textile companies. Select more than 200 respondents to give the answer of questionnaire. To find perception for this effort, think about MC to be a move for improvement of goods quality which permits for manufacturing of products after buyer give an order at minimum cost compare to ideal products. Outcome of this work were made by reviewing 40 above research papers of different area of MC and search methodology. For this work consider small, medium and large scale textile industries of different states of India, and participants are the middle and high level employees and owner of firm. In the last it is our confidence that MC is possible and that ultimately it will appear as a leading concept in the production and release of goods.

Keywords: Mass Customization, Factor Analysis, Reliability, Correlation.

I. INTRODUCTION

Mass customization (MC), as a completely new product mode; combine the advantages of both mass production and customized production. On the premise of not uncompromising economic benefit, MC provides customized product which satisfies increased consumer awareness of quality and functionality demands with low cost and short lead time. The developed model as presented is the relationship of the connection pertaining to customers' needs at industrial levels. Development in the textile and clothing industry has focused on technological and cost aspects. This work opens up the discussion on the radical new mindset and change needed in textile and clothing design, manufacturing, business and consumption. Main purpose of this research is only to check what is the level of manufacturing industries for mass production and customization manufacturer has enough resources for it or not.

II. STEPS FOR MASS CUSTOMIZATION

The first step in producing a customized garment is to measure the dimensions of a customer's body needed to properly size the garment. These measurements could be obtained by a human with a tape measure, automatic body measurement probably is necessary if mass customization is to be widely accepted.

- **Accuracy:** According to experiments performed by the Textile and Clothing Technology Corporation (TCTC), even trained tailors are prone to unacceptably large measurement errors.
- **Speed:** One company that sells custom-made suits describes over 50 measurements needed to fit its products, requiring about 30 minutes if taken by hand.
- **Comfort:** Measuring requires touching the customer in potentially objectionable places.

III. PROBLEM STATEMENT

Mass customization is new to the apparel industry, and in its processes, following problems need to be resolved for the full implementation of mass customization toward consumers:

- Indian companies have more hesitations to adopt mass customization in practice.
- Companies and stores have no proper way for mass customization.

IV. LITERATURE

The concept of mass Customization was first proposed by Stan Davis in 1989 and published in Future perfect in 1996. Davis studied Time, Space and Mass and mentioned about the business strategy that focused on quick response that was the origin of the concept “Any time and Any Place”. Later, this concept was continued by B. Joseph Pine II and entitled Forward by Stan Davis “Mass Customization” The New Frontier in Business Competition, which was published in Harvard Business School Press in the year of 1993. Pine’s (1993) theory of ‘mass customization’ appears to contradict the globalisation approach, however. According to Pine (1993) people are no longer willing to sacrifice their preferences in return for consistent quality at low prices, but are looking for exactly what they want and need and are willing to pay extra to obtain it.

Approaches to Mass Customization

- **Collaborative Customizers:** Levi's is an example of this approach. The company uses a computer system in its shops with plants. Customer wants (size, model, color) will be measured at Levi's shops, and then this information will be computerized and sent to Levi's plant to produce a custom-fitted pair of jeans.
- **Adaptive Customizers:** Customers buy a standard product but they can modify it by themselves based on their needs. For example, Microsoft offers a package of software designed to run all activities of small businesses.
- **Cosmetic Customizers:** These companies produce a standard product but present it differently to different customers. For example, Planters packages it peanuts and mixed nuts in a variety of containers.
- **Transparent Customizers:** These companies provide custom products without the customers' knowing that a product has been customized for them. Amazon.com is an example of it.

Research Methodology

The area of interest for this study is textile industry. From the available literature it has been observed that the mass customization study is not a regular practice. So the concept of mass customization is not common in apparel industries in Indian context. Therefore a study has been made in this regard. The aim of this study is to examine industries readiness for mass-customized products in India. In doing do the study examines the demand side of the market and begins to explore whether mass-customization can be implemented as an international product strategy.

The Questionnaire

The questionnaires used in this study are presented in Appendix 1. This includes the section 1, section 2, section 3, and section 4 questionnaires for supervisors and employees. The aim of this section is to discuss the design of the questionnaire in general terms due to the large number of measures it contains. For ease of clarity, the measures are discussed in detail in the relevant chapters.

The questionnaire consisted in the main of self-rated, non-comparative single-item rating scales used to assess respondents' level of agreement or disagreement with statements relating to the benefits and

disadvantages of customised apparel, to their satisfaction with standard features and to the difficulty of choice between many alternative models.

All items in the questionnaire are extracted from previous literature. We also include three control variables in our analysis – city, industry type, and plant size. This questionnaire is based on 6 points Likert scale [Strongly Agree (1), Agree (2), neither Agree nor Disagree (3), Disagree (4), Strongly Disagree (5), Not Applicable (6)]. Questionnaire is designed on the bases of previous literature and study related to mass customization; through these questions we also find unpredictable demand of products and how fashion and style influence consumer's buying behaviour.

Analysis Methods

SPSS software was designed to perform statistical analysis on quantitative data. In other words SPSS software is used for complex calculations to analyze numerical data. SPSS software is used in nonprofits agencies, educational institutions and even in business to analyze numerical data. It performs functions such as factor analysis, regression, which is a form of predictive calculation used to determine the relative effect of a single factor on a situation. SPSS is a full-featured data analysis program that offers a variety of applications including data base management and reporting, statistical analysis, and graphics.

Factor Analysis

Basically, factor analysis tells us what variables group or goes together. Factor analysis boils down a correlation matrix into a few major pieces so that the variables within the pieces are more highly correlated with each other than with variables in the other pieces. Factor analysis is actually a causal model. We assume that observed variables are correlated or go together because they share one or more underlying causes. The underlying causes are called factors.

Reliability Test

The correlation between the observed variable and the true score when the variable is an inexact or imprecise indicator of the true score. Inexact measures may come from random inattentiveness, guessing, differential perception, recording errors, etc. on the part of the observers.

Regression Test

In statistics, regression analysis includes any techniques for modelling and analyzing several variables, when the focus is on the relationship between a dependent variable and one or more independent variables. More specifically, regression analysis helps one understand how the typical value of the dependent variable changes when any one of the independent variables is varied, while the other independent variables are held fixed.

Correlation Test

In the social and natural sciences, researchers seek to understand and explain the nature of causal relations between phenomena. The phenomena are operationalized into measured relationships that are observed or tested. Hence, correlations serve as empirical indications of possible relationships between variables.

Data Collection

The data were collected from different cities (Indore, Bhopal, Nagpur, etc.) in India. Totally 221 agreed to participate and completed the questionnaire, which represents a response rate of approximately 100 percent. Prior to outlining the actual data collection method, the introduction process at the beginning of this study is

briefly described. Subsequent to access being agreed upon with the general manager, the next step involved meeting the union representatives.

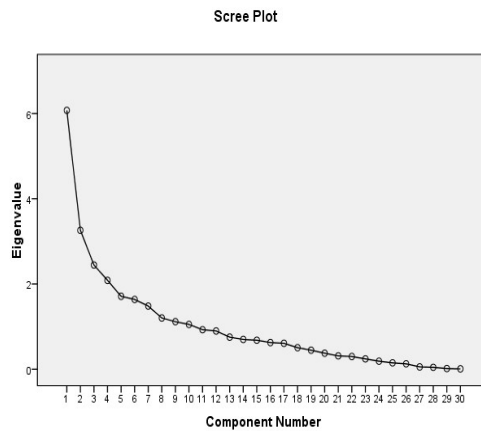
Table- Descriptive Statistics

	Mean	Std. Deviation	Analysis N	Missing N
VAR0000 1	1.3575	.48034	221	0
VAR0000 2	1.3665	.48295	221	0
VAR0000 3	1.4570	.54289	221	0
VAR0000 4	1.6923	1.00244	221	0
VAR0000 5	1.3394	.47457	221	0
VAR0000 6	1.7104	.45460	221	0
VAR0000 7	1.9412	.86402	221	0
VAR0000 8	1.7195	.55843	221	0
VAR0000 9	1.7738	.55876	221	0
VAR0001 0	1.4118	.54577	221	0
VAR0001 1	1.3032	.48938	221	0
VAR0001 2	1.3213	.49630	221	0
VAR0001 3	1.3846	.54065	221	0
VAR0001 4	1.4570	.55120	221	0
VAR0001 5	1.6380	.95594	221	0
VAR0001 6	1.8416	.85668	221	0
VAR0001 7	1.6380	.61438	221	0
VAR0001 8	2.0814	.83267	221	0
VAR0001 9	1.6652	.47301	221	0
VAR0002 0	1.4570	.55120	221	0

VAR00021	1.5701	.58838	221	0
VAR00022	1.3077	.49118	221	0
VAR00023	1.4027	.51856	221	0
VAR00024	1.7738	.64908	221	0
VAR00025	1.7149	.50919	221	0
VAR00026	1.7059	.45668	221	0
VAR00027	1.5701	.49618	221	0
VAR00028	2.0045	.87125	221	0
VAR00029	2.0407	1.21475	221	0
VAR00030	2.2172	.89842	221	0

Scree Plot

The scree plot is a graph of the eigenvalues against all the factors. The graph is useful for determining how many factors to retain. The point of interest is where the curve starts to flatten. Its shape is always like an elbow.



Reliability Analysis for All Data

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.767	.757	30

Table, shows the organization size.

Size of Organizations

S.No.	Company Name	Employees
1	Surbhi Textile	160
2	Pratibha Syntex	612
3	Niky Industries	114
4	Omkar Silk	67
5	Vipy Spinpro	118
6	S. Kumar's	743
7	Vardhaman	177
8	Swastik Textile	46
9	Bhagirath	75
10	Gimatex	80
11	Anant Spinning	158
12	Jabalpur Garment Clustre	510
13	Sagar Manufacturers Pvt.Ltd.	573
14	Soma Textiles Ltd.	180

Results:

Factor Analysis: - Questionnaire is divided in 7 groups or factors with the help of extraction sum of square loadings and rotation sum of square loading in SPSS soft ware; Before using SPSS we already divide this questionnaire in same 7 groups; but few variables are different in groups but not much difference in variables placed in factors and not highly changes in values or relations that mean our factor analysis is correct.

Reliability Analysis: - After factor analysis check the reliability of all individual groups of variables and finally reliability of total number of variables. In reliability analysis values of Cronbach's Alpha for all 7 Factors is greater than 0.5 according to book of "Multivariate Data Analysis" (Hair and Anderson) this value is considerable.

Regression Analysis: - In regression analysis ANOVA table and P-P plot shows the correct regression.

Correlation Analysis:- Correlation among all 7 factors shows the values between -1 to +1. In this test "-1" shows the perfect negative relation, "0" shows no relation and +1 shows perfect positive relation among all variables.

Suggestions

To utilize mass customization, manufacturing processes must be flexible, and to be flexible, every step in the manufacturing process must have the ability to react quickly to changes in product design and to changes in customer's interests and needs. After the manufacturer communicates with individual customers and receives the order or fit specifications, individual products are cut and assembled, and the garment is shipped to the

customer within about three weeks. In these processes, individual products may have totally different specifications, so the information received for production must be interpreted correctly by each operator in each of the manufacturing processes. We can improve In-store services and mass customization process on the apparel industries with the help of proposed structure given in the figure. In these proposed structure all customers are able to choose their own likings fit, colour, fabrics, style, etc. And this customer's satisfaction is helping us to produce customized products.

VI. CONCLUSIONS

The present study is concluded as follows:-

1. Some large size companies are ready to adopt mass customization in near future because of they have new advance technologies, man power, capital.
2. Medium and small size companies want to adopt mass customization but they not have good machines, software, and ability to communicate with consumers.
3. Customer desire always some unique products and able to pay something extra and wait for it.
4. The demand of products is highly unpredictable and fashion and style influence consumer's buying decisions.

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