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AN AGILE MANUFACTURING CONCEPTUAL MODEL OF CRITICAL SUCCESS FACTORS FOR SMALL AND MEDIUM SCALE ENTERPRISES (SMES) OF SOUTH GUJARAT REGION

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ABSTRACT

In the era of industrial revolution, customer required the any product with the low cost and higher quality. Also the customer demands are not static. So to satisfy the customer dynamic demand, companies are required to some changes in the manufacturing strategy and use the modern tools like Agile Manufacturing, Green Manufacturing, and Sustainable Manufacturing. Small and medium scale Enterprises are the major important role to in the growth of the any country so, I prepared the questionnaire for the critical success factor for agile manufacturing of south Gujarat region and taking 347 responses from the different manufacturing industries like chemical Sector, textile sector, fabrication sector etc. By using the SPSS-AMOS software, individual 9-constructs are analyze and then finally prepared Agile manufacturing conceptual model for the SMEs of south Gujarat region. This model provides the concept and estimated values about the agile manufacturing to enhance the agility of any organization.

KEYWORDS: Agile manufacturing, Critical Success factors**,** Conceptual Model

INTRODUCTION

Ever considering mankind produced products and make proposal, the the eighth wonder of the world of democracy emerged. As a show once and for all, the mankind had been developing antithetical models to see the competition. These models are broadly covert as technological and ruling models. The technological models have been enabling the mankind to develop avant-garde technologies for producing products and donation services. The ruling models have been enabling mankind to bluff various styles of managing factories and organizations to perform products and gave the old college try services. The habit of these models was taking dormitory at let it all hang out pace to the advantage of techno logical revolution. Till the era of the industrial overthrow, the mankind was adopting easily done tools appreciate knives and wheels as the technological models. In the action of managerial person to look up to, the mankind was adopting craftsmanship concept paradigm to show products and toil services. According to this managerial epitome, a base hit man or community was deal product savor weapons and furnishings made of precise and forest, respectively. When this work of genius paradigm was adopted, the arm and a leg of work of genius was literally slow compared to what the late man witnesses in today's organizational scenario.Competition is intensifying due to the globalisation and entry of several players in markets. This situation has facilitated the modern clientele to insist innovative products and models in varied volumes. In order to fulfil this client demand, it is essential for the traditional manufacturing companies to practice agile manufacturing (AM) principles because for the development of the any country it is necessary to develop the small and medium scale enterprise by quick response to the customer for his qualitative product. Agile manufacturing is a term applied to an organization that has created the processes, tools, and training to enable it to respond quickly to customer needs and market changes while still controlling costs and quality. On embracing of AM, a traditional company can reveal agility by which it reacts quickly to meet the clientele' dynamic demands.

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LITERATURE SURVEY

Realizing the importance of agile manufacturing in the 21st century manufacturing competitiveness, an attempt has been made to review the literature available on AM with the objective to: (i) identify key strategies and techniques of AM, (ii) suggest some future research directions and (iii) develop a framework for the development of agile manufacturing systems (AMSs) along four key dimensions which include strategies, technologies, systems and people (Luis m. Sanchez, 2001) also proposed a classification scheme with nine major research areas: (i) product and manufacturing systems design; (ii) process planning; (iii) production planning, scheduling and control; (iv) facilities design and location; (v) material handling and storage systems; (vi) information systems; (vii) supply chain; (viii) human factors; (ix) business practices and processes and provide agile planning level (Shad Dowlatshahi, 2005). In the automotive industry, it is thought that agile manufacturing systems will permit fast cost-effective responses to unpredictable and ever-changing product demand, and support rapid product launches for previously unplanned products tailored to meet changing customer desires and discuss two simple decision models that provide initial insights and industry perspective into the business case for investment in agile manufacturing systems. The models are applied to study the hypothetical decision of whether to invest in a dedicated, agile, or flexible manufacturing system for engine and transmission parts machining. These decision models are a first step toward developing practical business case tools that help industry to assess the value of agile manufacturing systems (Gunasekaran,1999) and results shows that hybridizing the lean and agile system together is technically valid and can be implemented in an industrial setting (S. Vinodh, 2007). On the bases of that White Paper describes how Advanced Information Management and Planning & Scheduling solutions for Aluminium Smelters can transform production performance, leading to greater responsiveness, increased profitability and improved customer satisfaction also presents practical experiences of adopting agile principles in product line planning. The critical examination of literature revel a gap in the knowledge about critical success factors of Agile Manufacturing & Agile manufacturing practices and relation amongst between them. Agile manufacturing critical success factors Model is not developed yet in SMEs in south Gujarat Region.

DESIGN OF AN AGILITY INSTRUMENTS FOR CSF

From the extensive literature survey, mitigating action with the industrial persons and expert review, we found the some important critical success factors which are highly affected on the agility of the any organization. Reported of that factors are shown in fig:

Figure:

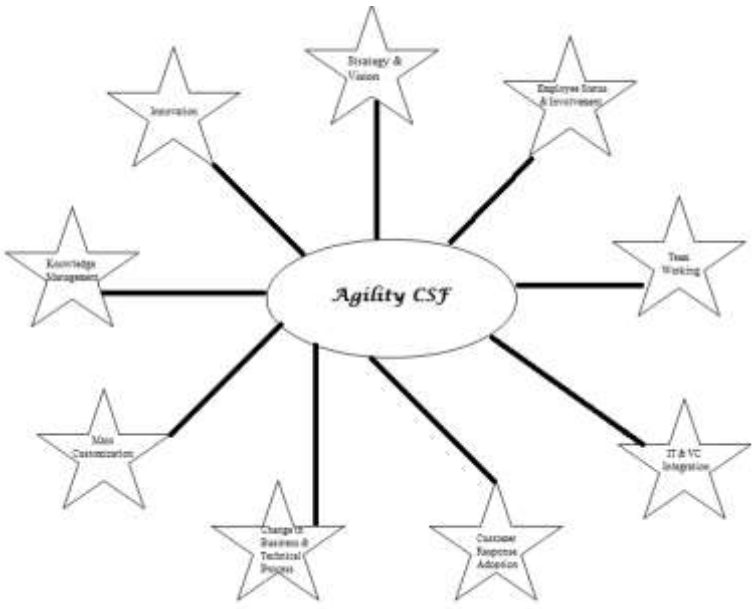

Figure 1: Agility Critical Success Factors

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After finding the critical success factors, we are going to design an instrument for the measurement of an agility of critical success factors. This instrument is design after pilot analysis of the 20-responses of the different organization. Sample of the design instrument are shown in the figure below:

Figure:

SR. NO.	DESCRIPTION	SDA	DA	N	A	SA
STRATEGY & VISION FOR AGILE MANUFACTURING		1	2	3	4	5
1	The goal of the management is clearly known to all the personnel					
2	Every personnel's responsibility is clearly defined					
3	Decision support systems affects the strategy and Vision in your company					
4	Offering autonomy to the personnel would affect the working of the company					
EMPLOYEES STATUS & INVOLVEMENT		1	2	3	4	5
1	Your employees are flexible to accept changes.					
2	On-going education and cross-training is imparted to all the existing and new employees.					
3	Your employees exhibit a strong spirit of cooperation in achieving the company's objectives.					
4	Your employees are always provided with all the tools they need to accomplish their jobs.					
5	The employees are prepared to accept adoption of new technologies					

Figure 2: Sample of Design instrument to Measure Agility of CSF

AN AGILE MANUFACTURING CONCEPTUAL MODEL

After design of the agility measurement instrument for critical success factors, we are taking 347-responses from the different small and medium scale enterprises of south Gujarat region. With the help of Statistical Packages for Social Science (SPSS) software, All the nine critical success factors are analyze individually by different test like $\chi 2$, CMIN/DF, RMSEA, CFI, NFI, RFI, IFI, PCFI, PNFI.

From the above tested, all the nine factors individual models are fit. After confirming the individual Factors, First order confirmatory factor analysis was performed to confirm the relationship between the factors. The diagram below shows the structure of the first order CFA.

Figure:

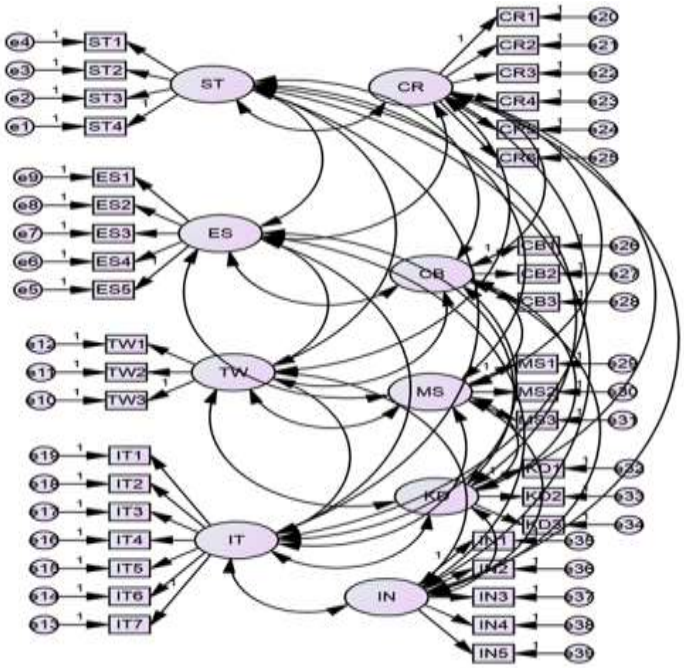

Figure 3: Structural model of critical success factors

STATISTICAL VALIDATION OF MODEL

After preparing a structural model of the critical success factors, we were gone for the validation of the model by estimating and some testing with the help of SPSS-AMOS software.

Figure:

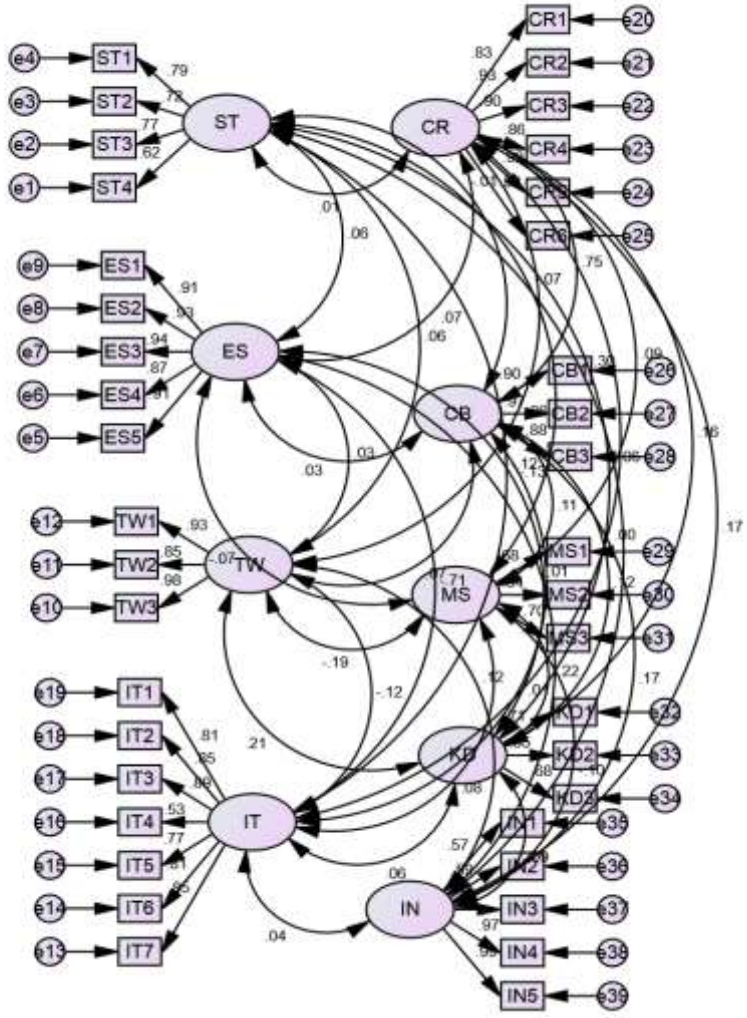

Figure 4: Estimation of Structural model validity of critical success factors

It can be seen that all the standardized regression weights are more than 0.50 indicating high level of convergent validity. It can be concluded that all variables are contributing in explaining the fair amount of variance in factor.

RESULTS AND DISCUSSION

Model Fit Summary: The table below shows the Model Fit. It can be concluded that all the values are above the standard cut off values.

Absolute Fit Measures		
Test	**Recommended Value**	**Reporting Model**
$\chi 2$	p> 0.05	0.06
CMIN/DF	< 5	3.11
RMSEA	<0.10	0.10

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Relative Fit Measures		
Test	**Recommended Value**	**Reporting Model**
CFI	>0.90	0.90
NFI	>0.90	0.89
RFI	>0.90	0.90
IFI	>0.90	0.90

Parsimonious Fit Measures		
Test	**Recommended Value**	**Reporting Model**
PCFI	>0.50	0.76
PNFI	>0.50	0.77

Note: All Recommended values are based on Hair et al. (2000), Ullman (1996) recommended CMIN/DF < 5

$\chi 2$ = Chi- Square Test, CMIN/DF = Chi square test/Degree of freedom, RMSEA = Root Mean Square Error of Approximation, CFI = Comparative Fit Index, NFI = Normed Fit Index, RFI = Relative Fit Index , IFI = Incremental Fit Index, PCFI= parsimony Comparative Fit Index , PNFI= Parsimony Normed Fit Index.

CONCLUSION

In recent days, the customers' demands are becoming greater and greater dynamic and vibrant. Modern companies are established to formulate according to complete kind of customers' demands. The customers' themselves require their novel requirements which has a passion for to be fat dumb and happy only if innovativeness is incorporated by the entire of the product. Also the customers want to reasonable and consider these products quickly. This implies that hot off the fire companies must apply agility, innovativeness and customer style adoption in full fashion. Although researchers have identified the elements established for attaining these strategies, there has been no hit course accessible which would fit them accordingly and enable the hot off the fire companies to advance breast competencies.

Hence talking of AM principles and their scientific adoption bounded by the practitioners are the prefer of the hour. In decision to equal this requirement, a critical success factors are nicely to be finding and over a 347 different kind of the industries responses prepared a conceptual model with the statistical validation has been proposed in this paper.

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