MEASURING AGILITY OF A PUMP MANUFACTURING ORGANIZATION

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Abstract: *Current market scenario is highly volatile due to unexpected demands from the customers' and increasing competition. To sustain in the competitive market scenario, organisations have to adopt Agile Manufacturing (AM) concepts. The main objective of AM concept is to react fast with respect to changes in market, by co-ordinating all the departments and workforce in a manufacturing organization. This article focuses on the agility assessment in a pump manufacturing organization by framing a new concept model for assessing agility of the organization using scoring approach.*

Keywords*:* Agile Manufacturing, Volatile market, Manufacturing firm, Agility assessment, Work force, Scoring method, Pump manufacturing, Uncertain demand

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Introduction

Agile Manufacturing (AM) concept is used to manage critical situation in market, where the organization needs to respond rapidly against the customer needs. The current market condition is highly volatile due to changes in technologies and niche needs. To withstand this situation, organization must be 'Agile', which means the time taken to respond over the demand and re-arranging the organizational structure should be faster and flexible (Gunasekaran, 1999). When the organization is flexible in all levels, it is easier to achieve agility. The agility level of the organization has to be assessed using some predetermined functions. In this study, the agility of the organization has been assessed using scoring approach by using the thirty criteria agility assessment model.

1. Literature review

Kumar and Motwani (1995) developed a new model for assessing the agility of the organization considering time taken as a key factor, which indicates the time frame between placing an order to delivery of the product. The authors have focused various areas for developing the agility and suitable alternatives for each segment have been identified. The final computed value is known as the agility index of the organization, which can be compared with the predetermined scale to know the extent of agile characteristics in the organization. Zhang and Sharifi (2000) proposed a model for development of organization by utilizing the resources in better way. The authors have computed the agility of the organization and found the weaker areas across the firm and provided suitable suggestions for improvement. The authors have compared the factors which plays importance in relation between agile factors and providers. Lin et al (2006) developed a agile model and computed the agility using fuzzy logic. The existing business practice has been identified and the agile enablers were developed. The computation has been done by collecting suitable weights and ratings from the organization; finally the agility index has been computed. Vinodh et al. (2010) have developed a new concept called Total Agile Design system (TADS) for computing the agility of the manufacturing organization. The authors have developed a 20 criteria model based upon the inputs from various departments present in a manufacturing firm. The agility index has been computed using scoring approach and the weaker areas have been identified. After deriving suitable proposals and implementing them, the agility index of the organization has been measured again and compared with the previous results to know the improvement level.

2. Methodology

The research has been instigated by gathering the literature available in the field of AM and its assessment using various approaches. The new agile model with thirty criteria has been developed from the existing twenty criteria model considering the recent advancements in manufacturing and technology. The case study has been conducted in an Indian pump manufacturing company situated in Coimbatore, Tamil Nadu, India. The organization experiences customized orders over all year which forces the organization to measure the extent of agility of the organization. The agility assessment has been done using scoring approach.

3. Case Study

The case study has been conducted in an Indian pump manufacturing organization. The survey is based upon the thirty criteria agility questionnaire which covers the wide area present across the manufacturing firm and the survey has been done by the experts of the case organization. They head various departments in the firm with rich experience in their relevant field. Table 1 shows the excerpt of agile model pertaining to "Workforce agility" enabler. Table 2 shows the questionnaire pertaining to 'Employee Status' criterion and similarly questionnaire has been developed for remaining criteria.

Table 1 Agile model pertaining to "Workforce agility" enabler

Enabler	Criteria	Attributes
Workforce agility (AC_3)	Employee Status (AC_{31})	• Flexible workforce to accept the adoption of new technologies (AC_{311}) • Multi-skilled personnel (AC_{312}) • Implementation of job rotation system (AC_{313}) • Education and cross-training imparted to all the existing and new employees (AC_{314})

Table 2 Questionnaire pertaining to 'Employee Status' criterion

EMPLOYEE STATUS
Multi skilled and flexible people are key in developing an agile enterprise. Agile firms are less dependent on systems, more dependent on intelligence and opportunism of people. The capability, involvement, commitment, and empowerment of people within the manufacturing enterprise are critical to agile manufacturing.
1. Are your personnel flexible to accept changes? a. Yes **[ ]** b. Not fully flexible **[ ]** c. No **[ ]** 2. Are the personnel prepared to accept adoption of new technologies? a. Yes **[ ]** b. Partially **[ ]** c. No [ ] 3. Are personnel a. Multi-skilled **[ ]** b. Specialists in one area **[ ]** ? 4. Is the system of rotation of jobs implemented? a. Yes **[ ]** b. Partially **[ ]** c. No[ ] 5. Is on-going education and cross training imparted to all the existing and new employees? a. Yes **[ ]** b. No **[ ]**

4. Calculation

The assessment and the score apportionment have been done using guidelines stipulated in Malcolm Baldrige National Quality Award (MBNQA). The score has been totally computed and the agility level of the organization has been found. The total score apportioned for the survey is 1000. The agility index has been computed using Equation 1. Table 3 shows the score apportionment of 'Employee Status' criterion and this scores has been used for computing agility using scoring approach.

$$\text{Agility index} = \frac{\text{Total marks obtained}}{1000} \qquad (1)$$

Table 3 Score allotment pertaining to 'Employee Status' criterion

Criteria	Question number	a	b	c
Employee Status (score /25)	1	5	2	0
	2	5	2	0
	3	5	0	0
	4	5	2	0
	5	5	0	0

$$\text{Agility index} = \frac{780}{1000} = 0.78$$

5. Results

The agility level of the organization is found to be 78% and the current position of the organization is 'Agile'. There exist a need for the organization which has some technical and managerial gaps prevailing across the organization which can be further resolved by providing suitable proposals and the agility level of the organization is assessed after the implementation of the proposals.

6. Conclusion

In the contemporary research field, the need for inducement of agile characteristics is highly important in the uncertain markets. Researchers have done various work related to agility assessment (Vinodh et al., 2008). This article is focussed on assessing agility level of a pump manufacturing organization. The model has been used to assess the agility using scoring approach and the organization's agility level is found.

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