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Evaluating the barriers for enhacing the utilization level of advanced manufacturing technologies (AMTs) in manufacturing industry

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ABSTRACT
This research has been out within the field of the barriers of advanced manufacturing technology. It has been goal to investigate the barriers affecting the implementation of AMT in the organisation. the work with this paper has been carried out in cooperation with machine well with the goal to create recommendation for the company in how they could implement AMT successfully in the company in order to answer the question what should a small industry focus on to implement the AMT concept successfully, an investigation in the two middle size industries in the Rajasthan (India) were visited. One interview was carried out with managers at both the two companies and a questionnaire was handed out to workers. The aim was to see if there were any large differences in the barriers of AMT which is applying in the company. The interview and questionnaire did show that a company should know about barriers of AMT & their inter relationship if they wanted to accomplish more in the organisation with tea work and get more busy from the employees. It is important that all workers know the vision and goal why a company is implementing AMT. Advanced manufacturing technology (AMT) has been viewed strategic weapon to gain competitive advantages by manufacturing organisation .

The small and medium scale industries (SMISs) are under increasing pressure to adopt advanced manufacturing technology to be competitive or simply to survive. The successful implementation of AMT will requires the companies to have a workforce with higher level of skills, a flexible organizational structure and include a new culture in managing and training a workforce in the manufacturing industries. The ability of the workers to run multiple machines, stopping production when problem occur, communication of organizational goals and participation in idea generation and decision making are important in achieving a higher benefits of AMT. The SMIs have to increase the educational and supervision needs of the workers and also have a higher understanding of the technology to realize its potential.

The proposed framework has synthesized previous studies and integrated related studies through conducting a complete literature review. This paper is a theoretical construction that synthesizes previous studies .this model can provide managers with practical solutions through granting in depth understanding of whole internal external technological and environmental and awarding empirical insight into overcoming barriers to the adoption and implementation of AMT.

I. 1.INTRODUCTION

Advanced manufacturing technology is defined as an automated production system of people, machines and tools for planning and control of production process, including the procurement of raw materials ,parts and components and the shipment and service of finished products (small and chen , 1995). It is also described a a variety of technologies that utilize the computers in the manufacturing activities either directly or indirectly (Boyer et al., 1996).AMT s enhances coordination between different departments .greater control of the processes, reduced product design time ,shorter lead time and stable high quality output (Meredith, 1987). AMT can be described as a group of computer based technologies, including computer –aided design (CAD), computer numerical control (CNC) machines, robotics (RO),flexible manufacturing system (FMS),automated storage and retrieval system , automated material handling system (AMHS), automated guided vehicles (AGV), bar coding (BC), material requirement planning (MRP), statistical process control (SPC), manufacturing resource planning (MRP II),enterprise resource (ERP), activity based costing (ABC) and office automation (OA) . (Dangyacha et. al., 2006.

The study will try to demonstrate the relationship of AMTs barriers and company performance .since most of the studies were done in the environment of developed countries , this study sets to explain the dimensions of advanced manufacturing technology and its relationship with company performances in the context of a new emerging Indian economy.

II. HURDLES/BARRIERS FOR ADVANCED MANUFACTURING TECHNOLOGIES (AMTS) UTILIZATION

It is accepted that technological innovation is a critically important activity Advances in technology have moved manufacturing organization towards a new competitive landscape. Managers in manufacturing organization are experiencing the emergences of advanced manufacturing technologies (AMTs) such as CAD/CAM,CAPP,FMS and robotics. An insight into the country's manufacturing scenario reveals that advanced manufacturing technologies (AMTs) and human factors remained As neglected areas in the Indian industry since long .thus Indian manufacturing organizations, in the last two decades have been fored to lookout for proactive strategic technology management initiatives, for harnessing manufacturing competitiveness. The detailed literature review reflects the following issues connected with hurdles/barriers in the advanced manufacturing technologies (AMTs) utilization process :-

- Education and training to management and its employees are crucial to utilization of advanced manufacturing technologies.
- Commitment from top management is a critical factors in any major organizational change
- Scarcity of skilled workforce is another hurdle for technology utilization.
- There is always a resistance from employees to the changing conditions and it impact on the success of technology utilization process needs to be investigated.

Barriers during advanced manufacturing technologies utilization

Table 2.1. Advanced Manufacturing Technology barriers

S.No.	AMT Barriers (AMTBs)	References
1	Lack of top management commitment	[2],[32]
2	Lack of strategic planning	[2],[38] ,[13]
3	Lack of appropriate source of finance	[30],[2],[32],[13
4	Lack of cost justification	[6],[2]
5	Lack of culture	[2]
6	Lack of interaction/ inadequate communication	[12]
7	Lack of employee empowerment	[12],[2]
8	Lack of organizational structure	[2]
9	Lack of Methodology	[2]
10	Lack of training and education	[2], [8]
11	Lack of Technology	[1],[2],[38],[14]
12	Lack of knowledge on AMT	[13]
13	Disparity in Pay	[2]
14	Lack of Integration of system	[2]
15	AMT skill deficiency	[22], [2] ,[1]
16	Resistance to change	[12],[2], [13]
17	Lack of performance measurement system	[2]
18	Increased maintenance Cost	[13]
19	Fear of loss of role identity	[1]
20	Fear of work overload	[1]

III. RESEARCH METHODOLOGY

The purpose of this study is to identify the possible barriers hindering the SMIs from achieving the strategic benefit offered by AMT.though numerous factors have been identified as necessary to obtain the strategic benefits of AMT, the study focuses on the organizational structure and culture, the availability of the right workforce, planning and understanding of the technology an level o computer integration

For the purpose of this research following methodology has been adopted.

- A search of the literature has been conducted to identify various barriers of AMT implementation. The search has been carried out in English language and employed the following electronic data bases.

  1. ABI / Inform - http://www.il.proquest.com/pqdauto
  2. EBSCO Databases - http://search.epnet.com/
  3. Elsevier's Science Direct- http://www.sciencedirect.com/
  4. Emerald Full-text - http://iris.emeraldinsight.com/
  5. IEEE / IEE Electronic Library Online (IEL) - http://ieeexplore.ieee.org/
  6. ProQuest Science (formerly ASTP) - http://www.il.proquest.com/pqdauto

- Interpretive structural Modelling is used to understanding the dynamics between various advance manufacturing technology barriers (AMTBs) that hinder the AMT implement in the organizations.
- AHP is a well established decision making process. It is used to develop the predictive model for AMTBs which hinders the AMT implementation.

IV. DISCUSSION OF RESULTS

In developing country especially India, technology is advancing so rapidly in the mechanical manufacturing industry those highly skilled and trained workers are believed to be an essential attribute of successful AMT systems. The results of the study show that skill deficiency; inadequate training programs and improper knowledge significantly affect the performance of the employees; leads to poor utilization of manpower. For this good education and training program should be arranged to enable employees to have confidence in performing the new jobs and bring them job satisfaction. It has been observed that lack of management experience and knowledge significantly affects the performance of any manufacturing system. In Indian manufacturing industry ,the result of study indicate that focus must be shifted to on the root cause of the problems by identifying and of relevant experience of top management at all levels for advanced manufacturing technology utilization. The Indian manufacturing industry is facing these problems. To survive in this competitive world, they have to improve their infrastructure for providing more competitive environments to everybody working in the system. The results of the study depict that increasing complexity of the technology leads to continuing education and training for co-workers working in the plant. Workers in modern manufacturing environments not only need training in depth (level of proficiency in a skill) but extent (different skills) as well. From an Indian workers' point of view, tailored training for high –tech jobs directly supports their career development and value to the firm

V. CONCLUSIONS

The research highlights the contribution of various research issues for enhancing the advanced manufacturing technology utilization in Indian industry for accruing strategic benefits for meeting the challenges posed by global competition .the literature review as well as research analysis has been employed in this study to investigate the roll of different AMTs barriers; which effect the performance of manufacturing organization for achieving success. It is concluded that Indian manufacturing industry has not been able to fully utilize it resources because of different hurdles affecting the performance of advanced manufacturing technology (AMTs) utilization .the following are the barriers that effect the manufacturing system significantly as pointed by empirical research analysis; scarcity of skilled workforce; training to management and its employees; lack of related infrastructure; resistance from employees to the changing conditions; disparity in pay scales of employees.

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