SEMINAIRE LASQUO & LISA

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Salle 411 (ISTIA)

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Presentation on research – Abstracts

1. THE EFFECT OF TRAINING IN MANUFACTURING INDUSTRY

Technical training of employees has become one of the major activities of modern industries in India. Rapid growth in technology and competition has given continuous learning a strategic importance. Training forms the backbone for the implementation of Total Quality Management. Employee education results in giving an organization competitive advantage. In a rapidly changing society, employee training and development helps in maintaining a valuable and knowledgeable workforce. Every organization needs to have well-trained and experienced people to perform their duties. As the job becomes more complex, the importance of employee development also increases. The automobile industry is growing strongly in the last decade. Automobile manufacturing companies invest heavily in giving technical training to the employees.

A study of the effect of technical training is needed with particular reference to the automobile manufacturing companies. The major effects of technical training are the benefits for the organization, the improvements achieved by the employee and work practices. Keeping in mind the above effects, a model of effect of technical training is proposed in this research. The model is intended to help the industries to find the effect of technical training in organizational improvement. How the employee and work practice improvements influence organizational improvement has been studied using the model.

In addition to demographic variables, there are 12 independent variables and 5 dependent variables. These 17 variables are the effects of technical training. Data was collected from 27 large scale companies which include 3 original equipment manufacturing companies. Four companies out of the 24 component supplying companies have received the Deming award.

In the first part of the analysis the relationships between the independent variables and the dependent variables have been studied. Multiple regression analysis has helped in identifying the association between each independent variable and dependent variables. It is followed by the findings of the group differences in variables. They involve discrimination in the three OEM companies with respect to the seventeen effects of technical training and discrimination in the four component supplying companies which have received the Deming award. The differences between original equipment manufacturing companies and component supplying companies have been analysed. The differences between component supplying companies with and without the Deming award have also been analysed.

Some of the findings of the study are as follows. The influencing factors of the business improvement are quality improvement, improvement in technical expertise and improved performance. The major factors leading to the cultural improvement are quality improvement, skill improvement, improved performance, work process improvement, and self and time management. The major factors leading to the continuous improvement are skill improvement, improved performance, work process improvement, improvement in technical expertise, and self and time management. The factors leading to the cost reduction are improvement in technical expertise, work process improvement, modernisation of work and quality improvement. The major factors leading to the initiative and knowledge dissemination are improvement in technical expertise, increase in motivation and career improvement.

The study suggests that improvement in technical expertise, quality improvement, improved performance and work process improvement play a significant role in influencing many organizational benefits.

2. A KNOWLEDGE MANAGEMENT SYSTEM FOR COST ESTIMATION AND PRICING DECISIONS IN MANUFACTURING FIRMS

Manufacturing firms, supplying components and customized products to the original equipment manufacturers, compete with other suppliers to get orders. The firm wins the contract for the supply of items on the basis of price, technical expertise, delivery time and reliability. A major problem in such a dynamic environment is that of determining the accurate cost of production so as to establish the price to be quoted. In the present competitive environment it is imperative that the estimates should be obtained accurately and expeditiously, so that the task of decision-making becomes easier. In this era of information technology, this type of cost estimation activity can be carried out with the aid of specialized software. Estimates can be made based on the previous experiences of the organizations. Estimating is of great importance to a company because it enables the organizations to decide about the manufacturing and also to device policies so as to run the business profitably. Current software products used for cost estimation do not include knowledge management which leads to errors in estimation. The objective of this work is to develop a system for cost estimation of machining processes integrated with knowledge management. The software has been successfully demonstrated and considerably reduces time and errors.

3. AN EMPIRICAL STUDY ON THIRD-PARTY LOGISTICS CAPABILITIES: EVIDENCE FROM MANUFACTURING COMPANIES

This study empirically evaluates the crucial third party logistics (3PL) service capabilities of manufacturing companies in Chennai. Five critical 3PL service capabilities were identified based on factor analysis. Cluster analysis was subsequently performed and three groups were identified among respondents' firms. Based on their mean scores in the five 3PL capability dimensions, the responded firms were assigned to one of the three groups, namely: (1) Information technology capability and employee capability of the logistics service provider (LSP), (2) Information technology capability and timely service capability, (3) employee capability and Co-operative capability of the logistics service provider. Findings indicated that Information technology and employee capabilities oriented firms had the best firm performance, followed by Information technology and timely service capabilities oriented firms, employee capability and co-operative capabilities oriented firms. One-way ANOVA was performed to validate the differences between the companies grouped by the cluster analysis.

4. ENHANCEMENT OF THE LIFE OF STARTER MOTOR USING NANO COATING

In recent years, nanotechnology has become one of the most important and exciting forefront fields in physics, chemistry and engineering. It shows grate promise for proving as in the near future with many breakthroughs that will change the direction of technological advances in a wide range of applications.

Nanotechnology is based on the recognition that particle less than the size of 100 nanometer (nanometer is 10^{-9} meter) posses new properties and behaviour. That advantage has been utilized in the coating technology to improve the product performance.

The objective of the work is to increase the life and reduce the wear of the IC engine starter motor drive unit by reducing the Brinell effect on the sliding surface through the process of monolayer CrN nano coating. The most important aspect of this work is to predict failures in the future application of starter motor.

Nano coating of CrN was done by PVD process. The micro hardness test was made using a dynamic ultra-micro hardness tester. The surface topography and the crystal structure were observed using the scanning electron microscopy and X-ray diffraction. The evaluation of the adhesion of coatings to the substrate was found using the scratch test. The wear and friction tests were performed on a pin-on-disc device at the room temperature. The friction coefficient between the pin and disc was measured during the test. Endurance cycle test was performed to find the life of the starters by running the product continually till they failed. The endurance result was carried out with CrN coated drive assembly components. The result shows that the life of the starter motor has considerably improved from 24,900 cycles to 30,000 cycles and above.

5. GA BASED STATIC SCHEDULING OF MULTILEVEL ASSEMBLY JOB SHOPS

This research focuses on scheduling operations of multi-level jobs, which undergo serial, parallel, and assembly operations in static assembly job shops with an objective of minimising makespan. A new optimisation heuristic based on Genetic Algorithm (GA) is proposed. Its performance is compared with some of the dispatch rules, which have best performances in scheduling multilevel jobs in dynamic assembly job shop. A simulation of assembly job shop is developed and integrated with a GA heuristic routine and analysed. It is found that the proposed algorithm performs well with respect to minimising the makespan compared to other dispatch rules.

6. VENDOR EVALUATION SYSTEM FOR SUPPLY CHAIN MANAGEMENT

In large business houses, vendor evaluation systems play a vital role for the success of the supply chain management process in terms of resource sharing and business partnership decisions for effective execution of everyday business. A "Multiple Vendors and Multiple Components" vendor evaluation system is concerned with the fact that there will be more than one vendor who will compete for the same item and they will have separate capacity and criterion factors. To optimize best order quantity of each vendor in the universe of supply chain criterion is a complex and sensitive task. A genetic algorithm based vendor evaluation system with multi objective mathematical modeling is being framed giving due importance to Quality-Delivery-Cost (QDC) trade-off. Optimization of QDC is considered one of the basic objectives in this process. The unique feature of this method is that while optimizing the order quantity some of the factors, which were not defined by the other methods, are taken into account like price discount factor, budget allocation for the total out sourcing, and predefined outsourcing quantity of each item. The predictability of best vendor combinations and order quantities using genetic algorithm is demonstrated with data and result.