Factors of MRP Implementation In Manufacturer for Small and Medium-Sized Firms

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Abstract

This research paper discusses the implementation process factors and results of the conduct of Materials Requirement Planning (MRP), and to know the relationship between these factors. The purpose of this study is to identify the elements of MRP implementation that are required to ensure successful implementation. Data collected by distributing questionnaires to 55 supervisor-level employees who directly handle the Material Requirement Planning (MRP) in manufacturing industries in SME'S industrial estates. The sampling technique used was simple random sampling. Analyzer used to test the hypothesis is the factor analysis and multiple regression analysis.

The results show there are six factors that dominate the process and results of the implementation of Material Requirement Planning (MRP), and there is a positive relationship between these factors and the results of the implementation process of the implementation of Material Requirement Planning (MRP) in manufacturing industry.

For manufacturing industries suggested should strive to always give priority to improvement of the things that contribute positively to the implementation process factors Material Requirement Planning (MRP).

Keywords*: MRP (Material Requirement Planning), Small-to medium sized enterprises*

INTRODUCTION

Inventories of raw materials have an important role in plant operations. The raw material is a major factor in the company to support the smooth process of production, because the raw material has a direct effect on company profits. Error in determining the amount of raw material inventory investment will press its advantage. One method in the management of inventory is Material Requirements Planning (MRP), which at first is a method of ordering material. Current MRP method has been used as a tool of planning and oversight of management functions.

Manufacturing industry is one industry that has its own characteristics which the material, production and production should be scheduled in a timely manner. But in reality on the ground often experienced difficulties relating to the provision of

material processes. As one method of inventory planning has developed a method of MRP. This method has been widely used especially in the manufacturing industry.

Based on initial observations of researchers discovered a few things the inability of the industry in the application of MRP. This shows the need to do research on factors related to the implementation of MRP in manufacturing in the industrial manufacturing.

REVIEW REFERENCES

Inventory

Understanding the inventory according to Jacobs. (2001), namely: "Inventory is the stock of some item or resource used in an organization. An inventory system is a set of policies and controls to monitor inventory levels and determine the level of inventory to be maintained, when stock should be provided and how much inventory to order." According to Rangkuti (2002): "Inventories are a number of materials, parts and materials supplied in the process contained in the company for the production process, as well as finished goods or products provided to meet demand from consumers or subscription at any time. "

Some understanding of the above, it can be concluded that the stock is all available resources owned by either the raw materials, intermediate goods, finished goods, homemade goods, materials, labor, funds, to maintain the smooth production and the anticipation of the fulfillment of consumer demand.

Inventory Control Control

According to the definition of Ahyari (1995), namely: "Control is a control that also can take some actions for the necessary repairs." While the definition of inventory control according to according to Ronald (1992), namely: "Controlling inventory is a technique for determining amount of inventory at the desired level. The Company focuses on products with emphasis on the physical form of the control of raw materials. "

Based on the above, it is known that inventory control is a method or technique to maintain, estimating, and determining a company's inventory levels so as to protect the smooth production, meet consumer demand, as well as taking advantage of the spending needs of companies and can minimize the total company's operating costs.

Material Requirements Planning

According Orickly (1994): "Material Requirements Planning consists of a set of notes, techniques and procedures are logical, and decisions relating to the elaboration of the Master Production Schedule of the final product, sub-assemblies or final item in

the net requirements and a number of requirements that must be ordered from each of the components needed to implement the Master Production Schedule. "

Understanding of MRP by Gaspersz (2001), namely: "Material Requirements Planning is a planning and control of orders and inventory for dependent demand items, where demand is likely discontinuous and Lumpy."

Some understanding of MRP above, it can be concluded that MRP is an information system designed with computer-based inventory is intended to control the raw materials / components that are dependent demand or request derivatives.

Based on the above literature, the authors are interested in examining the factors of the implementation process and results of executing a Material Requirement Planning (MRP) in the manufacturing industry and determine the relationship between these factors.

METHODOLOGY

The sampling method used is Simple Random Sampling. According to Sugiyono (2004) simple random sampling is used because the sampling of each population was randomly without examine strata in the population. How this is done when members of the population is considered homogeneous. To determine the amount of sample used Slovin formula in this study.

In this section, researchers conducted observations, interviews and distributing questionnaires to the 55 leadership of the company that handles inventory control directly. Data captured using statements with five response scales (5 Likert scale). In this study to analyze the factors of success of the Material Requirement Planning (MRP) and the success factors of the implementation of Material Requirements Planning (MRP) used a multivariate statistical technique of factor analysis and the multiple regression analysis.

RESULTS AND DISCUSSION

Validity of test results for the factors of MRP implementation process shows lack of grain validation statement obtained by comparing the corrected item total correlation with the r-table. R-value tables in this study based on observations of 20 objects are 0.444, a statement said to be a valid point if the corrected item total correlation greater than r-table values. Based on the above print out a questionnaire of 36 items used in the trials on the basis of data from 20 respondents in mind there are a total of 12 questionnaire items that are not valid. While the value of reliability (alpha = 0.9058), this value indicates the points of research are very reliable. So the statement that only 24 items used in the process of further research (the points are not valid will not be used in the study).

The results of test validity results of the implementation factors MRP showed no grain validation statement obtained by comparing the corrected item total correlation with the r-table. R-value tables in this study based on observations of 20 objects is 0444, a statement said to be a valid point if the corrected item total correlation greater than r-table values. Based on the above print out of the 30 item questionnaire used in the trials on the basis of data from 20 respondents known to have as many as 6 item questionnaire that is not valid. While the value of reliability (alpha = 0.9154), this value indicates the points of research are very reliable. So the statement that only 24 items used in the process of further research (the points are not valid will not be used in the study).

The factors of MRP implementation

Based on the results of factor analysis known print out that there is a KMO value of 0.8. This value indicates the amount of factor analysis can proceed. The next stage is the examination of the MSA, based on the results print out the whole grain is known that the process of implementing MRP had MSA values greater than 0.5. The magnitude of this value indicates that the whole point of the implementation process MRP may be included in the factor analysis. Based on the information that formed each factor can explain the data more than 0.5 or 50%. This shows the factors that have made significant contributions to the implementation process in the manufacturing industry.

The main purpose of factor analysis is to reduce or summarize the variables into a smaller number of variables. Formed through the variable is expected to facilitate the policy makers who have to concentrate on the factors of success of the MRP.

Based on the analysis of 24 grains is known that the process of implementation of MRP to form six main factors. The first factor can explain the data at 15.84%, the second factor can explain the data at 15:12%, the third factor can explain the data at 13.85%, the fourth factor can explain the data at 11.85%, the fifth factor can explain the data at 10.09%, and the sixth factor could explain data at 7.08%.

The number of principal components that can be determined and can be used for the analysis can be seen from the proportion of total diversity (Cumulative of Variance). Usually a lot of the major components used in the analysis are the main components of the cumulative able to explain more than 70% of data variability. From the table it by using the six main components are the proportion of data variability can be explained by 73.83%, based on this value the success of the implementation of Material Requirements Planning (MRP) in the manufacturing industry can be explained by the six factors that are formed.

According to the result is known that the leadership wants to invest in the education coefficient has a value score of 0.534 to support key management factors and formal planning. Coefficient score shows every increase of one unit of the indicator-led desire to invest in education will increase the score of the primary factors management support and formal planning for 0.534.

Indicator of the desire to invest in improving the leadership of the organization has a coefficient value score for 0.617 of the planning factors and formal management support. Coefficient score shows every increase of one unit of the indicator-led desire to invest in the improvement of the organization will increase the score of the primary factors management support and formal planning for 0.617.

Indicators led to a desire long-term benefit rather than short-term coefficient has a value score of 0.634 on planning factors and formal management support. Coefficient score shows every increase of one unit of the indicator-led desire to benefit the long term than the short term will increase the score of the primary factors management support and formal planning for 0.634.

Indicator of the clarity of the definition of the implementation of the main job has a value score coefficients for 0.611 to the planning factors and formal management support. Coefficient score shows every increase of one unit of the indicator the clarity of the definition of the implementation of the major work will enhance the support factor scores major management and planning for 0.611 formal.

Indicators of improvement planning program periodically coefficient has a value score of 0.725 on planning factors and formal management support. Coefficient score shows every increase of one unit of the indicator periodically improvement-planning program will increase the score of the primary factors management support and formal planning for 0.725. An indicator of formal methods of work processes with the economic evaluation score coefficient has a value of 0.649 to the planning factors and formal management support. Coefficient score shows every increase of one unit of the indicator method of formal evaluation process of working with an economical method of working with a formal evaluation process that will enhance the economic factor scores major management and planning support for formal 0.649.

Forecasting accuracy of market data indicator has a value score of 0.761 on the coefficient data accuracy factor. Coefficient score shows every increase of one unit of the indicator forecasting accuracy of market data will improve data accuracy factor score for 0.761.

Indicator has a value of inventory record accuracy coefficient score of 0.681 on the accuracy factor of data. Coefficient score shows every increase of one unit of the

indicator will improve the accuracy of recording of inventory data accuracy factor score of 0681.

Indicator of the accuracy of recording the waiting time coefficient has a value score of 0.620 on the accuracy factor of data. Coefficient score shows every increase of one unit of waiting time measurement accuracy indicators will improve data accuracy factor score for 0.620.

Indicator of the number of items of material demand coefficient has a value score of 0776 on data accuracy factor. Coefficient score shows every increase of one unit of the indicator number of items of material demand will increase data accuracy factor score for 0.776.

An indicator of the level of demand coefficient of the material has a value score of 0.653 on data accuracy factor. Coefficient score shows every increase of one unit of the indicator level material demand will increase data accuracy factor score for 0.653.

Indicator of the clarity of instructions between the leaders in the production process has a value score coefficients for 0.755 to the factor settings and the educational or training organization. Coefficient score shows every increase of one unit of the indicator between the clarity of instructions leadership in the production process will increase the score of factor settings and educational or training organization for 0.755.

Indicator of the involvement of all sections in the production process has a value score coefficients for 0.584 to factor settings and educational or training organization. Coefficient score shows every increase of one unit of the indicator involvement of all sections in the production process will increase the score of factor settings and educational or training organization for 0584.

Indicator of experienced experts in the production process has a value score coefficients for 0.607 to factor settings and educational or training organization. Coefficient score shows every increase of one unit of the indicator of experienced experts in the production process will increase the score of factor settings and educational or training organization for 0.607.

Indicators of training for senior staff and the organization's leaders have the score coefficient of 0.805 for regulatory factors, and educational or training organization. Coefficient score shows every increase of one unit of the indicator for the training of senior officials and leaders of organizations will increase the score of factor settings and educational or training organization for 0805.

Indicators of education for the employees involved in production planning and quality control coefficient has a value score of 0.557 for regulatory factors, and

educational or training organization. Coefficient score shows every increase of one unit of education indicators for the employees involved in production planning and quality control will increase the score factors and organizational arrangements for education or training 0.557.

Indicators of use of procedures typically has a value score of 0.755 coefficients for factors specific planning or control policies and procedures. Coefficient score shows every increase of one unit of the indicator in particular the use of the procedure will improve the scores of factors specific planning or control policies and procedures for 0.755.

Indicators use the master procedures specifically schedulling coefficient has a value score of 0.690 on special planning factors or control policies and procedures. Coefficient score shows every increase of one unit of the indicator schedulling master the use of procedures in particular will increase the score factors specific planning or control policies and procedures for 0.690.

Continuous calculation of the indicator score coefficient has a value of 0.510 for factors specific planning or control policies and procedures. Coefficient score shows every increase of one unit of indicator calculation will continuously improve the scores of factors specific planning or control policies and procedures for 0.510.

Indicators of the use of formal forecasting procedures score coefficient has a value of 0650 for factors specific planning or control policies and procedures. Coefficient score shows every increase of one unit of the indicator using formal forecasting procedures will increase the score factors specific planning or control policies and procedures for 0.650. Combination of indicator software has the value of the coefficient score of 0.894 on the characteristics of the software factor. Coefficient score shows every increase of one unit of the indicator combination software will enhance the software characteristics factor scores for 0.894.

Indicator of the cost of inventory control system has a value score of 0.714 against the factor coefficient characteristics of the software. This coefficient score showed any increase in the unit cost indicator inventory control system will increase the score factor characteristics of the software for 0.714.

Indicator of the ability of employees to solve the problem coefficient has a value score of 0.807 on the factors of individual characteristics of employees. Coefficient score shows every increase of one unit of the indicator ability of employees to solve problems will increase the individual employee characteristics factor scores for 0.807.

Indicator of the ability of employees to work in a team score coefficient has a value of 0634 to the factor of individual characteristics of employees. Coefficient score shows every increase of one unit of the indicator ability of employees to work in a team will increase the individual employee characteristics factor scores for 0.634.

The factors of MRP implementation

Based on the results of factor analysis known print out that there is a KMO value of 0.817. This value indicates the amount of factor analysis can proceed. The next stage is the examination of the MSA, based on the results print out whole grains is known that the implementation of Material Requirements Planning (MRP) had MSA values greater than 0.5. The magnitude of this value indicates that all items be included in the implementation of factor analysis.

Indicator of the accuracy of product delivery coefficient has a value score of 0.663 on customer satisfaction factors. Coefficient score shows every increase of one unit of product delivery timeliness indicator score will increase customer satisfaction factor of 0663. Indicator of the ability of the delivery period shows score coefficient has a value of 0.760 for customer satisfaction factors. Coefficient score shows every increase of one unit of the indicator ability effect delivery period will increase customer satisfaction factor score of 0.760.

Indicator of the ability to meet an increasing number of requests coefficient has a value score of 0584 on customer satisfaction factors. Coefficient score shows every increase of one unit of the indicator ability to meet an increasing number of requests will increase customer satisfaction factor score of 0584.

Indicator of the ability to reduce the grace period has a value score coefficient of 0.635 for customer satisfaction factors. Coefficient score shows every increase of one unit of the indicator to reduce the ability of the grace period will increase customer satisfaction factor score of 0.635.

Indicators of better production scheduling have a value score coefficients for 0.634 to a factor of planning and management control. Coefficient score shows every increase of one unit of the indicator better production scheduling will improve scores factor management planning and control for 0.634.

Indicator of the ability to reduce raw material reserves coefficient has a value score of 0.607 on the factors of planning and management control. Coefficient score shows every increase of one unit of the indicator to reduce the ability of reserves of raw materials will increase the factor scores for management planning and control 0.635.

Indicator of ability increased inventory control coefficient has a value score of 0.673 on the factors of planning and management control. Coefficient score shows

every increase of one unit of the indicator improved inventory control capability will enhance the factor scores for management planning and control 0.673.

An indicator of increased inventory turnover coefficient has a value score of 0.593 on the factors of planning and management control. Coefficient score shows every increase of one unit of the indicator increased inventory turns will increase the score factors management planning and control for 0.593.

Indicators of capacity planning capabilities have increased the value of the coefficient score of 0.716 on the factors of planning and management control. Coefficient score shows every increase of one unit of the indicator improved planning capabilities will enhance the capacity factor scores for management planning and control 0.716.

Indicators of increased ability to reduce overtime coefficient has a value score of 0.576 on increase efficiency factor. Coefficient score shows every increase of one unit of the indicator-increased ability to reduce overtime will increase efficiency incrase factor score for 0.576.

Indicator of the ability to reduce production failures coefficient has a value score of 0.726 on increase efficiency factor. Coefficient score shows every increase of one unit of the indicator of failure to reduce production capacity will increase efficiency increase factor score of 0.726.

Indicator of the ability to reduce labor cost coefficient has a value score of 0.560 on increase efficiency factor. Coefficient score shows every increase of one unit of the indicator to reduce the ability of labor costs will increase efficiency increasing factor score for 0.560.

Indicator of the ability to reduce the cost of raw materials has a value score coefficients for 0802 to increasing efficiency factor. Coefficient score shows every increase of one unit of the indicator to reduce the ability of raw material costs will increase efficiency increasing factor score for 0802.

Indicator of the ability to reduce shipping costs coefficient has a value score of 0.627 on increasing efficiency factor. Coefficient score shows every increase of one unit of the indicator to reduce the cost of shipping capacity will increase efficiency increasing factor score of 0.627.

Indicators reduces the ability of informal systems for materials management or supply or quality control coefficient has a value score of 0.706 on the factors of knowledge and competence. This coefficient score showed any increase in one unit reduces the ability of the informal system of indicators for material or inventory management or quality control will improve the knowledge and competence factor scores for 0.706.

An indicator of improved personal ability to do the work coefficient has a value score of 0.724 on the factors of knowledge and competence. Coefficient score shows every increase of one unit of the indicator improved personal ability to perform the work will enhance the knowledge and competence factor scores for 0.724.

An indicator of increased information on how to make decisions in the implementation of the inventory has a value score of 0.785 coefficients for factors of knowledge and competence. Coefficient score shows every increase of one unit of the indicator improved information on how to make decisions in the implementation of the inventory will increase knowledge and competence factor scores for 0.785.

Indicator of employee morale increasing coefficient has a value score of 0566 on organizational climate factors. Coefficient score shows every increase of one unit indicator increasing employee morale will improve organizational climate factor scores for 0.566. Indicators have improved employee job satisfaction score coefficient value of 0.615 for organizational climate factors. Coefficient score shows every increase of one unit of the indicator has increased employee job satisfaction score will increase the value of organizational climate factor scores for 0.615.

Indicator of improvement of relations between managers and employees has the score coefficients for 0.707 to the organizational climate factors. Coefficient score shows every increase of one unit of the indicator improved relations between managers and employees will improve the organizational climate factor scores for 0.707.

Indicators of increased coordination between marketing and sales department has a coefficient value score for 0.645 of the organizational climate factors. Coefficient score shows every increase of one unit of the indicator improved coordination between marketing and sales departments will improve the organizational climate factor scores for 0.645. Indicator of production capacity score coefficient has a value of 0.870 to increase the capacity factors of production and cost estimates. Coefficient score shows every increase of one unit of the indicator improved coordination between marketing and sales departments will increase production capacity and the estimated cost of 0.870.

Indicator of the ability of the estimated cost coefficient has a value score of 0.727 on capacity factors of production and cost estimates. Coefficient score shows every increase of one unit of the indicator of production capacity and cost estimates would increase the score of factor of production capacity and cost estimates for 0.727.

To determine the relationship of the implementation process of MRP with MRP implementation outcome in this study used multiple regression analysis, in particular by the success of the factor scores regression MRP with MRP

implementation outcome. Factor scores serve as the MRP implementation process of the independent variable (X) while the MRP implementation outcome the factor scores as dependent variable (Y). Coefficient value of each variable is weighted beta coefficient value of the regression equation, this value is explained as follows: (i) The major management and planning support formal best contribute to the planning and controlling management. (ii) The accuracy of the data gave the best contribution to knowledge and competence. (iii) Organizational arrangements and education or training best contribute to improving the efficiency. (iv) Special planning or control policies and procedures that best contribute to customer satisfaction. (v) Characteristics of the best software to contribute to the increase in production capacity and cost estimates. (vi) Individual characteristics of employees best contribute to improving the efficiency, knowledge and competence, and organizational climate.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

Through factor analysis there are six factors known to control the implementation process inventory Material Requirement Planning (MRP) in the manufacturing industry in these factors are the main management support and formal planning, the accuracy of the data, setting the organization's education or training, special planning or control policies and procedures, characteristics of software, as well as individual characteristics of employees.

There are six factors that contribute to the implementation of the manufacturing industry in SME's these factors are customer satisfaction, planning and management control, increased efficiency, knowledge and competencies, organizational climate, as well as increased production capacity and cost estimates.

Based on the results of multiple regression analysis is known that the major management and planning support formal best contribute to the planning and controlling management. The accuracy of the data gave the best contribution to knowledge and competence. Organizational arrangements and education or training best contribute to improving the efficiency. Special planning or control policies and procedures that best contribute to customer satisfaction. Characteristics of the best software to contribute to the increase in production capacity and cost estimates. Individual characteristics of employees best contribute to improving the efficiency, knowledge and competence, and organizational climate.

Suggestion

Based on the results of factor analysis in mind there are six factors that dominate the process and the implementation of Material Requirements Planning

(MRP) in the manufacturing industry in the SME's. These factors should be carried out if the company wants to compete and can continue to improve corporate profits. In addition the company must be careful because of the decrease of these factors can lead to the implementation of Material Requirements Planning (MRP) that will hurt the company.

Based on the results of regression analysis is known that there are things that contribute positively to the implementation process factors Material Requirement Planning (MRP). These conditions resulted in the manufacturing industry in the SME's should strive to always put the increase on things that are making a positive contribution.

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