

44. Enterprise resources planning project manager competency on improving organizational performance through process design and quality performance

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5 Enterprise Resources Planning Project Manager Competency on Improving Organizational Performance through Process Design and Quality Performance

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ABSTRACT

With the increasing numbers of organizations that implement the project management approach, there is an increasing interest of the key users to become the Enterprise Resource Planning (ERP) project manager. The project managers must possess roles and competencies to boost the organizational performance of a company. The implementation and development of ERP in the company are determined by the capabilities and expertise of the project manager. The project manager's competency is used to implement both ERP and Total Quality Management (TQM). Many companies implement ERP and Total Quality Management (TQM) that require managers to have reliable competencies, therefore, many companies seek and retrieve personnel from other companies who have sufficient competence. This research has three main problems, first of all, the influence of ERP project manager competence to improve the process design and the quality performance. Second, the influence of process design on company quality performance, and finally, the improvement of process design and quality performance are able to improve to the company performance. Based on the results of questionnaires distributed to 46 manufacturing companies, it is obtained that the project manager's competency has a positive and significant impact on the design process with 0.730, and on the quality performance with 0.553. Then, the design process has an impact but not significant to the quality performance of 0.164. Finally, it is found that the quality performance has a positive and significant impact on the performance with 0.466 and the process design had positive and significant effect on the performance with 0.692.

CCS Concepts

•Information systems → Enterprise resource planning

Keywords

1 Manager competency; organizational performance; process design

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and quality performance.

1. INTRODUCTION

Organizational management and interpersonal relationships aim to utilize the potential of personnel capabilities optimally, for example, through motivation, direction, division of labor, and other non-technical efforts. The completion of a project depends heavily on the ability of the project manager to select the project to work on, select the strategy for completing the project, select the work method to complete the project, select a measurement system to monitor the project, and select a system to evaluate a project and end the project [2].

The development and usage of project management standards is the standard that describes what is required to achieve an effective performance in project management in the workplace. Those who comply with the standard will succeed at work, or appear to be more effective at work, than those whose performance do not meet the standards. The implementation of Enterprise Resource Planning (ERP) technology in manufacturing companies has been done a lot, and also has many previous studies that discuss about the implementation of ERP and implementation TQM. The implementation of ERP in the company is the integration of departments within the company in which there is data integration from various related department [3]. The implementation of ERP in the company will provide data in real time and data sharing on line between departments by using single data entry. Many companies are using some ERP modules that are implementing able in the company. ERP modules in companies are tailored to the functions of each department in the company which may include quality management (QM) for inspecting raw materials acceptance, production process control, and finished goods.

Quality management in the company is a product quality planning designed by top management to improve quality, reduce production cost, decrease the number of product rejects, and improve company's productivity so that the organizational performance will be improved, which ultimately brings some impacts on the competitiveness of the company [4]. TQM is a management system to improve overall quality towards achieving the competitive advantage orientation of customer satisfaction by involving all members of the organization. The application of TQM can be achieved well by considering the following characteristics. (1) Customer satisfaction must be met in all aspects, including price, security, and timeliness. (2) Respect for everyone, each employee is seen as an individual with unique talents and creativity and all employees in the organization are treated well and given the opportunity to develop themselves,

especially participating in the team decision-making. (3) Fact-based management, the organization is fact-oriented which means that every organization's decisions must be based on data. (4) Continuous improvement important for every organization.

ERP technology is able to integrate management functions with single data base such as marketing function, production function, logistics function, finance function, human resource function, production function, quality function, and other functions [5]. Based on several previous researches, the critical success factors of ERP implementation are determined by the top management commitment [6]-[9]; project team competencies [10], [11] and project team competency acting as the research indicator [12]; business process design [13]-[15]; project management [7],[12].

Some previous researches discussed the implementation of TQM; among others are Sahoo and Yadav [16] who focus on the variables of leadership management, strategic planning, employee empowerment and involvement, and quality education and training. A research by Duran *et al.*, [17] observes that the quality management implementation is studied through knowledge management by considering customer satisfaction, employee participation in sharing knowledge about quality, quality process, quality culture, and company quality performance. Another research conducted by Jackson [18] focuses on quality management innovation variables which consists of management support to maintain product quality, employee development in quality understanding, and employee empowerment so that all play an important role in maintaining the quality by understanding the quality tools. Bolatan *et al.*, [19] state that integrated technologies can be used to improve total quality management and quality performance. The integrated technology enables to transfer data by using software and hardware so that the transferred knowledge and data can be done quickly and precisely. Previous studies are still focused on the product quality and service quality, but only a few researches discusses on how technology plays the roles in supporting quality performance which later on improves the organizational performance. With the use of the ERP technology, the integrated data can be access in real time. Company's operational activities related to product quality include material purchasing, material acceptance, material quality control, material use adapted to product quality, quality control of production process, and quality inspection of finished products.

2. HYPOTHESIS DEVELOPMENT

Critical success factors for the ERP implementation in the company are determined by the project manager's competency in designing the operational processes that are tailored to the ERP system. Customization processes are performed by key users together with the project manager so that the ERP system is in accordance with the operational processes. The adoption of ERP in the company has to be adjusted to day to day operation system by the key users setting up in detail the ERP software to fit the implementation of enterprise processes [20]. ERP system must be able to be tailored to the company's business process as a whole and be implemented in collaboration with the project managers and key users; meanwhile the ERP software is assisted by the ERP provider or consultant [21]. The implementation of the ERP project should be able to develop the company's internal business process and to enhance the employee's personal skills after collaborating with external parties (ERP consultants). The aims of ERP implementation for the companies rely on reducing operational costs, improving the efficiency of corporate processes,

increasing responsiveness to enterprise customers, and **integration of data between departments.**

The achievement of this goal is obtained by standardizing the company process, and trying to establish an optimal system based on the best practices of the company [22]. The competency of the project managers is measured by such indicators as project manager has demonstrable performance, project manager has knowledge and skill, project manager has personality characteristic [23].

Quality can work well if there is a commitment from the top management by providing time and resources over a certain period of time when implementing TQM. The implementation failures often occur in companies due to the lack of supports from the top management. Failure that occurs can be caused by an ambiguous vision of quality from the top management, a misunderstanding of the management role in quality management, and an unclear program from the top management about quality. Management commitment is the main thing for companies to implement the quality system [24]. Based on the above explanation, it can be formulated that the first and second hypothesis are: first hypothesis: the increased managers' competency is able to provide the accelerated integrated design process. Second hypothesis: the increased managers' competency is able to increase the integrated quality management.

Increasing ability of the employees will provide faster TQM implementation process [19]. The quality management supports a stable enterprise system and can keep the company consistently to always develop the process in order to focus on the customers and the continuous improvement [25]. The process at the company should be designed to make it easy to know the business process owner, the process ownership restrictions, the process integration, and the steps of each process by building the business blue print. This condition can also be used as the statistical process control so that the quality system can maintain the good product [26].

The indicators for the design process are the integration of data among departments within the company, the regular coordination in improving the design of the corporate systems, and the existence integrated inventory systems in real time in the company. The ERP used by the company can redesign the company's business process to provide the speed and agility of the company's operational system [27]. The design process using ERP technology can also change the manual control system to the ERP control system [28]. This can be done when the company has integrated the relevant departments through the process design modules that are available and customized so that the achievement of the ERP system is obtained optimally. Optimization can be achieved by setting the business process standards, business rules, information system reporting. The standardization that is performed on quality management module system is a quality material acceptance system with the standard business process, standardized production quality control system, and reporting system on the standardized ERP system. Based on the above explanation, the third hypothesis and fourth hypothesis are formulated as **4** following: third hypothesis: the process design is able to provide a positive and significant impact on the integrated quality management system. Fourth Hypothesis: **the process design can increase the company performance.**

Research conducted by Demirbag *et al.*, [29] states that TQM can improve the product quality and can be continuously used to improve the company performance. The results of Chzee's [30] study states that the implementation of TQM in Malaysia provides

an improved performance. A research conducted by Cetindere *et al.*, [31] shows that the total quality management, which is consisting of training, continuous improvement, internal and external customer, and training, have a positive and significant influence simultaneously to the company performance. The indicator used for the quality management is including the decreasing defect rate, better material price than competitor, better supplier delivery performance, better supplier response time, better coordination among purchasing department, and increased order forecast accuracy. While the indicators for organizational performance can be derived from the company's performance, which includes the increased product quality, the increased delivery accuracy time, the increasing productivity, and the increasing response to customers. Based on the above explanation, the fifth hypothesis can be constructed as follows: fifth hypothesis, the integrated quality management can bring an improved corporate performance.

3. RESEARCH METHOD

Data collection techniques are using questionnaires that are distributed to manufacturing companies to obtain information about the competence of project managers in completing ERP implementation projects, especially on the quality management module (QM module). This questionnaire is intended to obtain descriptive data to test hypotheses and model studies. To obtain the data, the questionnaire is using closed questions, made in such a way that the respondents are limited in giving answers to some alternatives only or to one answer only. The distribution of questionnaires is using the likert scale: 5 = strongly agree, 4 = agree, 3 = less agree, = 2 disagree, and 1 = strongly disagree. Data collection is completed by distributing questionnaires to the company's project manager or those who are fully responsible during the project work or key users who develops the module quality management.

The questionnaires are distributed to manufacturing companies in East Java that have implemented ERP. As many as 102 questionnaires are distributed and 71 questionnaires are returned. Only 38 respondents are the project manager implemented implementation of ERP or key user quality management module so that the response rate is 37.25%. To test the five predefined hypotheses, PLS (Partial least Square) is used. The path diagram shows the flow of influence between the independent variables and the dependent variables, i.e. first, the competency manager variables affect the project design process; second, the competency manager project variables influence the implementation of the quality management module. Meanwhile, the dependent variables with other dependent variables are the design process influencing the implementation quality management module, the design process influencing the organization's performance, and the implementation of quality management module influencing the organization's performance.

To obtain representative data for this research, the instruments for analysis need to be tested to determine the reliability and validity of the instrument, therefore the validity test and reliability test are conducted to examine the instrument. The instruments for analysis have met the requirements, as the instruments are valid if the Corrected Item-Total Correlation of the instruments is ≥ 0.3 . Based on Table 1, it is obtained that the smallest Corrected Item-Total Correlation value of the manager competency variable is on the indicator of demonstrable performance with 0.594; so it is valid. For the second variable, the design process, the smallest value is on the company real time inventory system integration indicator with 0.582. For the third variable, which is the quality

management, the smallest indicator value is on the level of decreased defect by 0.333. For the last variable, which is the organization performance, the smallest indicator value is on the increased product quality of 0.391. Based on the validity test, all indicators are valid, meaning they are able to measure the variables. The reliability test is obtained from Cronbach's Alpha value, where an instrument is reliable if the coefficient of reliability or alpha of 0.6 [32], [33]. The reliability value for all variables is above the value of 0.6 so all variables are reliable.

Table 1. Loading factor and instruments analysis

Variable	Indicators Description	Loading Factor	Corrected Item-Total Correlation	Alpha (α)
Competency Manager	Demonstrable performance	0.859	0.594	0.806
	Knowledge and skill	0.779	0.760	
	Personality characteristic	0.916	0.631	
Design Process	Data integration among departments	0.874	0.656	0.716
	Routine coordination to improve system	0.928	0.779	
	Real time integrated inventory system	0.754	0.582	
Quality Management	Decreased defect	0.570	0.333	0.817
	Better material price than competitors	0.459	0.373	
	Better supplier delivery performance	0.768	0.573	
	Better supplier response time	0.732	0.501	
	Better coordination among departments	0.602	0.524	
	More accurate in order forecasting	0.671	0.403	
Organization Performance	Better product quality	0.653	0.391	0.641
	More accurate delivery time	0.672	0.571	
	Increased productivity	0.809	0.449	
	Better response to customers	0.626	0.637	

4. DATA ANALYSIS

The test conducted on 38 respondents, or those who are implementing the ERP module, is using PLS (Partial Least Square). The results of the five hypotheses are in Table 2.

Table 2. The result of the hypotheses tests

Hypotheses	original sample estimate	mean of sub samples	Standard deviation	T-Statistic
Competency QM ->	0.553	0.582	0.152	3.639
Design -> QM	0.164	0.164	0.194	0.848
Competency Design ->	0.730	0.758	0.044	16.768
QM -> OP	0.446	0.389	0.160	3.320
Design -> OP	0.692	0.664	0.092	7.547

From the data processing using SEM PLS in Table 2, the competency of project manager variable to the implementation of the quality management module gets the t-statistic value of 3.639 > 1.96; so the first hypothesis is acceptable. This means that there is a positive and significant influence from the manager's competency on the implementation of the quality management module of 0.553. The competency of the project managers in implementing ERP is demonstrating by their performance, especially in their focused attention to the projects and the ability to take risks. The competency is also demonstrating through a good characteristic personality, which is able to give improvement to accelerate the implementation of quality management module. The manager's competency can also increase the supplier's response.

From the data processing using SEM PLS in Table 2, the design process toward implementation quality management module is obtained the t-statistic of 0.848 < 1.96; therefore, the third hypothesis is rejected. It means that there is no influence from the design process to the implementation of quality management module. This suggests that the integration of data among departments within the company and the regular coordination used by the company in the implementation of ERP modules have not been able to accelerate the implementation quality module of ERP in the company. This is due to the inability of the quality management module system to accommodate the company's operational system in detail. The inability of this system cannot surrender an impact on the quality management performance that is seen from the timely delivery and faster response time of the company's suppliers. This condition brings a negative consequence in purchasing planning as it is not on schedule so the purchasing plan has to reschedule the orders or to customize the module. The data processing using SEM PLS in Table 2 reveals that the manager project competency variable to the design process has a t-statistic value of 16.768 > 1.96; so, the second hypothesis is accepted. It means there is a positive and significant influence from the manager project competency to the design process of 0.730. The manager project competency implementing ERP together with the demonstrable performances are consisting of the management focus on project and the ability to take risks. The project manager competency with a good characteristic personality is able to provide the acceleration to the company's

operational design process in accordance with the company's ERP system.

According to the data processing using SEM PLS in Table 2, the design process variable to operation performance has the t-statistic value of 7.547 > 1.96; then the fourth hypothesis is accepted. This means that there is a positive and significant influence from the design process to the operation performance of 0.692. The company's design process is integrating data between departments and continuously coordinating departments in the company so it is able to provide an increased productivity performance and product delivery time to the company's customers.

The data processing using SEM PLS in Table 2, the implementation of the quality management module variable to the operation performance gets t-statistic value of 3.320 > 1.96; then the fifth hypothesis is accepted. This means that the implementation quality module in the company has not been able to fully describe the detail quality management system in the ERP system. However, the overall ERP implementation is able to provide an increased delivery performance of suppliers, with faster and better response time assisted by the ERP system. This can be seen from the increased company productivity and the time of completion of the customer products.

5. RESEARCH IMPLICATIONS

The company's competency manager project in implementing ERP modules can provide an improved design process, more effectively through the coordination of departments in the company and the integration of data between departments. The competency of manager project is also able to provide an improved performance of the company's suppliers in terms of providing product delivery response and accuracy of material delivery required by the company. The design process undertaken by the relevant departments within the company, especially in the quality management department, has not been able to accommodate the real time of the company's operational quality system [33], so it does not have an impact on ERP implementation quality module. However, the impact from the process design is able to provide an improvement in the company's operational performance which is seen in the improved company productivity and the completion time of the company's product. The implementation quality module ERP as measured by quality performance indicators is able to improve the performance of the organization. This research needs further refinement by choosing the quality department manager as the right respondent, not the ERP project manager. The next stage of the research needs to be an understanding of ERP providers to introduce the importance of implementing quality management modules for companies, as only few companies are interested in the implementation of quality modules. This condition is very different from the corporate system which have implemented TQM fully and already had the ISO certification in producing products.

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