Impact of Enterprise Resource Planning (ERP) implementation on user performance: studies at University of Jember

A Andrianto
System Information Study Program, University of Jember
Email: anang.uppti@unej.ac.id

Abstract. University of Jember is a university that has used Enterprise Resource Planning (ERP) as a means to plan and manage its resources. The application of a system will certainly affect employee performance and organizational performance. This study aims to determine whether the implementation of ERP in University of Jember has an impact on the performance of employees (lecturers) and in order to generate conclusions in the form of evaluation of the application of ERP in the University of Jember better. Indicator used in this research is the performance of employees consist of Quantity of Work, Quality of Work, Job Knowledge, Creativeness, Cooperation, Dependability, Initiative, personal qualities as the model. The method used in this research is qualitative method is descriptive analytical and evaluative, by analyzing the impact of ERP system implementation on employee performance components. The data obtained from informants in this case lecturers and the results obtained is the application of ERP has a positive impact on user performance components.

1. Introduction
Higher education in recent years is heavily influenced by global trends, primarily as a result of government policies for all universities in the world to improve their performance and efficiency [1]. Increased expectations of stakeholders (especially students and governments), quality and performance requirements, and a competitive educational environment, along with declining government support, have pressured universities around the world to adopt new strategies to improve their performance [2]. As a result, the higher education sector has turned to the adoption of Enterprise Resource Planning (ERP) in the hope of helping them to cope with the changing environment [3]. As a result, existing management and computer administration systems have been replaced by ERP in these institutions [4], to achieve more efficiency and accessibility for all members and improve end-user performance by providing better managerial tools [5].

The purpose of ERP implementation is to provide universities, schools and departments, with enhanced capability for research and teaching at low or reasonable cost [6]. Unfortunately, however, it has been claimed that as many as 60% to 80% percent of all ERPs fail to meet the expected results [7], while other implementations do not improve performance with users who explicitly express dissatisfaction with performance. Given these facts and because resource
investments made by organizations are large enough to adopt or switch to ERP, some research has a strong desire to explain the causes and factors that lead to good performance with ERP [8].

ERP is a software application adopted by a university with a substantial service coverage for its implementation. However, little research has been done about ERP in the university environment, as compared to other environments [9]. Universities differ from other organizations because they have different environments and circumstances, and they use ERP technology for academic purposes [7]. Faculty and staff generally interact with core institutional activities through ERP, and students need more information and a better E-learning environment. In short, this means that the system is, by definition, very important to the mission of the institution. In addition, these organizations are governmental organizations and do business for non-profit purposes, which may create ERP systems in these organizations with different interrelations, especially with a high percentage of failure implementation.

University of Jember one of the universities in Indonesia is a large organization having a variety of resources. This condition certainly has a level of complexity in the management of resources. As a non profit company, University of Jember provide a service that produces graduates who are expected to have the competencies required by stakeholders with a relatively short waiting period. The resources in University of Jember are also not much different from the resources owned by other organizations such as human resources, finance, raw material resources, machinery and equipment, technology, and information.

The resources management in University of Jember currently has implemented an ERP system, so called SISTER (Integrated System). This system is used by students and lecturers for academic administration purposes such as registration, learning load planning, lecturer workload planning, and learning evaluation. Besides, there are also SIMKEU (Finance Information System) as a means for financial management, SIMPEG (Human Resource Information System) as the management of human resources, and SIMANGGA (Budget Planning Information System) as a tool to manage budget planning based on proposed activities that will be done.

According to the empirical research that has been conducted [10], the researchers chose 3 of 25 universities in Saudi Arabia that have experience in ERP system: King Abdul Aziz university, the system name is ODES plus, King Saud university, the system name is MADAR, King Fahd University, e Moraslat system. This system serves the administrative and academic sections of all universities and branches. The researcher collected data on three previous university ERP systems through interviews of three different types of users at the university, regardless of the difference in name and system design, but the result was 3 systems covering the following administrative sectors: a) Human resources, b) Financial management, c) Procurement management, d) Management of infrastructure (store), e) Student registration management, f) Library management.

The core part of this problem focuses on the research objectives, whether the ERP system improves the user's performance, and also whether the ERP system meets the requirements of users in that environment. Therefore, studying the impact of ERP implementation on user performance is an appropriate way to assess the usefulness of this application at University of Jember and how they contribute to the efficiency and effectiveness of performance. When ERP is fully embodied in business organizations, they generate significant benefits [11], such as increased access to accurate and timely information [5]. Based on the study [12], it was concluded that ERP has the potential to improve business performance in higher education by improving services offered to students, faculty and staff. Studies on [1] found that organizational culture and communication had a significant effect on ERP implementation results in higher education in the UK. The results of the study [7] show that organizational culture has little impact on the success of ERP implementation and the combination of these elements is not related to performance success. From the study [13] stated many staff affirm that the benefits of the ERP system will be achieved not through autocratic leadership but through executives controlling the shared vision and empowering staff.
2. Literature review

2.1. Enterprise Resource Planning (ERP)

The information system according to [14] is defined, "The information system is the set of formal procedures by which data are collected, processed into information and distributed to users." Thus it can be interpreted "The information system is the unity of formal procedures with data collected, processed into information and distributed to the user. The ERP concept[15] (Enterprise Resource Planning) comes from the MRP (Manufacture Resource Planning) and CIM (Computer Integrated Manufacturing) introduced by Gartner research and analysis company, where the ERP system tries to cover all the basic functions held by a company whether the company is engaged in business or non-profit. ERP is a system where on the inside there is software that has interrelated functions and is more easier for users because of the standardization that only uses one system integrated in a company and the existence of the same database for main data storage. While the ERP concept according to [16], the ERP system is a corporate information system designed to coordinate all the resources, information and activities required for complete business processes. This system has one database and software to process the data. The software has a function to integrate all departments in managing company resources. The concept of ERP can be illustrated as figure1:

![Figure1 The basic concept of ERP](image)

Purpose is the cornerstone of the application of a system, according to [15], the main purpose of ERP implementation is to improve and strengthen the effectiveness of existing resources within the enterprise, such as: (1) Human resources, where every member of the company has the responsibility and has the ability to create a productive atmosphere within the company. (2) Production resources, so that the company can produce more quality products. (3) Sales, where companies are able to increase sales in the presence of more effective marketing. (4) Corporate financial reporting and logistics accounting company more effective and integrated. (5) Be able to compete with competitor companies. (6) To avoid complicated resource problems in the future.

2.2. Task-Technology Fit

Understanding the suitability of technological tasks according to [17] "Task-technology fit is defined as an ideal profile formed from a set of internally consistent task dependencies with technological elements used that would result in executing performance and according to [18] in [19], "Tasktechnology fit (TTF) as the degree to which a technology assists an individual in performing his or her tasks", the intent of the opinion, Tasktechnology fit (TTF) as the level or the size of how often the technology helps the individual in doing his tasks Based on the above understanding it can be concluded that the suitability of task-technology can be defined as the level or how big a technological ability in helping the individual to do his tasks and later will result in the performance executor.
2.3. Performance
The concept or sense of performance according to [17] is the level of success of employees for what is the responsibility in achieving a company's goals. Factors affecting performance include motivation, ability, education, knowledge, experience, skills, training, interests, attitudes, personality, physical condition and various other human needs both biological, social and egoistic. While the concept or understanding according to [18] is the result of what the employee, how much the employee's contribution to the company and the ability of the employee in completing all tasks and responsibilities. Factors that affect employee performance are ability and motivation. Ability consists of IQ and knowledge, while the motivation is formed when employees face work situations in the form of something that moves the employee to achieve company goals. The concept of performance appraisal by [19], performance appraisal can also be divided into several interrelated dimensions, among others; (1) Quantity of work, ie the amount of work completed in a given period. (2) Quality of work, ie quality of work in accordance with predetermined standards. (3) Job knowledge, which is knowledge about the work and what things are the responsibility. (4) Creativeness, namely creativity to create solutions to problems that arise in the work. (5) Cooperation, ie the ability to cooperate with others. (6) Dependability, ie awareness of a work completed to be done. (7) Initiative, ie awareness and willingness to expand responsibilities in the work. (8) Personal qualities, namely the quality of a worker that includes personality, leadership, daily attitude and integrity.

3. Research methods
Based on the scope of research to be studied, this type of research is phenomenological research which is trying to explain or reveal the meaning of the concept or phenomenon of experience based on awareness that occurs in some individuals. This research is conducted in a natural situation, so there is no limit in interpreting or understanding the phenomena studied. This research uses qualitative approach. Qualitative research to answer the problems related to the presence or absence of the impact of ERP implementation on user performance in this case lecturers. Then the data source for this research is primary data. Primary data are field data obtained from interviews, surveys and direct observation to the data source. Technique of collecting data which is done by using interview that is by conducting interview openly and depth to user (lecturer). ERP who feel experience before using ERP and after using ERP. The survey was conducted to several faculties that exist in the environment University of Jember that has different characteristics and the informants who have the level of understanding of the use of different means of information technology. The relationship between ERP implementation, Task ERP Fit and Employee Performance as shown in Figure 2.

![Figure 2](image-url)

Figure 2 The relationship of variables to be studied
The development of variables will be done related to employee performance dimensions which include: Quantity work, Quality work, Job Knowledge, Creativeness, Cooperation, Dependability, Initiative, and Personal qualities.
4. Results and Discussion

(a) User Performance Analysis Before and After the Implementation of the ERP System

It should be underlined that the main purpose of ERP implementation is to improve and strengthen the effectiveness of existing resources at University of Jember. The resources in this research are lecturers, staff and students using ERP system. One of the criteria for successful implementation of ERP is the increased institutional performance of the institution, where the institution's performance is sustained or supported by the performance of lecturers and students. Based on the above explanation can be made a comparison of eight criteria of the performance appraisal related before the implementation and after the implementation of ERP conducted by the institution, the eight performance assessment criteria are Quantity of Work (number of work completed in a certain period), Quality of Work with a predetermined standard), Job Knowledge (knowledge of work and what matters are his responsibility), Creativeness (creativity to create solutions to problems that arise in the work), Cooperation (the ability to work with others ), Dependability (awareness of a work completion to be done), Initiative (personal awareness and willingness to expand responsibilities), personal qualities (personality qualities, leadership, everyday attitude and integrity).

Based on the data and information that was obtained in the field for the quantity of work component (the amount of work completed in a given period). The quantity of work generated prior to implementation and compared with after ERP implementation are 45 informants providing information related to the increasing of the quantity of work related to ERP implementation as a whole. They stated that the output of the quantity of work they produced more than before using ERP. There are several causes that can be taken from the informant's statement, among others, with the ERP some informants can do the job more planned and measurable, in accordance with job description so that they produce or complete more jobs than before using ERP, some informants feel not focused in completing the work they were supposed to do for accepting non-work of the informants. The second statement was that with the ERP, some informants could manage and monitor the work they had completed more quickly and efficiently, so that some informants could manage the time to complete their work in accordance with predetermined targets. Before using the ERP takes time to monitor and check the work that has been completed by the informants.

For the components of quality of work (quality of work in accordance with predetermined standards), all of 45 informants provided data and information stated that the positive impact with the implementation of ERP is all work done and standardized, because at the implementation stage all business processes that are still manual to be made into a computerized system in the form of ERP. The quality standards referred to in this case are the standard outcome of the work (teaching, research and service) and the standard time of completion of the work. Prior to the implementation of ERP, although the standard of work has been established in the operational standards of the institution, but in the implementation of frequent adjustments due to changes in conditions in the field so it is not clear how far the existing standard can be changed to adjust to the conditions in the field. With the use of ERP all changes from the standard can be determined the level of tolerance of the change.

Then for the components of Job knowledge (knowledge of the job and what things are the responsibility), all of 45 informants provided data and information stated that before the ERP to know the responsibility and knowledge about their work, some informants must confirm to the staff or academics to know their work and responsibility. Some informants should read the operational standards in detail if there is uncertainty regarding the authority and responsibility for a job. So conflict often occurs because not all employees (lecturers with the extra task) know the responsibility and knowledge about the work they should carry out. In the ERP everything related to the work that must be done and implemented by each user has been standardized in modules and menus tailored to the function and position of each user. In addition, the implementation and size of the completion of work also exists in each module ERP users in accordance with the function and user positions.
Associated with the Creativeness component (creativity to create solutions to problems that arise in the work), one of the advantages of ERP is data processing to information more quickly and efficiently, in addition to analyze a problem by using data and information from the ERP is much more fast. All informants are 45 informants who give testimony and the statement states that before the implementation of ERP analysis process using data and information to solve a problem takes a short time, because the process of converting data into information if done manually takes a short time so that affect solving a problem or decision-making process. After the implementation of ERP and ERP use the informants stated helpful to make solving a problem or decision making so that solutions and decisions become more creative, creative here interpreted as solutions and decisions beyond the decisions and normative solutions where the decision and creative solutions can run efficiently and effectively.

Cooperation component (ability to cooperate with others), based on testimony and statement from informant, some informants stated that with ERP system work they become more individual, because all their work become standardized. Some other informants stated they could increase cooperation in team teaching, research and dedication because communication can be done efficiently and effectively in ERP. Having analyzed the informants who stated that they work to be more individualistic did not take advantage of features or facilities that have been embedded or existing communication in the ERP. One of the functions to streamline inter-faculty and interpersonal communication within a university using ERP is a communication function that can be a chat, short message and discussion forum related to work completion.

Then for the component dependability (awareness of a completion of work to be done), All of 45 informants gave testimonials and the statement that prior to the implementation of ERP dependence of their work settlement is still very dependent of what is remembered, because the data and information needed to the completion of their work is processed manually in accordance with each way. After the use and application of ERP, all informants stated that with the increasing process of data processing into information and increased flow of data provide a positive impact to informants with increased level of completion of the work of informants on the data they need for the completion of their work.

In the inititive component (awareness and willingness to expand responsibilities in the work), some informants stated before using ERP to feel more initiative compared to after using ERP, because the problems encountered make some informants have initiative in solving it. After using ERP or after the implementation of ERP they stated lack of initiative because all the work is already in the ERP used. While some of the informants stated that with the implementation of ERP or the use of ERP they can complete the work more quickly and can perform other work initiatives that are still related to their functions and responsibilities. Before using ERP they feel less able to take the initiative because busy to finish the job.

Then for the components of personal qualities (the quality of a worker covering personality, leadership, everyday attitude and integrity) all informants stated that with the implementation of ERP all users become more disciplined and follow the rules set by the institution that is standard operating procedures. The operational standard of the procedure is in the use of ERP. In addition, ERP user informants say compared before using ERP they claim to be able to maintain their integrity as all work done is monitored through ERP.

(b) Impact Evaluation of ERP Implementation on User Performance
Based on the above discussion can be analyzed in general ERP implementation has a positive impact on user performance. For the quantity of work component (the number of jobs completed in a given period), the implementation of the ERP system has a positive impact because the informant produces more quantity of work in one period. And can monitor the work that has been and has not been completed by using the ERP system more quickly. Then the quality of work component (the quality of work in accordance with predetermined standards), the implementation of ERP has a positive impact because the work of informants have a clear standard by using ERP system, so that related job standards have a clear standard. For the Job knowledge component (knowledge of the job and what matters are the
responsibility), ERP implementation has a positive impact because the job information, the standard time of completion and the procedure of completion of work all the information is incorporated into the ERP.

Components of Creativeness (creativity to create solutions to problems that arise in the work), ERP implementation has a positive impact on informants, because ERP provides more complete and fast information. The information is useful for informants in terms of job completion and making decisions based on better quality information compared to using manual processes, where the information provided becomes more limited and requires a process that is not fast and efficient.

Then for the Cooperation component (ability to cooperate with others), ERP implementation concluded by some informants have a positive impact because it can interact using ERP, ERP features applied in the company has supported communication between functions and units within the company through ERP. While some informants gave the statement that ERP has a negative impact on cooperation, because all of their work is managed in the ERP system and eliminates the relationship with other functions and units. From the results of observations and further interviews it turns out that informants have not utilized the existing communication features in the ERP system. In this case the socialization of all the functions of ERP becomes very important because the user can maximize all the functions associated with the field of work.

Then the dependability component (awareness of the completion of work to be done), the implementation of ERP system has a positive impact for users of ERP system, due to the increasing level of work completion as a result of business process improvement in terms of process speed and process accuracy so that users of ERP system get data and information needed to complete a job becomes faster.

The next component of initiative (awareness and willingness to expand responsibilities in the work), the implementation of the ERP system gives two impacts to the informant that some claim to have more initiative and some states have no initiative. Informants who claimed to have more initiatives because they had a faster job completion time so they could take the initiative to do the next work, then informants who claimed to have no initiative because all the work has been incorporated into the ERP system module they use, so they do not need the initiative to work on the other. From the analysis that this is not a problem if all the work that should be done by the user has been accommodated in the ERP system.

The last component is personal qualities. After the implementation of ERP system, all users of the ERP system claim to have a positive impact on personal quality of users in terms of discipline, work coordination in a unit or division, then integrity, and also important informants get more value because they have experience using the ERP system.

5. Conclusion
Based on the evaluation results related to the impact of ERP system implementation on the user performance, it can be concluded that in general the ERP system has a positive impact on user performance. Based on data and information, ERP implementation gives positive impact to Quantity of Work performance component (number of work completed in one certain period), Quality of Work (job quality in accordance with predetermined standard), Job Knowledge (work knowledge and matters what are the responsibilities), Creativeness (creativity to create solutions to problems arising in the work), Dependability (awareness of a work completion to be done), personal qualities (qualities of a worker that includes personality, leadership, everyday attitude and integrity). The above components as a whole are positively impacted by the use of ERP systems at the institution.

Furthermore, for Initiative component (awareness and willingness to expand responsibilities in the work) and the Cooperation component (the ability to work with others), some informants are positively affected because of the application and use of the ERP system, but some are not. In the Initiative component (awareness and willingness to expand responsibilities in work), informants who claimed not to have a positive impact because the use and application of ERP
can be inferred not matter as long as all of their work is accommodated in the applied ERP system and the informants have completed all responsibilities their work, because the informants considered less initiative because all their work is in the ERP system that apply. In the Cooperation component (the ability to cooperate with others), the informants who stated no positive impact because the use and application of ERP can be concluded that the lack of socialization of all features and functions of ERP systems developed so that communication features are not known by some informants and it becomes the basis that they are less able to communicate and coordinate with other functions and units using the ERP system.

Based on the above conclusions, in the implementation of an ERP system there are some very important things that become the key to the success of ERP system implementation. It should be improved both by the institute and developer of ERP system that is management commitment and training the use of ERP system. Management commitment is required to make ERP system that has been built and implemented in the institution is used maximally in all levels, so that the function of ERP system can run properly. Then the training factor becomes important because the user get information how to use all the functions in the existing ERP system optimally, so the purpose of implementing the ERP system is to improve and strengthen the effectiveness of the resources in the institution.

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