Enhancing Performance of an ERP Systems with a Dashboard System

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Abstract—the goal of implementation for ERP systems are improving performance business process and achieve work more efficiency and productivity. The ERP systems as basic to consider evaluating performance achievement as a tool for analyzing, evaluating and support decision making. In the reality, the managers have problems using ERP systems to making decisions and ultimately improve the synchronization of business strategy. This research attempts to present how to ERP systems can support making decision using a dashboard systems to achievement the performance of organizations. The methodology used in this research involves the survey for analytic hierarchy business process. This research is expected that such a model may be used organizations to assessment the efficiency of the ERP system and can be used in evaluating, assessment, and the organizations can be able to increase competitive advantage.

Keywords—Enterprise Resource Planning (ERP) systems, Dashboard system

I. INTRODUCTION

The conditions of high competition, it requires enterprises to have a breakthrough in business strategy in an effort to achieve enhanced performance of business. Although the needs of the enterprises have a tool for supporting decision making accurately. The implementing of Enterprise Resource Planning (ERP) system is one way to achieve it. ERP system s are an integrated system to support the enterprise's core business. ERP systems can help improve the performance workings to achieve a more efficiency in sharing data and information, which ultimately the organizations can improve the lucrative and growing into a better direction. In the fact, the found a variety of problems related which the executives have problems in managing information of an ERP systems for monitoring, evaluating and assess the performance of the business. ERP systems don't use with optimal in supporting a strategic decision. The executives have incorrect conclusions on information produced and misunderstanding of ERP systems in providing solutions to the problems faced.

The dashboard systems need integrate data of activities business process and manage and process data to make many information. The goal of implementation of ERP systems are to assist top management and make decision making, analyze business process. Therefore, this research attempts to intend to problem solving how to manage information of an ERP systems using a dashboard system based on key performance indicators that can be used to evaluating, assess the performance of a business unit objectively. To overcome these problems, this research intends to conduct research on how to enhance the performance of an ERP systems using a dashboard system.

Based on the problems above, this research gave the research question of this research is: What is the enhancing performance of an ERP systems using a dashboard system in order to performance of organizations?

II. LITERATURE STUDY

A. Enterprise Resource Planning System

The Enterprise Resource Planning (ERP) systems are information systems which are enterprise wide, modular, integrated and have broad business functionality (Hawking, 2005). The ERP systems are designed to make change enterprises competitiveness, and have competitive advantage to generate accurate information throughout the companies. The consideration complexity of the issues facing business, therefore the company should have traceability to analyze, respond to issues potentially significant to problem solving skills. The ERP Systems will be the synergy of all the functions of existing departments within the company. In addition, ERP systems can involve all management functions and integrate to be finished products efficiently and effectively, such as: accounting and finance function, manufacturing function, sales and marketing function, purchasing, and inventory functions, human resource functions. The Improvement of business process performance, needed to control business process. The information has been assimilated and evaluated by humans to solve a problem or make a decision (Inmon, 2005:498).

A business process is a relative set of activities carried out collaborating to achieve effective business process. Therefore, organizational activity into business processes must be driven by an understanding business process (Martyn, 2005:6). The other factor to consider is infrastructure issue, the companies are using separate

subsystems in their daily operations to support improve business process. When management makes decisions based on information obtained within one functional area, those decisions, which are apt to be made from a narrow perspective may not be in the best interest of the company. Given the current environment, companies should carefully examine every step in their business process and question the necessity of each step. It is critical for companies to use information technology such as ERP system to improve performance of enterprises. With an ERP system, the database management need integration and sharing data across functional areas based on companies business process. The design of an information system is event driven according to the business process (Janie, 2007:1)

B. The Critical Success Factors of ERP System

The implement of ERP systems need to improve business processes to manage investment, competitive, and increasing responsiveness. This research have focus identify the Critical Success Factors (CSFs) to achieve implementation ERP systems successful. The CSFs of ERP systems are strong executive management support of the project mission and project team. Management will continue to provide best full time resources as agreed so as not to impact implementation, clear roles defined for the project implement to assure accountability, and project team have understanding of the project mission, goals, and milestones. A thorough understanding of known project risks and assumptions, throughout the executive committee and project team, high quality of data, committed and capable and trained users. When planning project, the issues to consider are incurring costs in implement systems in parallel run, cost of training users to achieve familiarizing new procedures. The training users is an essential part of any system deployment project. The users are people who use system for day to day to achieve business process purpose. Training users must emphasize hands on use for specific business processes (Satzinger, 2012:429)

CRITICAL Success Factor	COMPONENTS	RESEARCHERS
Management structure and strategy	Lack of senior management support	Holland and Light, 1999
	Lack of proper management control structure	Summer, 1999
	Lack of a champion	Summer, 2000
	Ineffective communications	Shanks et all, 2000
	Lack of a change management strategy	Esteves, Casanovas and Paster, 2003
Software system design	Failure to adhere to standarized specifications which the software supports	Holland and Light, 1999
	Failure to effectively integrate "add on" modules	Allen Keru and Havenhand, 2002
	Failure to recognise the importance of applications specific knowledge	Esteves, Casanovas and Paster, 2003
Organizational fit	Failure to re-design business processes	Holland and Light, 1999
	Failure to follow and enterprise-wide design which supports and integration	Shanks et all, 2000
	Lack of data integrations and lack of data standarization	Esteves, Casanovas and Paster, 2003
Skill Mix	Insufficient training and re-skilling	Holland and Light, 1999
	Insufficient internal expertise	Summer, 1999
	Lack of business analysis with business and technology knowledge	Summer, 2000
	Failure to effectively mix internal and external expertise	Shanks et all, 2000
	Lack of ability to recruit and retain qualified ERP systems developers	Esteves, Casanovas and Paster, 2003
User Involvement and training	Insufficient training of end users	Holland and Light, 1999
	Ineffective communications	Shanks et all, 2000
	Lack of full time commitment of customer to project management and project activities	Summer, 1999
	Lack of sensitivity to user resistance	Allen Keru and Havenhand, 2002
	Failure to emphasize reporting	Esteves, Casanovas and Paster, 2003
Technology Planning	Inability to avoid technological bottlenecks	Holland and Light, 1999
	Lack of support client server implementation	Summer, 2000
	Attempting to build bridges to legacy application	Esteves, Casanovas and Paster, 2003
Project Management	Lack of disciplined flexible project management	Holland and Light, 1999
	Failure to recognise the risk of scope expansion (time cost)	Shanks et all, 2000

FIGURE I. Critical Success Factors of ERP systems [12]

C. Dashboard systems

The significance dashboards in trends in information delivery. a dashboard is an application with a collection of metrics, benchmarks, goals, results, and alerts presented in a visually effective manner, whereas a portal is a collection of different applications presented together within a personalized framework (S Malik, 2005:12). Dashboard performance refers to the user experience in terms of the response time required for loading a dashboard. Evaluating performance is somewhat subjective, but it is nevertheless an important criterion. The performance dashboard (S Malik, 2005:150) :
- For monitoring of business processes and using metrics of business performance.
- For analyze of problems by exploring relevant information.
- For manage people and business process to improve decision making and optimize performance of companies.

The dashboard system contains all relevant metrics for the functional areas such as finance statement (profit loss statement), sales forecast, accounts receivable aging, account payable aging.

FIGURE II. SAMPLE DASHBOARD FINANCIAL PERFORMANCE

D. BTripleE Framework

The measuring value of IT, should be based on two attributes as follows (Zee, 2002:36):

- **An overall management framework**, IT applications aim to simplify business processes of enterprises
- **A set of key measures of value,** Managing IT will be constructing a performance of enterprises

Dashboard as tool necessary key performance indicators to measure performance of enterprises (Zee, 2002:60). The dashboard associated with IT performance indicators needs to be built. BTripleE is a framework that offers a dashboard and identify the differences and the stages were independent between the business value of IT, effectiveness of IT, as well as the effectiveness and efficiency of IT Planning. Business value of IT measurement can be done by taking into account costs that are used in IT investments as well as three-dimensional performance are interrelated, as follows:

- **Financial Performance**. Measured using the financial indicators such as profitability, productivity, etc.
- **Business Performance**. Measured by non-financial indicators , such as competitiveness , new product sales , lead time in developing new products , lead time for distribution , and customer satisfaction

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III. RESEARCH METHODOLOGY

This research have approach to collect data, analyze data and information that will be processed in support of this research. This research do things as follows:

1. This research collected from related books, publication, annual reports, and records of organization under study.
2. The collected information by the questionnaire method for assessment a case study: implements of an ERP system at AM Group (manufacture companies)
3. Design prototype, develop interpretation and implementation for dashboard systems.

IV. RESULTS AND DISCUSSION

This research conducted a study on ERP implements in the production module at group of manufacturing companies, which the ERP system developed. The results of data collected by each users. The questionnaire method is considered able to get the results objectively whether the ERP implementation in accordance with the business processes and it is able to provide solutions to performance for the development of a better system.

The category choice answer to the questions contained in the questionnaire:

The category choice answers question No. 1

a. Highly Efficient (> 5 minutes)
b. More Efficient (> 3-5 minutes)
c. Efficient (> 1-3 minutes)
d. Less Efficient (<= 1 minute)
e. Very In-efficient (longer than the old system)

The category choice answers question No. 2

a. Very Good (6 modules)
b. Good Enough (5 modules)
c. Good (4 modules)
d. Less Good (3 modules)
e. No Good (2 modules)

The category choice answers question No. 3

a. Very Easy (<1 week)
b. Quite Easy (> 1-2 weeks)
c. Easy (> 2-3 weeks)
d. Less Easy (> 3-4 weeks)
e. Not Easy (> 4 weeks)

The category choice answers question No. 4

a. Very Rare (<3 times)
b. Rarely (> 3- 6 times)
c. Often (> 6-9 times)
d. Quite often (> 9-12 times)
e. Very often (> 12 times)

The category choice answers question No. 5

a. < 10 days
b. 10-20 days
c. 20-30 days
d. 1-2 months
e. 2 months

The category choice answers question No. 6

a. < 3 times
b. > 3-6 times
c. > 6-9 times
d. > 9-12 times
e. > 12 times

Weight rating is used for selection of each question is:
Value 5 is given to the choice of answers:
a. Highly Efficient (> 5 minutes)
b. Excellent (6 modules)
c. Very easy (<1 week)
d. Very rarely (<3 times)

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e. <10 days
f. < 3 times

The value 4 is given to the choice of answers:
a. Efficient enough (> 3-5 minutes)
b. Good Enough (5 modules)
c. Easy enough (> 1-2 weeks)
d. Rarely (> 3- 6 times)
e. 10-20 days
f. > 3-6 times

The value 3 is given for the choice of answers:
a. Efficient (> 1-3 minutes)
b. Good (4 modules)
c. Easy (> 2-3 weeks)
d. Often (> 6-9 times)
e. 20-30 days
f. > 6-9 times

The value 2 is given to the choice of answers:
a. Less Efficient (<= 1 min)
b. Less Good (3 modules)
c. Less Easy (> 3-4 weeks)
d. Often enough (> 9-12 times)
e. 12 months
f. > 9-12 times

The value 1 is given to the choice of answers:
a. Extremely Inefficient
b. Very Not Good (2 modules)
c. Very Not Easy (> 4 weeks)
d. Very Often (> 12 times)
e. 2 months
f. > 12 times

After weight rating multiplied by the number of users of each choice answers, it will get the total value. Then the total value compared with a range of categories of answers to each question are obtained from a reduction in the total value of the maximum and minimum total value of the total value of the results of the questionnaire. The questionnaire aimed at people administrative of production department, are as follows:

Question No. 1
How long the ERP system can help speed up the completion of work compared to the old system?

TABLE I. QUESTIONNAIRE

Choice answer question	answer	score	total
> 5 minutes	0	5	0
> 3-5 minutes	1	4	4
> 1-3 minutes	15	3	45
<= 1 minute	5	2	10
longer than the old system	0	1	0
Total	21		59

The total value in question 1 is 59, it can be concluded that the ERP system has been implemented efficiently and may speed in completing the work as compared with the old system.

Question No. 2
How many modules of the ERP system are already well integrated?

TABLE II. QUESTIONNAIRE

Choice answer question	answer	score	total
6 module	0	5	0
5 module	0	4	0
4 module	2	3	6
3 module	19	2	38
2 module	0	1	0
Total	21		44

The total value in question 2 is 44, then it can be concluded that the modules of the ERP system in the company are already well integrated

Question No. 3
how many days are required by people administrative of production department understanding and using the ERP system?

TABLE III. QUESTIONNAIRE

Choice answer question	answer	score	total
> 1 week	0	5	0
> 1-2 weeks	1	4	4
> 2-3 weeks	13	3	39
> 3-4 weeks	7	2	14
> 4 weeks	0	1	0
Total	21		57

The total value in question 3 is 57, then the number of days about 2-3 weeks mean ERP system easily understood and used by the user's production department.

Question No. 4
Is the ERP system that is applied to the production department is still frequently encountered errors within the last 1 year?

TABLE IV. QUESTIONNAIRE

Choice answer question	answer	score	total
< 3 times	0	1	0
> 3-6 times	15	2	30
> 6-9 times	6	3	18
> 9-12 times	0	4	0
> 12 times	0	5	0
Total	21		48

The total value to question 4 is 48, it can be concluded that the ERP system is applied in the production department rarely has an error within the last 1 year.

Question No. 5
How long is the number of days of training that has been held for the user (user) for the last 1 year?

TABLE V. QUESTIONNAIRE

Choice answer question	answer	score	total
< 10 days	2	5	10
> 10-20 days	1	4	4
> 20-30 days	16	3	48
> 1-2 month	2	2	4
> 2 month	0	1	0
Total	21		66

The total value in question 5 is 66, which proves that the number of days of training have been conducted for users of the ERP system is more than 20 to 30 days each year.

Question No. 6
how often the user needs help team support in dealing with problems that occur on the system each month?

TABLE VI. QUESTIONNAIRE

Choice answer question	answer	score	total
< 3 times	0	5	0
> 3-6 times	1	4	4
> 6-9 times	5	3	15
> 9-12 times	15	2	30
> 12 times	0	1	0
Total	21		49

The total value in question 6 is 49, it can be concluded that user of department production requires 9-12 times assistance team support to solve problems that occur on the system each month.

The results of the questionnaire can be concluded that the implementation of an ERP system is running well, but needs to develop ERP system in order to produce a better performance. Implementation of an ERP system can prove to increase efficient and productivity.

Finding related to ERP System with *BTripleE Framework*
IT Supply Management

This scorecard can measure how the role of ERP systems can affect the level of effectiveness and efficiency that It can support the needs of executives. The implementation of ERP system is run by a team of IT costs a relatively large for training and procurement software. Taking into account the age of the hardware used in running the ERP system. Noting ideas for the development of ERP systems that support increased productivity.

IT Development Management

This scorecard can manage the development of the ERP system in order to run in accordance with the company's business needs. The findings indicate that a relatively long time to be able to fully implement the ERP system to achieve efficiency levels. Tests performance of the ERP system and required training to key users periodically to ensure proper use of ERP system running well.

The results of the finding related to the ERP system with BTripleX framework on IT Supply Management and IT Development Management can be concluded that the needs to the involvement of people actively with the ERP system is to determine the successful ERP system implementation. The beside that, the needs to develop ERP systems with a dashboard systems. It helps managers make decisions and ultimately improve the synchronization of business strategy and can be optimized to integrate all data and information flow of business processes.

SCOPE		MEASURES	FINDING	SOLUTION
IT Supply Management Scorecard	Be an innovative supplier	% of budget spent on IT research and development.	The costs are allocated in the development of the ERP system is approximately 200-500 million rupiah yearly	The costs are allocated to the development of the ERP system tailored to the needs in supporting increased productivity
		Average ages of hardware and IT applications.	The average age of a workstation (hardware) used ranged from 1-3 years .	The use of workstations (hardware), adjusted to compatible ERP system that is used for the performance of the hardware to support a more efficient way of working
		Mix of new and old technology and extent of their usage.	Level fusion between the old system and the ERP system. It still looks pretty high, reaching 50 % .	The combination of old and new technologies can be minimized periodically to prevent the duplication process, with clearer timeline
	Foster innovative thinking	Number of employee improvement ideas made, approved and implemented per year.	The ideas of users who implemented each year there are about 4-6 ideas	Improvement ideas are innovative and creative in order to improve the performance of the company , can be improved with the active involvement of users and levels of executives in running the ERP system
		% of budget spent on IT training.	Incurred costs for training annually no more than 100 million yearly .	IT training costs to be optimized in people and technology update
		% of revenues from new applications, products, and/or relationships.	Increased productivity from the ERP system and the application of new IT products are intertwined in it , including for non IT Division could reach 50-70 % .	Increased productivity improved ERP system better, so that IT departments can become an agents of change for other departments in implementing ERP systems
IT Development Management Scorecard	Be a quick adopter	Average elapsed time to (fully) implement new development approached/techniques/support tools.	The average time needed to implement methods of implementation of an ERP system is less than 6 months . While the technology or tools supporting the technology is about 6-12 months .	Average time in studying the technology or tools supporting , particularly those associated with the ERP system should be customized as user requirement
		Average elapsed time to fully support new client applications/client technology.	The average time required to fully support the implementation of ERP system to users is not more than 3 months .	Average time to fully support the ERP system can be improved , for efficient use of time and focus on other business units
IT Development Management Scorecard	Foster innovation	Number of experiments with new package/IT solutions per year.	The information of ERP system is not yet optimal to support the executives in decision-making	Create the Dashboard system with enhance ERP system, in order to the executives level can more easily get information of the ERP system , so that it can support in making strategic decisions that improve company performance
				Training the use of Dashboard system for the executive levels provided in the form of tutorials are conducted online , so it can help the executive level in use dashboard system anywhere , anytime as needed

FIGURE III. IT SUPPORT AND DEVELOPMENT MANAGEMENT

FIGURE IV. MENU DASHBOARD SYSTEM

FIGURE V. DASHBOARD SALES PERFORMANCE

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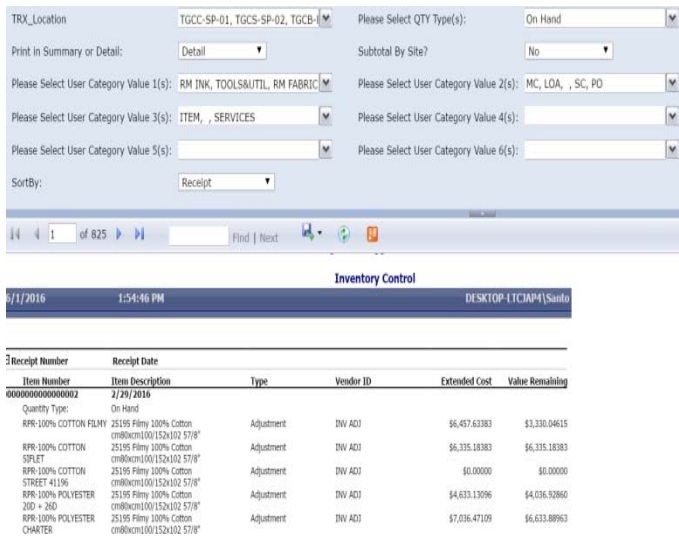**2016 International Conference on Information Management and Technology (ICIMTech)**

FIGURE VI. DASHBOARD PURCHASE PERFORMANCE

V. LIMITATION AND FUTURE RESEARCH

The researcher understand that this research has some limitation in the number of database, the sample size, a single group organization, and far from comprehensive, so the results cannot be directly generalized and applied in other organizations. Moreover, in this research, the analysis of integration challenges to financial function only, so future studies should be expanded to cover other domains as well.

VI. CONCLUSION

The implementation of ERP systems can improve work efficiency and productivity. The key success implementation of ERP systems are an active user's involvement including managerial level. Managerial levels can more easily take strategic decisions through the use of dashboard systems. The challenges of ERP systems are to ensure that the value of the investment can be empowering and useful for managerial interests and parties related to the achievement of good performance. The challenges of ERP implementation can run well, not only depend on the software and the device used, but is determined by key user and managers' ability in response to enhance performance. The links ERP systems using dashboard systems can assist managers of the organizations to generate the best decisions accurately without consider time, place, and where in an effort to increase the flexibility to support management. The dashboard systems can improve performance of organizations with help managers to increase achievement performance. Thus, ERP systems using dashboard systems have become a critical issue for organizations that provide integration support core business processes achieve the work becomes productivity. The dashboard systems can achieve alignment with business strategy, and ultimately the organizations can improve performance and profitability. It required a strong commitment of executives to become as an agent of change to managing the human resources within the organization to support changing business processes.

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