Measuring Readiness of Erp Application Implementation Using The Balanced Scorecard Method

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Abstract

The paper entitled "Measuring Readiness Of Erp Application Implementation Using The Balanced Scorecard Method". The author takes the title as the background of the increasing number of companies that have started implementing the government's proposal, namely Industry 4.0, where each company is required to have an integrated system in making financial reports for internal and external purposes, many companies carry out Governance by re-implementing the system. The preparation process in implementing an integrated system is very important, because the implementation process is quite long and also the cost is not small, therefore we need a method that functions to provide a measurement in the form of a value or score to assist management in making appropriate and appropriate decisions. This preparation process is mature and the implementation process can be successful as expected. The Balanced Scorecard method prioritizes 4 perspectives, namely: financial perspective, customer perspective, internal business process perspective, learning and growth perspective. However, the perspective to be measured is the perspective of internal business processes and the perspective of learning growth. From this research, the results achieved are suggestions in determining planning which will be continued into an ERP application information system project management.

I. INTRODUCTION

With the development of technology in Indonesia, the government always announces or calls on every business stakeholder to always improve financial reporting or reports on internal and external needs with an integrated system, with this information there are still many companies implementing this information system experiencing many obstacles. thus causing the implementation of ERP applications to always have an impact on a big risk and re-implementation activities also occur, management of management organizations that still do not understand about a readiness in implementing an ERP system makes the risk of planning delays or implementation obstruction so that there are still a lot of business companies still implementing ERP systems over and over with different application systems, for that, before proceeding to the ERP application implementation stage proclaimed by the government, management needs understand more broadly about what readiness is required in implementing an integrated system, the stages that will be passed should also be studied at the beginning to reduce the risk of ERP implementation failure, measurement using the balanced scorecard method is a method that will help business management in see the results achieved in internal business organizations about understanding an integrated system so as to provide suggestions for improvements needed to prepare for the implementation of ERP applications in the business unit.

At certain points, the knowledge or information possessed by each staff is indeed different, and also the concept of forced replacement should not be done for staff who are deemed to lack understanding of the integrated system, therefore training and knowledge transfer are very intensively needed to carry out uniform understanding of each staff or user in the business unit so that the measurement of ERP system implementation readiness using a balanced scorecard is more accurate and able to provide suggestions to management in decision making.

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For this reason, this paper is prepared based on the results of a review that is able to update information to be able to provide innovation and future planning actions so that the readiness of ERP application implementation is able to have a good impact and improve business process work efficiently for PT. Argo Pantes, Tbk.

II. RELATED WORKS/LITERATURE REVIEW (OPTIONAL)

In general, data is a critical point in information that will later become decision-making and plays an important role in determining victory in market control and in achieving the company's Vision and Mission [1]. The purpose of a database management system (DBMS) is to bridge the gap between information and data, so that data stored in primary and secondary memory will be converted into information that can be utilized [2]. Information is processed data that has been processed so that it becomes useful information for those who get it [3]. System integration implementation goes far beyond the perception of installing enterprise-wide software. Implementation is just an unconventional process, which needs to be aligned with some structured methodology regarding organizational benefits. Therefore, implementing this system requires a lot of attention from each stakeholder unit [4]. According to [5] ERP application is defined as a system that is implemented in a company / business organization where it works, where in its application it aims to make decisions for the user, in this case the management level. Many ERP implementations still rely on traditional methods that emphasize the implementation method based on phases that need to be tailored to the needs of the company. [6]. The updated ERP has made many improvements including the existence of extended ERP, namely CRM and SCM, where the role of a CRM system provides a centralized service that stores all data on business activities that occur within an organization, such as: customer contacts, prospective customers, suppliers of goods, the press, and transactions. that is done in the system. System implementation [7] are parts or procedures that are carried out in completing a project that has been approved by the parties concerned to achieve certain goals. as for the parts in implementation, which include:

1. initiation process,
2. Planning process,
3. Execution process,
4. Controlling process,
5. Closing process.

Strategic Business

The description of the strategic business for an organization is a level of maturity which when described as a form of integrated and interrelated data, there is information needed by the company to support its business strategy to compete with other organizations. The description of the maturity level consists of six levels (0 to 5) which describe the level of reliability of controlled activities in the IT system classified in the example below by ISACA [8], opinions of many experts and best practices in the field of information technology are generic and have also been used as international standards. The research steps are presented in Figure 1 :
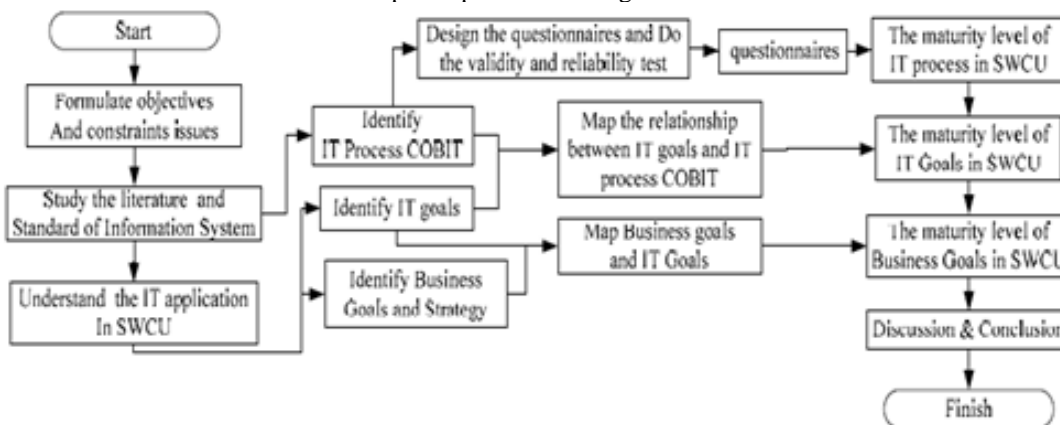

Figure 1. recommendations in determining business strategy

III. METHODS

The business objectives in several places are set by experts using 4 Balanced Scorecard (BSC) perspectives. a financial perspective that is the basis for a good and transparent management that is influenced by increasing profits,

while the objectives related to improving service, also quality are to ensure that the services provided are always timely and reliable, and make consumers / customers satisfied are The main objectives are set from the perspective of customers who have an internal commitment to correcting and maintaining business process functions and ensuring that the services provided will follow external laws and internal policies so that service quality is well maintained. Whereas the purpose of learning and a growth perspective is always to get new / creative things by developing human resources to become leaders in the organization to maintain business continuity in the company. Therefore a proper business strategy is required to achieve the stated business goals. Business strategy is defined using 4 IT - BSC).

Table 1. Perspective IT - Balanced Scorecard

BSC Perspective		SWCU Business Goals	IT-BSC Perspective	SWCU Business Strategy
Financial	1	Provide a good return on investment of IT-enabled business investments	Business Contribution	Control costs, increase revenue and improve service coverage.
	2	Manage IT-related business risk		
	3	Improve corporate governance and transparency.		
Customer	1	Improve customer orientation and service	User Orientation	Customer value proposition that includes the rates, quality, service provided, service and partnerships.
	2	Offer competitive products and services		
	3	Establish service continuity and availability		
	4	Create agility in responding to changing business requirements		
	5	Achieve cost optimisation of service delivery		
Internal	1	Improve and maintain business process functionality	Operational Excellence	improvement of internal processes by implementing the operations management, customer management and innovation.
	2	Lower process costs		
	3	Provide compliance with external laws, regulations and contracts		
	4	Provide compliance with internal policies		
	5	Improve corporate governance and transparency		
	6	Manage business change		
	7	Improve and maintain operational and staff productivity		
Learning and Growth	1	Manage product and business innovation	Future Orientation	Enhanced capabilities and skills through the strengthening of human capital, strengthening of information capital, and strengthening of organization capital
	2	Acquire and maintain skilled and motivated people		
	3	Obtain reliable and useful information for strategic decision making		

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Balanced Scorecard Approach.

The framework used in this study involves critical measurement criteria for ERP implementation preparation and also has an important point in the role of implementation preparation. [He W & Da Xu L (2014): 9]. The four dimensions of ERP performance based on balanced scorecard, the measurement system are as follows:
1. Financial perspective
2. The customer perspective
3. Internal business processes
4. Innovation and learning perspective

The methods sections often come disguised with other article-specific section titles, but serve a unified purpose: to detail the methods used in an objective manner without introduction of interpretation or opinion. The methods sections should tell the reader clearly how the results were obtained. They should be specific. They should also make adequate reference to accepted methods and identify differences.

Preparation for ERP System Implementation
1. Temporary Design Timeline Implementation
    In preparation for the implementation of ERP applications carried out by PT. Argo Pantes, Tbk is to carry out several scenarios created by the MIS (Management Information System) team, one of which is in making temporary plans in the form of an implementation timeline table, in that planning, of course, involves IT team members in it to provide views of each form of activity which will happen later and even look for some important points / key success factors that will later play an important role in determining the smoothness during the

implementation phase, then the perception between the user and the IT team is very important in the future when the implementation phase takes place.

The following is a picture of the temporary design that has been carried out by the IT project team as follows:
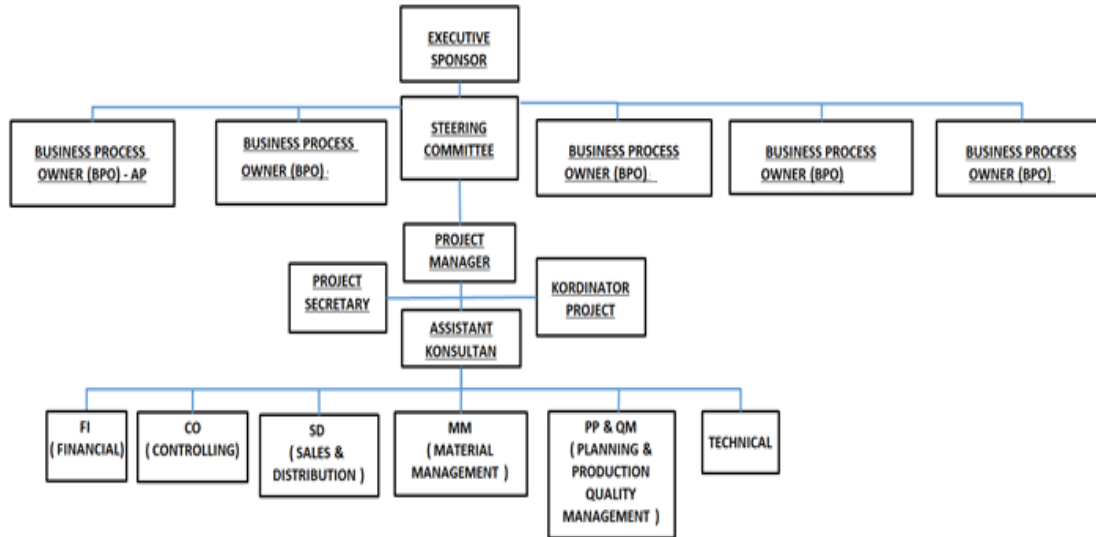

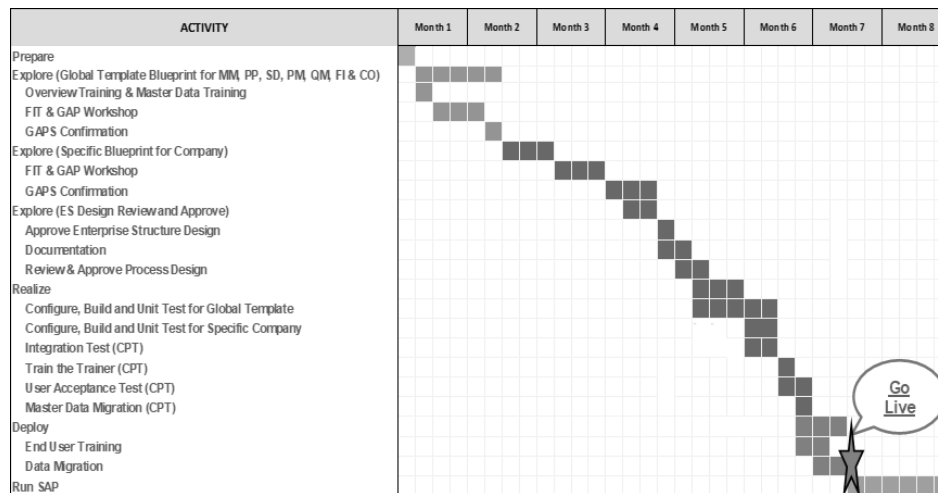Figure 2 Temporary planning of ERP Project team structure

Figure 3 Planning the temporary ERP project timeline

Preparation Project Structure Responsibilities

In preparation for implementing ERP applications related to other factors it also needs to be reviewed, one of which is the project structure responsibilities in the project team which will be standardized, by carrying out several scenarios created by the MIS (Management Information System) team in conducting discussion forums related to the results of the planning. project team that already exists, then the explanation of responsibility is very necessary in avoiding wrong communication between one another.

ERP application implementation planning
ERP standard module implementation:
   1. FI - Financial Accounting
   2. CO - Controlling
   3. SD - Sales and Distribution
   4. MM - Material Management

5. PP & QM - Production Planing & Quality Management
6. PS - Project System

Designing a Business Process Activity Diagram

In every organization that implements the system, it never stops reviewing business processes, because in implementing the system that has been done it always brings changes to every activity / activity that in daily routines is still not according to best practice.
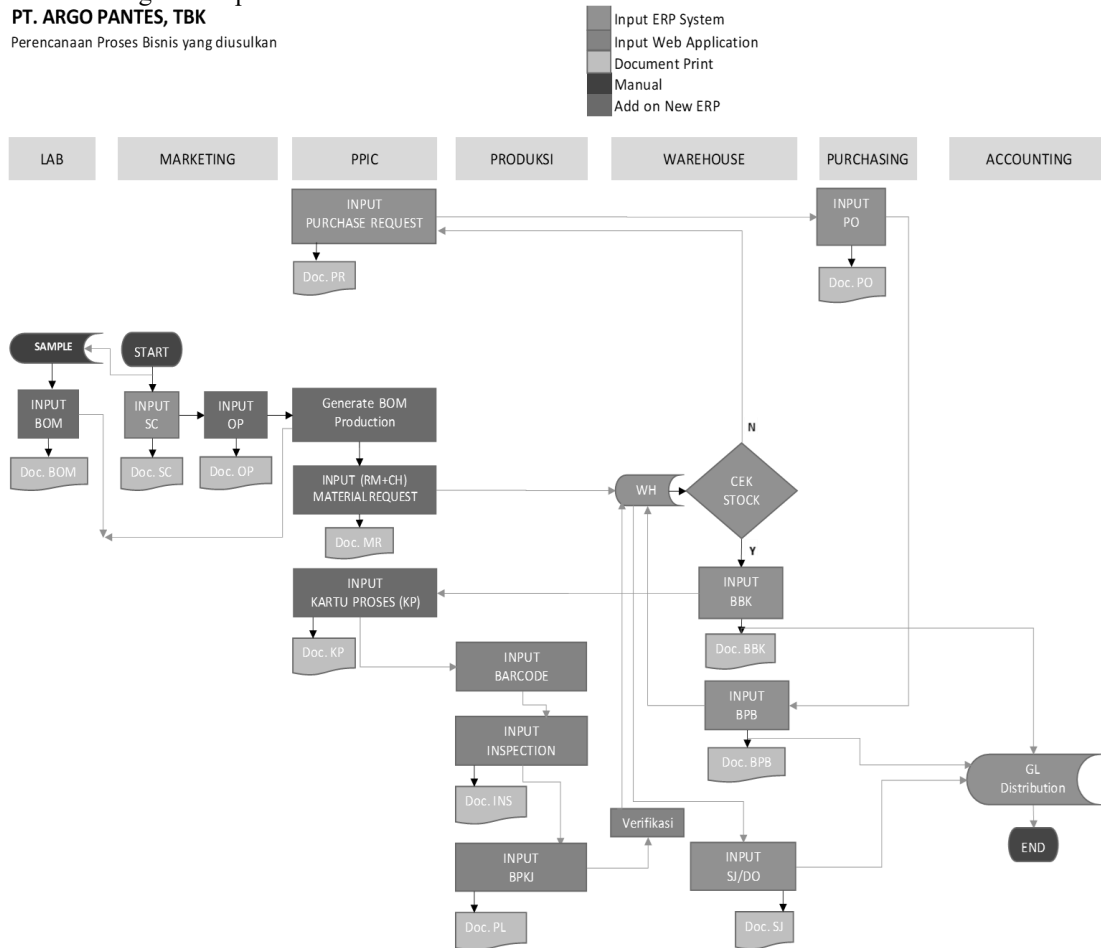

Figure 4 Activity diagrams of Business Process Design

Making a prototype of the proposed system
1. The preparation process for business process mapping needs is still in the general stage and does not involve user operations in it, business process mapping is still with the leaders in each related department.
2. The selection process with vendors that requires a longer tentative time from starting to bid with vendors until the vendor confirms a factory visit as a form of measuring the scope taken by the vendor before determining the final proposal.
3. There are several management who have an interest in preparing for the implementation of this system, so it takes more time to conduct discussions together to get the same agreement in support of business strategy through the implementation of this EPR system.

Analysis of the preparation requirements for implementing ERP applications.

Based on the results of interviews, observations and work practices, the information on the preparation for implementing the ERP application needed by PT. Argo Pantes, Tbk are as follows:

1. Reviewing the balanced scorecard approach from the preparations that have been carried out by PT. Argo Pantes, Tbk
2. Make suggestions based on the recommendations provided by the balanced scorecard matrix
3. Analyze management needs in preparation for implementation with the TOWS matrix.

Research Framework

Some of the factors that become the point of view in this readiness assessment are the main points in this study, where the points of view or factors that exist on this balanced scorecard are the Financial Perspective, Customer Perspective, Internal Process Perspective. Internal Business Process), Learning and Growth Perspective (Learning and Growth Perspective). The focus point of this readiness assessment is on an internal process perspective and also on a financial perspective. Researchers will conduct a survey at the perspective closest to the readiness to implement integrated applications in industrial companies.
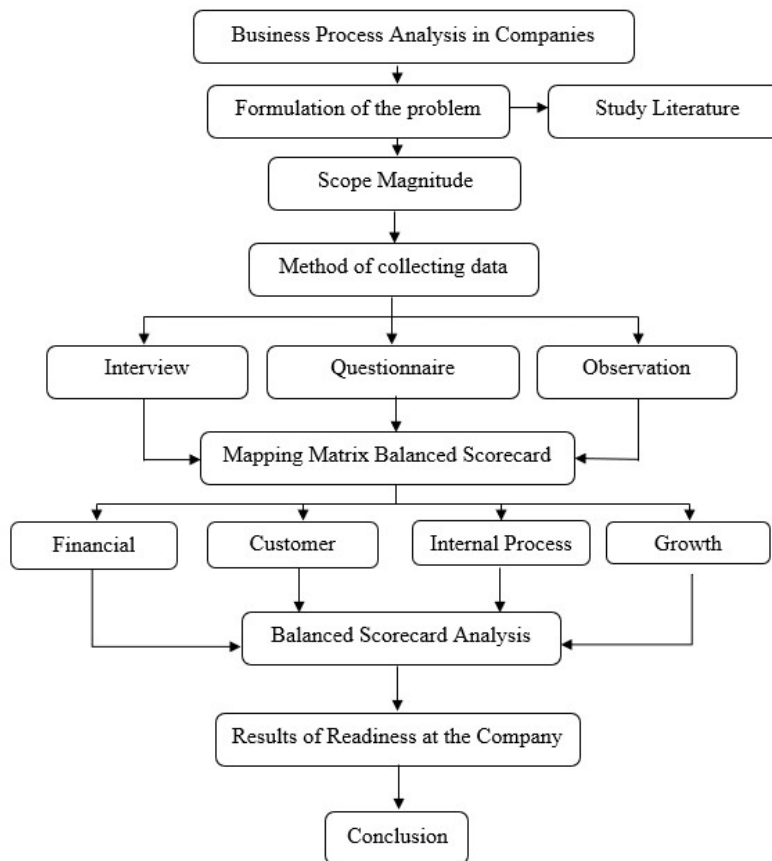

Figure 5 Framework for the preparation of ERP application implementation

Approach to measuring the preparation of ERP application implementation

In measuring the preparation of implementing ERP applications in manufacturing companies with the Balanced Scorecard method approach. The Balanced Scorecard which has 4 perspective angles makes the measurement more objective and closer to the actual, although the Balanced Scorecard method is often used by companies to evaluate the performance of existing business processes or departments so that the Balanced Scorecard method is very supportive in the ERP implementation preparation approach to measuring the performance of a software. (ERP application).
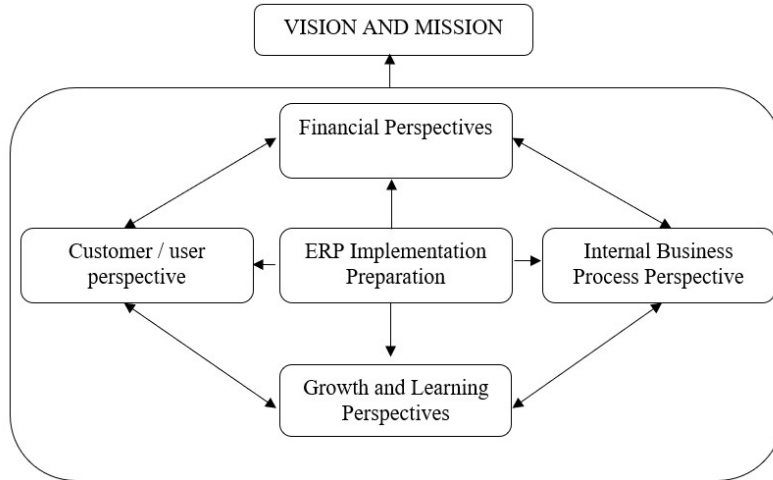
Figure 6 Balanced Scorecard Perspective Approach

Planning phase and forming the project team

On a large organizational scale, letter of assignment This can be made in the form of a Board of Directors Decree or a letter directly from the owner of the company. The form of this assignment letter of course varies, depending on the organization concerned and depending on the method in each company concerned. Attached is an example of a submission request form which will be approved by the company leadership.

Figure 7 Form for submitting an ERP system project approval

The discussion model applied using the discussion of the critical success points of this project, the discussion models carried out with the relevant departments are:

1. Drawing the work process during the discussion is carried out with a Class Diagram to describe the relationship between the key user (entity) and the user as well as the required department which is depicted in the Use Case Diagram and its function specifications
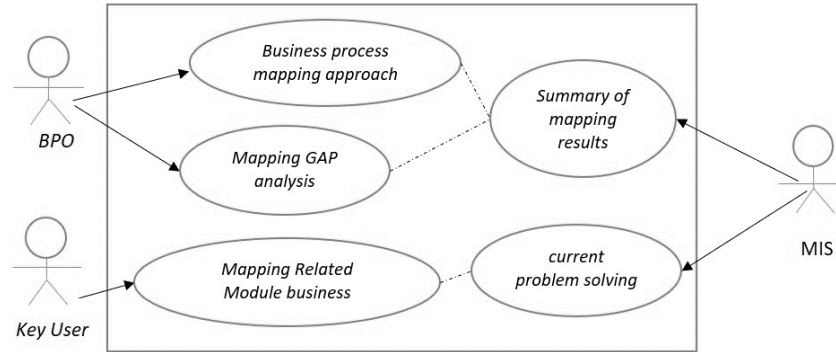

Figure 8 the form of mapping activities for each department

2. Depiction of the technology readiness process that is running to analyze the problems that occur and also the technology requirements proposed to meet the standardization of the use of ERP applications to be implemented, technology discussions with the infrastructure team and also the technical support team is described in the use case diagram below:

Figure 9 form of technology requirements discussion activities
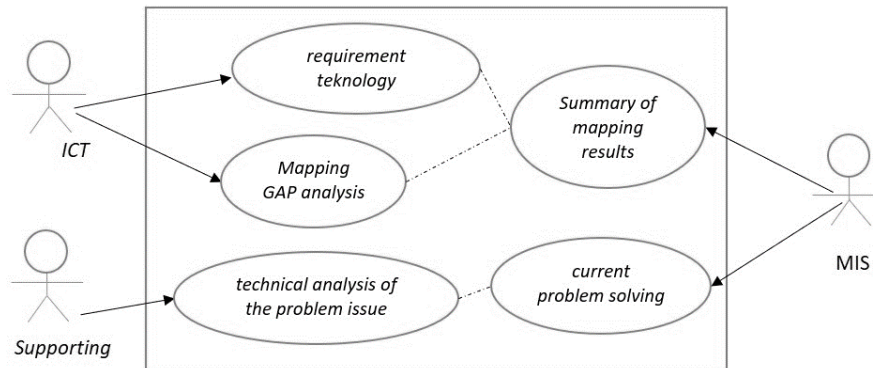
3. Field observations with the aim of taking an approach that occurs in the field related to project bids that will be made by an external consultant for further processing, with the need to be informed by the project team leader in conducting a needs analysis discussion is described in the use case diagram below:
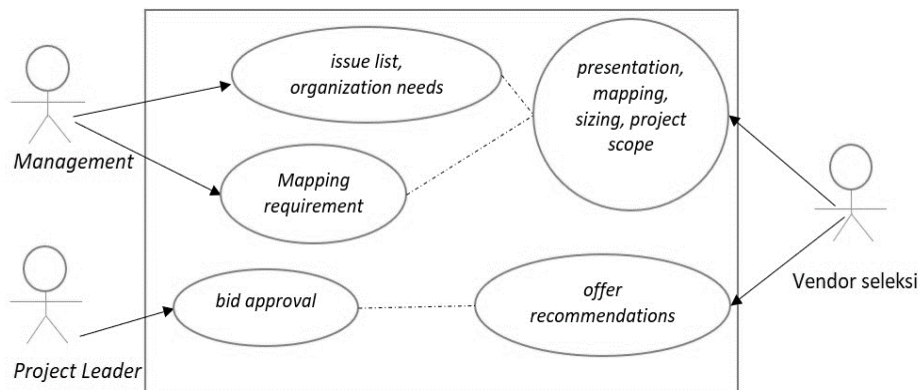

Figure 10 forms of selection tender activities

Balanced scorecard approach

After carrying out the preparatory activities that have been carried out, the existing forms of information will be managed with a balanced scorecard approach using 4 perspectives which are expected to be able to approach satisfactory results in assessing the results of readiness carried out by the ERP application project team at PT. Argo Pantes, tbk. This readiness analysis for implementation will be carried out with a TOWS matrix that facilitates delivery to related parties so that management is able to monitor future implementation activities in a more systematic and structured manner. The form of management carried out by the balanced scorecard is the following approach:

1. Making variables in the form of discussion points
2. Inviting the project team and related PIC
3. Confirm or approval from the leadership
4. Perform data processing results of the discussion
5. Conducting the steering committee with the leadership

IV. RESULTS

After analyzing the preparations for implementing an ERP system at PT. Argo Pantes, Tbk., Then the next process is to measure the preparations made by PT. Argo Pantes, Tbk., In the 4 perspectives contained in the balanced scorecard, the data collection methods used to make these measurements include interviews and discussion results between the project team and each related department and the related modules. interviews are addressed to each business process owner (BPO) and key user users from representatives of each division who will be involved in the ERP implementation project. This data is adjusted to the predetermined measurement criteria, namely: financial perspective, user perspective, internal business process perspective, learning perspective. Selection of the discussion forum method for preparation in ERP implementation from the point of view of the selected key user to explain the business activities that are running by looking at the required criteria to be implemented in the ERP system in the future, this method is considered capable of obtaining results whether the level of preparation in the key user / department is considered sufficient in accordance with existing business processes and able to provide solutions to problems that arise or which will be prepared in the ERP system project later so that the development of this ERP system becomes more effective and more advanced.

In the discussion forum used, there are 4 categories of points which both contain questions related to the current journey of the ERP system as well as the existing travel business processes, as well as knowing the current problems / solutions. The discus forum consists of several questions addressed to the business process owner and key users from each division involved in the project team. Meanwhile, the method used to calculate the results of the discussion forums is the Likert scale. Calculations using the Likert Scale can indicate whether a readiness is in preparation for implementing an IT project that will be carried out, which can be used as a measure to provide conclusions on the results of the discussion.

In the Likert scale, we divide it into five categories for which the range is adjusted to the number of BPO and key users and the choice of answers to each question. This measure will be obtained based on the total value from the calculation results of the discussion answered by the BPO and key users.

Category of answer choices for each discussion point in the discussion:

a) Very Effective (> 80 Points)
b) Fairly Effective (> 70 - 80 Points)
c) Effective (> 60 - 70 Points)
d) Less Effective (> 50 - 60 Points)
e) Very Inefficient (<= 50 Points)

The following is the calculation of the range for the answer category for each question:

Minimum grade weight: 700
Number of BPO and key user: 2
Number of related Departments: 7
Maximum total score: 700/2/7 = 50 points
Maximum value weight: 1134
Number of BPO and key user: 2
Number of related Departments: 7
Maximum total score: 1134/2/7 = 81

Difference in total maximum and minimum score: 31
Choice of answers for each discussion point: 5

range of answer categories for each question: 1

A. Mapping variable point diskusi dengan balanced scorecard

The following is the calculation of the answers to the related department discussion forums on 4 balanced scorecard perspectives:

Table 2. Mapping Points discussion of ERP application implementation preparation

Mapping Point diskusi persiapan dalam implementasi aplikasi ERP

No	Perspektif	Variable	Readiness for ERP System Implementation	5	4	3	2	1
1	Financial	**Accounting Closing Date**	prepared on the 5th to the 6th of the following month	5				
2	Financial	**Financial Reporting Date (Balance Sheet, P&L), Cashflow (forecast vs actual)**	prepared on the 7th to the 8th of the following month		4			
3	Financial	**Report Management (consolidated report)**	still manual and required in ERP implementation readiness	5				
4	Financial	**Cashflow management and reporting**	6 sd. 10 (waiting for closing)	5				
5	Financial	**the process of tracking document audit via the system**	expected to be adequate (internal / external audit has not been carried out)	5				
6	Financial	**document repair process (correction / revision)**	It is hoped that revisions will take place following the ERP best practice SOP	5				
7	Financial	**Payment Integration with Third Party**	it is hoped that there will be interbank facilities			3		
8	Financial	**Asset Monitoring**	expected to be able to monitor assets			3		
9	Customer	**purchase approval via the system**	is expected to be done without the need for a wet signature		4			
10	Customer	**real time stock data monitoring**	It is expected that stock data can be monitored in real time	5				
11	Customer	**Standardization of Naming Master Data**	It is expected that the naming of the master data item can be standard and not double	5				
12	Customer	**Human Error error rate**	it is hoped that people's mistakes can be reduced	5				
13	Customer	**Realtime data monitoring / reports via ERP without Print (paperless)**	expected to be able to monitor real time report data without printing		4			
14	Internal Business Process	**Organizational Job Functions**	it is hoped that the allocation of resources by work can be effective	5				
15	Internal Business Process	**Business Process Integration (According to ERP Best Practice SOP)**	it is expected that integration has been 1 cycle	5				
16	Internal Business Process	**System data transparency**	It is hoped that all data will be transparent and integrated from 1 source		4			
17	Internal Business Process	**coordination between departments**	It is hoped that communication between departments will be better maintained		4			
18	Internal Business Process	**GAP problem solving reviews**	It is hoped that any problems that arise can be resolved quickly	5				
19	Learning Growth	**Training in the project team**	It is hoped that there will be trainers in the project team	5				
20	Learning Growth	**SOP job description project team**	It is expected that the SOP will run according to the job description	5				
21	Learning Growth	**external training**	It is expected that there will be external training for updating knowledge		4			
22	Learning Growth	**increase in internal human resources**	it is expected that user capabilities will increase	5				

Scoring information:

1. Very Dissatisfied	not needed and there is no activity
2. Not Satisfied	not needed, there is activity
3. Quite satisfied	needed but there is no activity
4. Satisfied	needed and there is already activity
5. Very Satisfied	needed, there are activities and evaluated

B. Results of discussion discussions achieved

The total value for the discussion of the results of the ongoing discussion was carried out with excel calculations by following the formulation previously described, so it can be concluded that the readiness for implementation that will be carried out by PT. Argo Pantes, Tbk, through the project team that has been formed, gets a very positive value with the results shown in the table below:

Table 3. Results Points for discussion of financial perspectives

Financial Perspective	Results	Weighted	Total value
Accounting Closing Date	5	1	100
Financial Reporting Date (Balance Sheet, P&L), Cashflow (forecast vs actual)	4	1	80
Report Management (consolidated report)	5	1	100
Cashflow management dan reporting	5	1	100
the process of tracking document audit via	5	1	100
document repair process	5	1	100
Payment Integration with Third Party	3	1	60
Asset Monitoring	3	1	60
Number of Points	35	Total	700
	%		87,50%

Table 4. Results Points for discussion of user / customer perspectives

User / Customer Perspective	result	Weight	Total Value
purchase approval via the system	4	1	80
real time stock data monitoring	5	1	100
Standardization of Naming Master Data	5	1	100
Human Error error rate	5	1	100
Realtime data monitoring / reports via ERP	4	1	80
Number of Points	23	Total	460
	%		92%

Table 5. Results Points for discussion of internal business process perspectives

Internal Business Process Perspective	Result	Weight	Total Value
Organizational Job Functions	5	1	100
Business Process Integration (According to ERP Best Practice SOP)	5	1	100
System data transparency	4	1	80
coordination between departments	4	1	80
GAP problem solving reviews	5	1	100
Number of Points	23	Total	460
	%		92%

Table 6. Results Points for discussion of learning perspectives

Learning Perspective	Result	Weight	Total Value
Training in the project team	5	1	100
SOP job description project team	5	1	100
external training	4	1	80
increase in internal human resources	5	1	100
Number of Points	19	Total	380
	%		95%

C. Analysis of results 4 balanced scorecard approach perspective

From the combination of data obtained from discussion forums and interviews, it can be concluded that in 4 balanced scorecard perspectives it is necessary to implement ERP applications and with the results below, the readiness of PT. Argo Pantes, Tbk in preparing ERP application implementation can be said to be very effective because the point value that has been determined to be discussed is very relevant to the readiness that has been prepared by the relevant department which will later be involved in the ERP project, therefore a very effective readiness can see the results. incorporation below :

Table 7. summary point 4 of the balanced scorecard perspective.

The balanced scorecard perspective	Result	Weight	Total Value
Financial Perspective	87,5	1	87,5
User / Customer Perspective	92	1	92
Internal Business Process Perspective	92	1	92
Learning perspective	95	1	95
Number of Points	366,5	Total	366,5
	%		91,63%

V. DISCUSSION

Table 8. TOWS analysis matrix

	Internal Strentgh :	Internal Weakness :
External Opportunities :	SO 1. Able to increase project success. 2. Able to improve project efficiency 3. Able to achieve the project's vision and mission	WO 1. Prepared to improve the job description allocation 2. Prepared to monitor best practice SOP
External Threats :	ST 1. Authorize user access restrictions 2. Update the user's knowledge key which is the main role during the project 3. Update hardware in the need of an ERP project	WT 1. Dynamic HR in and out 2. The resistance of old people is very high 3. Changing the mindset of users and management

VI. Conclusions

Based on the results of observations and discussion forums in the readiness of PT. Argo Pantes, Tbk in planning to implement ERP applications. So several things can be concluded:

1. In increasing business competition in this industrial era with the application of industry 4.0, organizations are competing in implementing ERP applications, but before carrying out the ERP application implementation project, there are stages of readiness needed in the organization, in this case the readiness of an organization to prepare team and related departments to be able to run in harmony in order to achieve the objectives of ERP application implementation, by conducting discussion forums and interviews then with category 4 perspectives on the balanced scorecard assisting in analyzing readiness at PT. Argo Pantes, Tbk.

2. With the measurement produced by the balanced scorecard in the form of 4 perspectives, namely financial perspective, user perspective, internal business process perspective, learning perspective, the mapping of readiness carried out by PT. Argo Pantes, Tbk is more patterned so that management can see the GAP analysis that occurs before the implementation of the ERP application begins, the results of the TOWS matrix which adds analysis by mapping points of excellence, weakness, opportunities, and threats that can be mitigated before the ERP application project starts.

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