

It balanced scorecard method for performance measurement of information system technology unit in regional water company of Surabaya City

*** Faisal Muttaqin, Firza Prima Aditiawan, Fetty Tri Anggraeny and Try Khurniawati**

Faculty of Computer Science, Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia

ABSTRACT: The Process of measuring the performance of IT division unit in the company is a very important thing for the progress of the company. This research discusses about IT balanced scorecard method for performance measurement of information system technology unit in Regional Water Company (PDAM) Surabaya city. The purpose of this study is to performance measurement of information system technology unit to assess the extent to which the information system technology unit in contributing to PDAM Surabaya city. IT balance scorecard is a method for measuring performance of IT owned by a company, which will be measured with four perspectives. The first is the company contribution perspective, the second is the user orientation perspective, the third is the operational excellence perspective and the fourth is the future orientation perspective. After doing research on information system technology unit in PDAM Surabaya city using IT balanced scorecard get value that is for company contribution perspective is 78.80%, user orientation perspective get value 79.20%, operational excellence perspective get value 75.80% and future orientation perspective get value 75.80%. From these results, the value obtained by the information system technology unit in PDAM Surabaya city is categorized well.

Keywords: IT Performance Measurement, IT Balanced Scorecard, Information Systems Technology

1. INTRODUCTION

Balance Scorecard method was introduced by Kaplan and Norton [1], [2], has been successfully implemented into various areas such as manufacturing companies, government units, nonprofit companies, service organizations and other industries around the world [3], [4], [5], [6]. According to [7], Balance Scorecard (BSC) can help organizations achieve better results when compared to traditional performance measurement systems. Balance scorecards are adopted by companies around the world to implement corporate strategy, so it can be considered as a bridge to implement sustainability strategies and link the company's sustainability goals with actions and performance results [8].

The Balanced Scorecard (BSC) is one of the most important and widely applied methods of performance measurement, and especially the use of recently developed IT governance makes it an attractive tool for measuring and evaluating IT contribution to corporate performance [9]. Balance scorecard (BSC), originally developed by Kaplan and Norton, is a performance management system that enables companies to drive strategies based on measurement and follow-through. IT BSC is becoming a popular tool with widely supported concepts and spread by international consulting groups such as Gartner Group, Renaissance Systems, Nolan Norton Institute, and others [10].

According to Wati and Co [11] introduce the Green IT Balanced Scorecard by incorporating an

environmental aspect of technology into the scorecard measurement method. We conceptualized the Green IT balanced scorecard as “a nomological management tool to systematically align IT strategy with business strategy from an environmental sustainability perspective in order to achieve competitive advantage”. The objectives of the Green IT balanced scorecard include the measurement of technology performance via the effective integration of environmental aspects, the investigation of both tangible and intangible assets of Green IT investment, the alignment of IT performance and business performance, and the transformation of the results into competitive advantage. This concept offers a new possibility for both practitioners and researchers to translate their sustainable business strategies into Green IT actions.

Van Der Zee and De Jong [12], for instance, explored the ways of integrating business and IT management by examining two cases of building a corporate Balanced Scorecard. They argued that the Balanced Scorecard offers two unique benefits to the alignment process in contrast to traditional methods. First, business and IT management can use the same “performance measurement” language, enabling discussions on what IT can do to support business performance. Second, IT can be managed using an integrated planning and evaluation cycle as other business processes.

Balanced Scorecard (BSC) is a discipline that has considerably evolved in recent years and is the most widely accepted discipline in organizations when deploying a balanced strategy and, subsequently, monitoring the evolution of change and its deviations. Moreover, in recent years interesting methodologies, techniques and models which have brought IT to business, as is the case of version 3 of ITIL and its philosophy based on the life cycle of IT services, have appeared. All these ideas have affected IT governance and, consequently, IT Strategic Planning process, one of its most important processes, and its deployment through Balanced Scorecard oriented to IT (IT BSC) [13].

High levels of investment in IT and related products and services over the last two decades have produced only mixed results. Research has shown that one of the most significant determinants of successful IT investment is the alignment between IT and the competitive strategies of a firm. Yet, it is largely unclear to both researchers and practitioners how to achieve such alignment in a complex business environment. In this paper, using the IT alignment model of Reich and Benbasat [14] as the underlying theory, we present the preliminary findings of a case study on how one company used a well established strategic management tool, the Balanced Scorecard, as the framework for aligning its IT initiatives with business strategies, that resulted in financial success for the company [15].

According to [16] many companies use Balanced Scorecard but for it to be really successful from an IT perspective, there must be alignment with IT. The Enterprise IT Balanced Scorecard version must be created and both of these should be broken down into business unit level or some other appropriate low level. Action should be defined at every level. In this way, the whole enterprise can pull together in the same direction to achieve its business purpose. We focus on how AstraZeneca has implemented its business and IT strategy and the scorecards they have defined to follow and measure progress.

Performance measurement is an important factor for the current and future organizational environment and current performance appraisal methods that are only seen from financial performance still have weaknesses, then effective performance measurement should be able to translate the mission, vision and organizational strategy into the measurement of financial performance as well as non-financial [17].

The IT Balanced Scorecard will measure IT performance from four perspectives. The first perspective is a corporate contribution that shows how the management (leadership) assesses or sees the IT organization. The second perspective is customer orientation, to know the results of IT performance based on the way users view or see the results of IT organizations. The third perspective is operational excellence which contains measures of effectiveness and efficiency of IT processes. While the fourth perspective is the future orientation that contains the measures that describe how IT positions in the future challenges. Thus IT Balanced Scorecard is very well used to formulate strategic targets IT support the strategic objectives of the company and measure the performance of IT comprehensively [18].

Regional Water Company (PDAM) Surya Sembada Surabaya is one of Surabaya City

Government-owned companies, located on Jalan Mayjen Prof. Dr. Moestopo 2 Surabaya. PDAM Surabaya City has a main business in the provision of drinking water for the people of Surabaya. PDAM Surabaya City has been serious to implement Information technology in the environment in order to position itself as a world-class company in providing service to customers. Support from all levels of PDAM to collaborate and participate in realizing the sustainability and success demanded in PDAM vision and mission is a requirement to meet the goals and objectives to be achieved PDAM Surabaya City.

Based on the results of interviews with [19] found the problem that is in the management of human resources existing in the TSI Unit (Information Systems Technology) has not been managed properly because of the qualifications or skills of IT from Human Resources TSI Unit available is not enough to support business processes in the TSI Unit. So far, PDAM Surabaya City has not yet measured the performance of TSI Unit to assess how the contribution made by TSI Unit to the company. With the existence of these problems it is necessary that the measurement of IT performance on the TSI Unit using IT Balanced Scorecard so that later can know the extent to which the contribution of TSI performance to PDAM Surabaya City.

2. METHODS

The following is the research flow used to measure the performance of IT in PDAM Surabaya city, can be seen in figure 1.

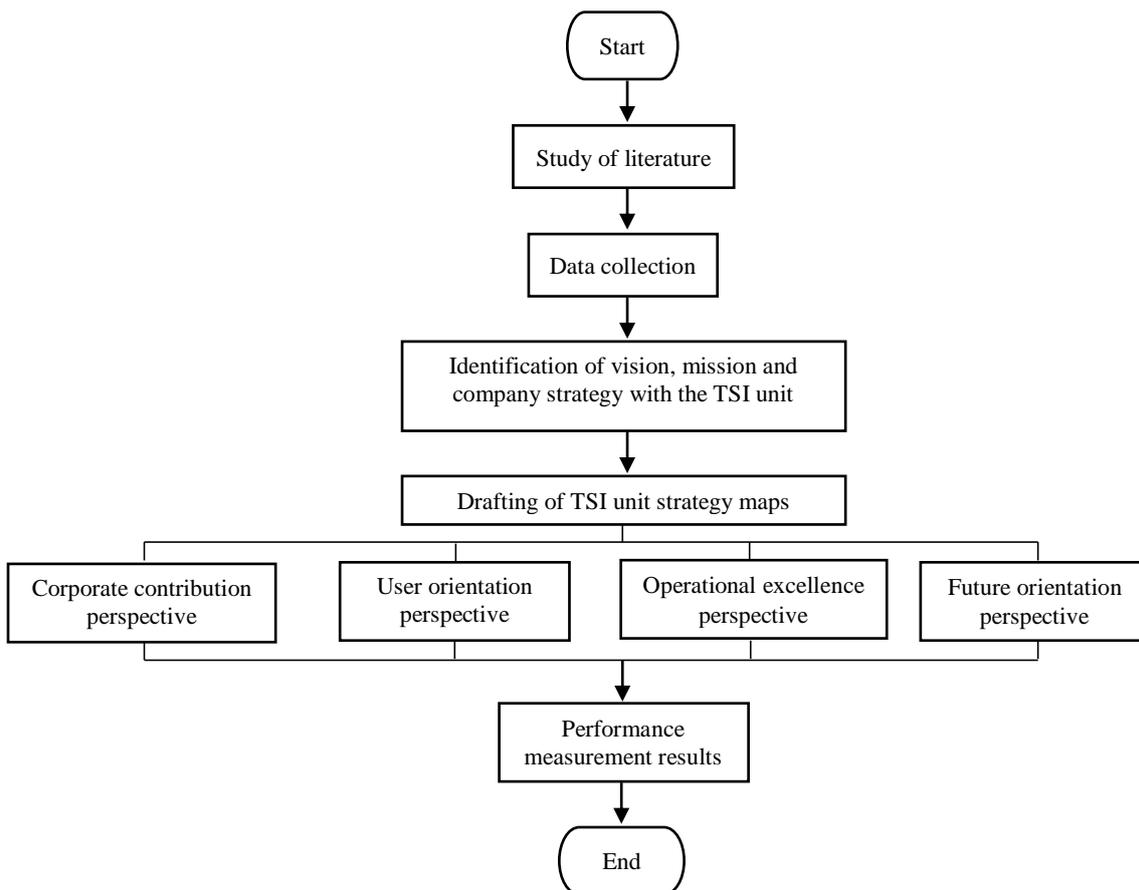


Fig. 1 Research Stages

2.1. Study of Literature

At this stage of the literature study is looking for information and references in the form of text

books, literature, articles, journals and information from the internet and other sources related to this research.

2.2. Data Collection

At this stage the data obtained comes from the primary data and secondary data. For primary data, data collection techniques were conducted with interviews and field observations and questionnaires. While for secondary data obtained from various reports and publications relevant to the research.

2.3. Identification of Vision, Mission and Company Strategy with the Tsi Unit.

At this stage the process identification of the company's vision, mission, and strategy with the unit of information systems technology that aims to see how the relevance of the division with the company.

2.4. Preparation of TSI Unit Strategy Map

At this stage will be the compilation of strategic information technology unit map based on the strategy that has been done by information technology unit.

2.5. Identification of KPI (Key Performance Indicator)

At this stage will determine the strategic objectives based on interviews with TSI Unit manager and determine the targets to be achieved on each KPI based on interviews with Information Systems Technology manager and determine the number of performance or realization conducted by the organization based on the results of the questionnaire.

2.6. Corporate Contribution Perspective

At this stage the authors define strategic targets for the perspective of the company's contribution IT cost control and measuring the business value of information technology system investment in the organization.

2.7. User Orientation Perspective

At this stage an evaluation is performed on information technology users. The focus of this perspective is how the end user's view of the IT division is corporate customers and internal users (company employees) aimed at ensuring user satisfaction.

2.8. Operational Excellence Perspective

At this stage will be the process of measuring information technology that produces and develops applications and focuses on the measurement and progress of the two main processes of information systems technology units, namely the development of information systems and computer operations.

2.9. Future Orientation Perspective

At this stage, will be measured against information technology system personnel and information technology personnel expertise and perform an evaluation process that focuses on the mastery of information technology systems both in terms of technology and individuals who use it.

2.10. Performance Measurement Results

This stage will get performance measurement results by assessing the target weight, current

conditions and achievement of the four perspectives that exist in IT Balanced Scorecard. With the result of measurement performance of unit of information system technology hence will know each percentage of four perspectives that exist in IT Balanced Scorecard.

3. RESULT AND DISCUSSION

There are several steps in completing this research include:

3.1. Identify the Company's Vision, Mission and Strategy with the TSI Unit

3.1.1. Vision of Surabaya City Drinking Water Company:

The availability of sufficient drinking water for customers through an independent, global, and best water supply company in Indonesia.

3.1.2. Mission of Drinking Water Company of Surabaya City:

- Producing and distributing drinking water for customers.
- Providing excellent customer service and sustainable for the stakeholders.
- Do other business for the company's progress and actively participate in social activities.

3.1.3. Strategy of Regional Water Company of Surabaya City:

- Improve customer service that includes quality, quantity, and continuity.
- Looking for better sources of raw water in terms of quality and quantity.
- Maintain, build on the existing drinking water supply system infrastructure, suitable for customers and technological developments.
- Build Soft Skill capabilities in the construction of water supply system which includes installation, transmission, distribution, quality laboratory, customer service.
- Making a professional and independent company in professional management.

3.1.4. Vision Unit Information Technology System:

Making Information Technology as the company's advantage in customer service. In an effort to support the vision of Regional Water Company of Surabaya City.

3.1.5. Mission Unit of Information System Technology:

- Use the right and current IT to improve customer service.
- Utilizing IT as an added value for the company.
- Perform maintenance and development of IT tools to support management policies.
- Utilizing the competitive advantage of IT to make PDAM Surabaya become the best PDAM in its class.
- Creating a conducive and dynamic working environment for all personnel of information systems technology unit.

3.1.6. Information Systems Technology Unit Strategy:

- Improved data quality and data integration that is complete, accurate, timely and valid.
- Improved quality of IT infrastructure and reliable communications.
- Improved accessibility of data and information to users.
- Increased competence of human resources for IT knowledge.

Based on the strategies owned by the information technology unit that supports the company's

strategy in achieving the company's vision, the strategy within the information technology unit can then be mapped into the perspective of the IT Balanced Scorecard that is the company's contribution perspective, operational excellence, user orientation and future orientation. For the results of the mapping can be seen in table 1.

Table 1. Mapping the TSI Unit Strategy to the BSC IT perspective

IT Balance Scorecard perspective	Strategy
Corporate Contributions	Improved data quality and data integration that is complete, accurate, timely and valid.
Operational Excellence	Improved quality of IT infrastructure and reliable communications.
User Orientation	Increased accessibility of data and information to users.
Future Orientation	Increased competence of human resources will IT knowledge.

3.2. Preparation of TSI Unit Strategy Map

In the information technology unit strategy map, every element of each perspective perceives relationships that are related to each other. Each cause and effect relationship between the elements in each perspective are positively correlated to the achievement of information technology unit contribution to PDAM Surabaya City. For the result of strategic map of TSI unit can be seen in figure 2.

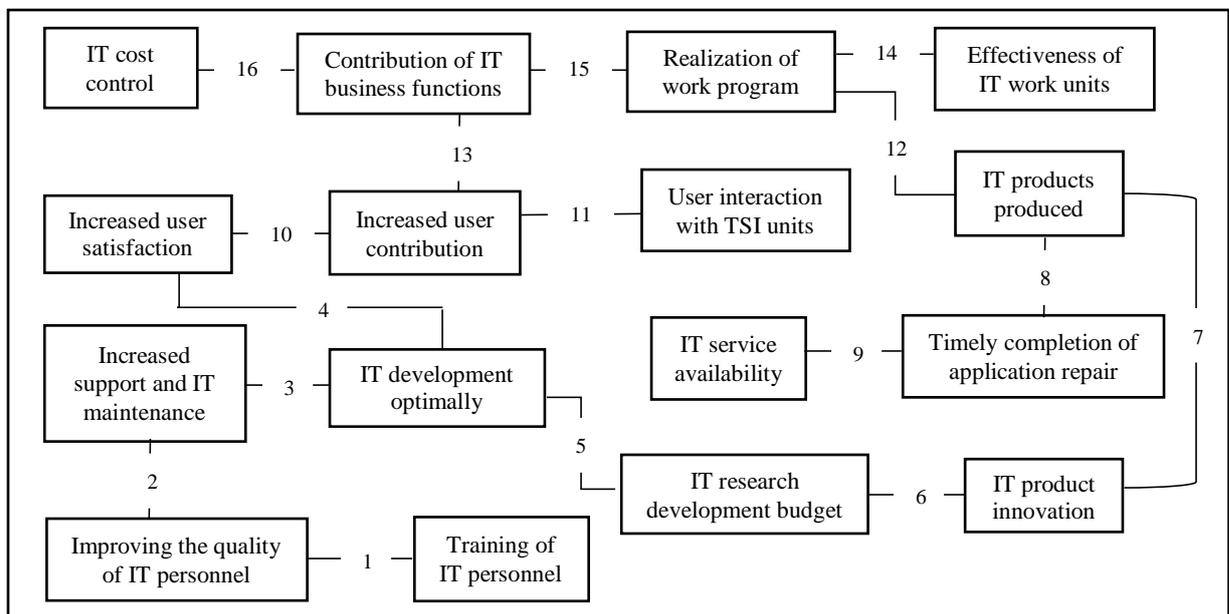


Fig 2. Strategy Map of Information System Technology Unit

3.3. Identification Key Performance Indicator (KPI)

After Preparation of corporate strategy map is completed, then the next step is to determine the Key Performance Indicator (KPI) for each strategic target on the TSI Unit. Based on it balanced scorecard perspective there are already some examples of objectives to determine key performance indicators to achieve the success of the company. In table 2 is the KPI that will be used to perform

IT performance measurement of TSI units in PDAM Surabaya City:

Table 2. KPI in perspective IT Balance Scorecard

Corporate contribution perspective	User orientation perspective
IT cost control	User satisfaction
Contribution of IT business functions	User contributions
Realization of work program	User interaction with TSI units
The effectiveness of IT work units	IT products produced
Operational excellence perspective	Future orientation perspective
Level support and IT maintenance	Quality IT personnel
Development IT optimally	Training IT personnel
Availability IT services	Budget development IT research
Completion application repairs on time	IT Product Innovation

3.4. IT Performance Measurement Based on IT Balanced Scorecard

IT performance measurement based on IT Balanced Scorecard is done by division of questionnaire according to perspective in IT Balanced Scorecard that is company contribution perspective, operational excellence perspective, user orientation perspective and future orientation perspective. The questionnaire is given to the Information Systems Technology Unit and is filled in accordance with the conditions of the actual work unit condition. For the number of questionnaires given are as many employees who are in PDAM System Information System Unit Surabaya City. Then do the calculation to get the final value of each indicator. The calculation used using Likert scale to get the percentage value based on the result of the questionnaire. The questionnaire provided contains 16 questions in accordance with each indicator in the IT Balanced Scorecard. After the measurement is obtained results for Unit of information systems technology in PDAM Surabaya city that can be seen in table 3.

Table 3. Total Value of Balanced Scorecard in TSI Unit of PDAM Surabaya

Perspective	Performance
Corporate contribution perspective	78,80 %
User orientation perspective	79,20 %
Operational excellence perspective	75,80 %
Future orientation perspective	75,80 %
Total Performance	77,40%

Explanation:

- Results 76% - 100% categorized as good
- Results 51% - 75% categorized quite well
- Results 25% - 50% categorized as unfavorable

Based on table 3 shows that the performance appraisal results in the corporate contribution perspective to get a value of 78.80%, so for this criterion can be categorized well. While the results of performance appraisal in the user orientation perspective get the value of 79.20%, so for this criterion can also be categorized well. Next to the results of performance appraisal in the operational excellence perspective get the value of 75.80%, so for this criterion can be categorized well. And the last is for the results of performance assessment in the future orientation perspective shows the value of 75.80%, so for this criterion can be categorized well also for the results.

4. CONCLUSION

Based on the result of measurement of performance of Information Technology System Unit at Municipal Water Company of Surabaya City, it can be concluded that in four assessments perspective that have been done to get the average value of 77.40% so that for the criteria can be categorized well. But for the two perspectives that exist is the operational excellence perspective and future orientation perspective needs to be improved again because it still get the value of 75.80, So it needs to be improved again the performance of Information Systems Technology Unit at Surabaya Regional Water Company to further develop and improve the performance of TSI Unit in the future.

5. ACKNOWLEDGMENT

The authors gratefully acknowledge to Informatics Engineering, Faculty of Computer Science, Universitas Pembangunan Nasional Veteran Jawa Timur.

6. REFERENCES

- [1] Kaplan R. S. and Norton D. P., "The balance scorecard – measures that drive performance," *Harvard Business Review*, vol. 70, no. 1, pp. 71-79, 1992.
- [2] Kaplan R. S. and Norton D. P., "Using the balance scorecard as a strategic management system," *Harvard Business Review*, vol. 74, no. 1, pp. 75-85, 1996.
- [3] Said A. A., HassabElnaby H. R. and Wier B., "An empirical investigation of the performance consequences of nonfinancial measures," *Journal of Management Accounting Research*, no. 15, pp. 193-223, 2003.
- [4] Banker R. D., Chang H. and Pizzini M. J., "The balanced scorecard: Judgmental effects of performance measures linked to strategy," *Accounting Review*, vol. 79, no. 1, pp. 1-23, 2004.
- [5] Zopiatis A., "Is it art or science? Chef's competencies for success.," *International Journal of Hospitality Management*, vol. 29, no. 1, pp. 459-467, 2010.
- [6] Kartalis N., Valentzas J. and Broni G., "Balance Scorecard and Performance Measurement in a Greek Industry," *Procedia Economics and Finance*, vol. 5, no. 1, pp. 413-422, 2013.
- [7] Andra G. and Robert N., "Entrepreneurs use a Balanced Scorecard to translate strategy into performance measures," *Journal of Small Business Management*, vol. 44, pp. 407- 425, 2006.
- [8] Kalender Z. T. and Vayvay O., "The Fifth Pillar of the Balanced Scorecard: Sustainability," *Procedia Social and Behavioural Sciences*, no. 1, pp. 76-83, 2016.
- [9] Blumenberg S. A. and Hinz D. J., "Enhancing the Prognostic Power of IT Balanced Scorecards with Bayesian Belief Networks," in *Hawaii International Conference on System Sciences*, Hawaii, 2006.
- [10] Grembergen W. V., Saull R. and Haes S. D., "Linking the IT Balanced Scorecard to the Business Objectives at a Major Canadian Financial group," *Journal of Information Technology Case and Application Research*, vol. 5, no. 1, p. 23, 2003.
- [11] Wati Y. and Koo C., "An Introduction to the Green IT Balanced Scorecard as a Strategic IT Management System," in *Proceedings of the 44th Hawaii International Conference on System Sciences*, Hawaii, 2011.
- [12] Van Der Zee J. and Jong B. D., "Alignment Is Not Enough: Integrating Business and Information Technology Management with the Balanced Business Scorecard," *Journal of Management Information Systems*, vol. 16, no. 2, pp. 137-156, 1999.
- [13] Marcos A. F., Rouyet J. I. and Bosch A., "An IT Balance Scorecard Design under Service Management Philosophy," in *Hawaii International Conference on System Sciences*, Hawaii, 2012.

- [14] Reich B. H. and Benbasat I., "Factors That Influence the Social Dimension of Alignment Between Business and Information Technology Objectives," *MIS Quarterly*, vol. 24, no. 1, pp. 81-113, 2000.
- [15] Hu Q. and Huang C. D., "Aligning IT with Firm Business Strategies Using the Balance Scorecard System," in *Proceedings of the 38th Hawaii International Conference on System Sciences*, Hawaii, 2005.
- [16] Bricknall R., Darrell G., Nilsson H. and Pessi K., "Aligning IT Strategy with Business Strategy through the Balanced Scorecard in a multinational pharmaceutical company," in *Proceedings of the 40th Hawaii International Conference on System Sciences*, Hawaii, 2007.
- [17] Gaspersz V., *Integrated Performance Management System Balanced Scorecard with Six Sigma For Business and Governance Organizations*, Jakarta: PT. Gramedia Pustaka Umum, 2003.
- [18] Arofah N. S. and Nisafani A. S., "Preparation of IT Balanced Scorecard For Performance Measurement IT Division At PT. Pertamina UPMS V Surabaya," *JURNAL TEKNIK POMITS*, vol. 1, no. 2, pp. 1-9, 2012.
- [19] S. P., Interviewee, *Scope of PDAM (Unit TSI)*. [Interview]. 2 Februari 2017.