

DESIGNING BUSINESS PROCESS TO SUPPORT BALANCED SCORECARD-BASED PERFORMANCE MEASUREMENT (CASE STUDY: FACULTY OF ENGINEERING, ATMA JAYA CATHOLIC UNIVERSITY OF INDONESIA)

Vivi Triyanti¹, Nixon William Kumala²

Atma Jaya Catholic University of Indonesia, Jakarta, Indonesia

¹vivi.triyanti.2@gmail.com

ABSTRACT

To become a reliable learning facility, Faculty of Engineering, Atma Jaya Catholic University of Indonesia is necessary to ensure the quality is at its optimum. Therefore, previous research was conducted to determine the performance measures that need to be measured in the form of key indicators schemes based on balanced, and continued in subsequent studies, that has produced a performance measurement tool based on the balanced scorecard using Microsoft Excel media (performance measurement dashboard) to the Department of Industrial Engineering, Engineering Faculty of Atma Jaya Catholic University of Indonesia.

This study is a continuation of the previous research, especially in terms of the development of the performance measurement dashboard applied not only to the Department of Industrial Engineering, but also to cover the entire Engineering Faculty. In order to proof the necessity of performance measurement dashboard, then business process is made, which compares the balanced scorecard based performance measurement calculations when done manually with if it were to use tools such as dashboard application. Helping documents are made from the new business process, such as Standard Operating Procedures (SOP) and Work Instructions.

Furthermore, test is done on the user who is also a stakeholder in the Engineering Faculty, to determine whether the dashboard and its supporting devices (SOP and Work Instructions) is ready to be implemented or not. Dashboard is improved until it is approved by the stakeholders, so it is considered as good enough by the stakeholders.

Keywords: Business Process, Dashboard, Balanced Scorecard, Performance Measurement

1. INTRODUCTION

Organization activities driven by different components in it, so the quality of an organization is also highly dependent on the quality of the components of the event, and the size of the components of activity, which is defined as the performance. For the betterment of the organization, then this performance needs to be optimized. Therefore, the organization must know their current performance to know where the performance needs to be improved. Faculty of Engineering, as an organization that is part of Atma Jaya Catholic University of Indonesia, to become a reliable learning facility, it is necessary to ensure the quality is at its optimum.

In this regard, a paper that produced performance measures schematic of key

performance indexes (KPIs) based on balanced scorecard for the Atma Jaya's Faculty of Engineering has been done before ^{[5],[7],[13],[14]}. As the application media of the KPIs scheme, Microsoft Excel-based dashboard to display and measure the value of the performance indicator for Industrial Engineering Program has also been created in another papers ^{[11],[15]}

This paper is intended as an attempt to continue the previous research done on those theses, particularly in the development of dashboard that have been made to cover the whole Atma Jaya's Faculty of Engineering and the readiness level of the dashboard to be implemented in the FT UAJ. To prove that this is indeed the dashboard is necessary as a performance measurement tool, then the mapping of business process performance

measurement is made to be compared to manual calculation. Standard Operating Procedures (SOP) and Work Instructions also going to be made on this thesis as a guiding tool for the user of the dashboard.

The main objectives of this paper are therefore as follows:

1. Develop business process of performance measurement in Atma Jaya's Faculty of Engineering.
2. Develop the dashboard so that it covers the whole Atma Jaya's Faculty of Engineering.
3. Testing and analyzing the performance measurement dashboard, so it can be implemented.

2. THEORETICAL BACKGROUND

Performance management is "the continuous process of identifying, measuring, and developing the performance of individuals and teams and aligning performance with the strategic objectives of the organization" (Aguinis, 2009). It should be noted that a key component of this definition is that it is a continuous process and that there is an alignment with strategic goals.

We could describe the balanced scorecard (BSC) as a set of steps that are carefully selected from the organization's strategy. BSC enables organizations to translate vision and strategy by providing a new framework, which tells the story of the organization's strategy through the objectives and measures chosen. BSC maintains financial measures, and is equipped with three other measures, different perspectives: customer, internal process, and learning and growth.

According to Michael Alexander (2008) Dashboard is an interface that provides a visual glance view of some dimension measurements that are relevant to a particular goal or business process. Dashboard has three main features, namely:

1. Dashboards are usually very graphic form, provides a depiction which helps focus attention on trends, comparisons, and spesific things.
2. Dashboard displays only the relevant data to the specified purpose.

3. Dashboard is designed with a specific purpose, so it is fundamentally defined to contain its own conclusions without the need for user analysis.

The process of business process mapping has several benefits, including better documentation in the monitoring process, the ability to visually describe the process, and a holistic view of the various aspects of the process. Steps of the process mapping:

1. Identification process: achieving a full understanding of all the steps of a process.
2. Collection of information: identifying objectives, risks, and key controls in the process.
3. Interviews and mapping: understanding the perspective of the individual in the process and designing actual maps.
4. Analysis: utilizing tools and approaches to make the process run more effectively and efficiently.

3. METHODOLOGY

The methodology starts with collecting data from previous research: list of data requirements for the indicators, responsibility distribution list, strategy map, series of performance indicators based on the balanced scorecard, and performance measurement dashboard of Industrial Engineering Department. It continues to data processing, which consists of the business process development, analysis of manual performance measurent business process, creation of Faculty of Engineering level performance measurement dashboard, and proposed improvement design of performance measurement business process.

At the business process development stage, the mapping of the processes that occur to measure performance is done by doing process indentification first. The analysis of manual performance measurent business process performed by using the analysis tools: bureaucracy elimination, duplication elimination, simplification, and automation. By doing this analysis, it will get the things of the current performance measurement, which need to be improved to run a better business process.

The creation of Faculty of Engineering level performance dashboard stage is started by the replication of Industrial Engineering Department level dashboard, so it can produce both Mechanical Engineering and Electrical Engineering Department level dashboard. Basically those three are the same, that's why it's called as "replication", and the only adjustment made is the naming on the layout of each of the respective department that the dashboard is for.

Next is the making of the Faculty of Engineering level dashboard, that will give out the performance measurement of the whole faculty using the data that has been inputted on each of department's dashboard.

At the proposed improvement design of performance measurement business process stage, improvement suggestion to resolve the problems identified in the analysis stage will be applied. From those improvement suggestions, the new design of improved business process will be made, and from that business process, it will derive SOP, process timeline, and work instruction as its supporters.

4. RESULTS

The business process development stage, after identifying the process for manual performance measurement, resulted a series of business process maps describing the detailed visualization of the whole process involved. The overall process is pictured on a context diagram that is shown in figure 1. This context diagram is broken down into more detailed maps which amounts to a total of 29 maps, distributed to 5 different levels of detail (level 0 as the most general to level 4 as the most detailed).

Business process of manual performance measurement has problems on almost of the entire process, which can be solved with two tools, the automation and simplification. The manual performance measurement have 78 steps, while with the dashboard application, to apply the automation and simplification, the steps are reduced into only 2 steps.

To measure performance automatically, a template from previous dashboard application is still used. However some

adjustment has been made to make the dashboard compatible to gather data from 3 departments. Adjustment is also made at the scorecard part of the dashboard, the indicator value, value target, and score is being averaged from each of department's dashboard so there's no error in the calculation. The captured of the application is shown in figure 2, 3, and 4.

Imagining the application of the suggestion above, new business process map is being made. The context diagram of this new business process map can be seen in Figure 5.

5. DISCUSSION

To test whether the dashboards are ready to be implemented, a trial is made for the stakeholders of the faculty, which will also be the users of the dashboard. The respondents of this trial is the Dean of Engineering Faculty and the Head of Industrial Engineering Department, they will rate the usage of the dashboard, and its supportive components (SOP, process timeline, work instruction) with the indicators that have been provided. At first trial, the dashboard is being deemed as still lacking, so improvement is done on the said part that's still lacking. The aspects that still have lackings, are:

1. Unclear description of the "Numbering" ("Penomoran") on the scorecard part of dashboard.
2. The inconsistent use of words on "Indicator Value Description" ("Deskripsi Nilai Indikator") on the scorecard part of dashboard.
3. The final score on the scorecard that does not exist at the bottom of the scorecard part of dashboard.
4. The lack of information on the menus of the dashboard.
5. The small homepage (not full screen).
6. The absence of authorization function to use the dashboard.

Those lackings then got fixed and the second trial is being done. After the second trial, the respondents concluded that the dashboards are good enough and that being said, the dashboards are ready to be implemented. The recap of the rating being

done by the respondent can be seen on the table 1.

By comparing the business process of the manual performance measurement and the newer one that applies the usage of dashboard, can be seen that the process becomes much simpler and resolved with automation. On the new business process, rather than counting each of largely numbered performance indicators manually with a variety of different data sources, and complex various formulas, the whole process has been done in an automated way. In addition, the presentation of the data is also arranged in such way that all of the performance rates can be read easily. With the SOP and work instruction, the proposed process also become easier to be done.

Continuous business process development is needed so that the business process can adapt with the newer condition in the future. The business process development can be carried out, among other things:

1. Make authorization so that the output (scorecard and dashboard list) can only be seen by the stakeholders (Dean, Vice Dean, and Head of the Department), and the data output can not be seen by those who only served to input the dashboard, but not a part of the stakeholders.
2. Communication with Academic Administration Bureau (BAA) so that they can provide data that is specifically made to be inputted into the dataset of the dashboard, unlike the data that are currently available on the university's network which still needs format conversion before they can be calculated by Microsoft Excel, incomplete, and the table order are not in accordance with the table in the dataset of dashboard.
3. Training a person to be appointed as a dashboard administrator, in terms of Microsoft Excel skills and macros through Visual Basic programming in general, and specifically on the performance measurement dashboard usage. This is useful so that there is one party who is responsible and an expert who can help out if there are problems during the implementation of the dashboard, and if further development on the dashboard

which has not been done in this research is needed.

6. CONCLUSION

Some points of conclusions which can be derived from this project are as follows:

1. Business process of manual performance measurement has problems on almost of the entire process, which can be solved with two tools, the automation and simplification. The manual performance measurement have 78 steps, while with the dashboard application, to apply the automation and simplification, the steps are reduced into only 2 steps.
2. Dashboards are created so it can cover the entire Engineering Faculty as the improvement solution of the business process. Dean-level dashboard (faculty level) has been adjusted so it does not need to be inputted again and automatically takes input directly from the dashboards of each department.

In the first trial, the Stakeholders respondents initially felt there was lackings on the dashboards. Improvement then made in accordance with the stated lackings, so that eventually both the respondents agreed and stated that the dashboard is good enough through questionnaires, in which there is no longer the criteria of the dashboard is stated as unclear or difficult, so the dashboard is ready to be implemented.

7. REFERENCES

- (a) Aguinis, Herman. 2013. *Performance management (3rd edition)*. Upper Saddle River, NJ: Pearson Prentice Hall.
- (b) Alexander, Michael. 2008. *Excel 2007 Dashboard and Reports for Dummies*. Indianapolis: Wiley Publishing, Inc.
- (c) CPA Australia. 2011. *Dashboard Reporting: A Guide to Improving Management Reporting in SMEs*. Southbank, Victoria, Australia: Certified Public Accountant Australia.
- (d) EPA. 2001. *Guidance for Preparing Standard Operating Procedures (SOPs)*. United States: Office of Environmental Information.

- (e) Fernando, D. 2014. Perancangan Indikator Kinerja Di Fakultas Teknik Universitas Katolik Indonesia Atma Jaya Berbasis Balanced scorecard. *Tugas Akhir Sarjana*. Jakarta: Program Studi Teknik Industri, Fakultas Teknik, Unika Atma Jaya.
- (f) Lehman, Mark W., Lehman, Carol, M., Fezell J. 2011. Dashboard Your Scorecard. *Journal of Accountancy*, 5(2): 20-27.
- (g) Nataniel, Erwin. 2012. Perancangan Strategy Map di Fakultas Teknik Unika Atma Jaya Berbasis Balanced Scorecard (Studi Kasus: Tingkat Unit Terkait Program Studi). *Tugas Akhir Sarjana*. Jakarta: Program Studi Teknik Industri, Fakultas Teknik, Unika Atma Jaya.
- (h) Niven, Paul R. 2006. *Balanced Scorecard Step-by-Step: Maximising Performance and Maintaining Results. 2nd Edition*. New Jersey: John Wiley and Sons
- (i) Page, Susan. 2010. *The Power of Business Process Improvement: 10 Simple Steps to Increase Effectiveness, Efficiency, and Adaptability*. New York: American Management Association.
- (j) Person, Ron. 2009. *Balanced Scorecards and Operational Dashboards with Microsoft Excel*. Indianapolis: Wiley Publishing, Inc.
- (k) Rafavy, Carlos Y. 2013. Perancangan Dashboard untuk Pengukuran Kinerja unit Organisasi di Perguruan Tinggi (Studi Kasus: Program Studi Teknik Industri, Fakultas Teknik, Unika Atma Jaya). *Tugas Akhir Sarjana*. Jakarta: Program Studi Teknik Industri, Fakultas Teknik, Unika Atma Jaya.
- (l) Smither, James W., London, Manuel. (Eds.). 2009. *Performance management: Putting research into action*. San Francisco: Jossey-Bass
- (m) Triyanti, Vivi. 2013, Quantitative Approach To Measure Process Connectivity In Balanced Scorecard Model. Batam: *Proceeding of 6th International Seminar on Industrial Engineering and management Conference*
- (n) Triyanti V, Bachtiar M., and Tukiran M 2012. Perancangan Peta Strategi Berbasis Balanced Scorecard Untuk Mendukung Penerapan Manajemen Kinerja. Bandung: *Industrial Engineering Conference on Telecommunication (INDECT) 2012*
- (o) Triyanti, Vivi and Ravafy, Carlos Y. 2013, Development of Performance Dashboard For University Based On Balanced Scorecard Concept. (ISSN 2350-742X) pg 127. Cebu, Philippines: *Proceeding of the 14th Asia pacific Industrial Engineering and Management Systems Conference 2013*
- (p) Wise, Lyndsay. 2010. *Operational Dashboard vs Analytical Dashboards: What Problem Are You Solving?*. Ottawa: Klipfolio, Inc.

AUTHOR BIOGRAPHIES

Vivi Triyanti is a lecturer in Department of Industrial Engineering, Faculty of Engineering, Atma Jaya Catholic University of Indonesia. She received her Master of Science from Hogeschool van Utrecht, the Netherlands in 2004. Her research interests are in the area of Product and System Design and Analysis. Her email address is <vivi.triyanti.2@gmail.com>

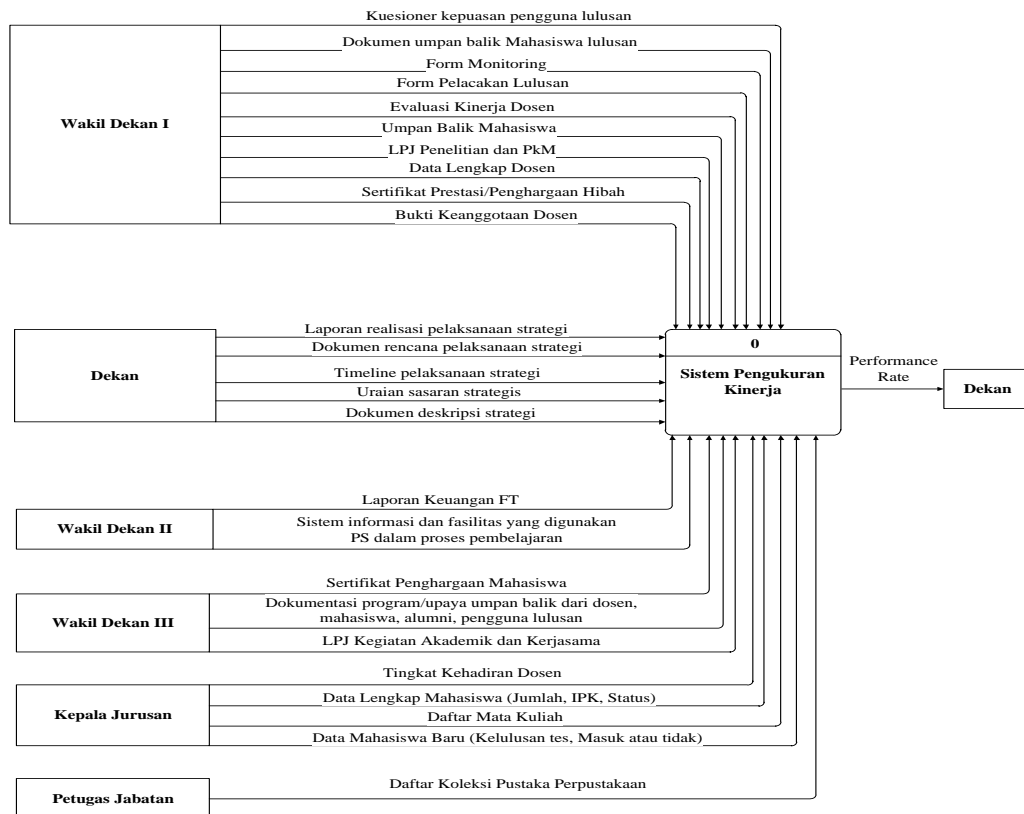


Figure 1. Existing Business Process - Context Diagram



Figure 2. Dashboard List of The Application

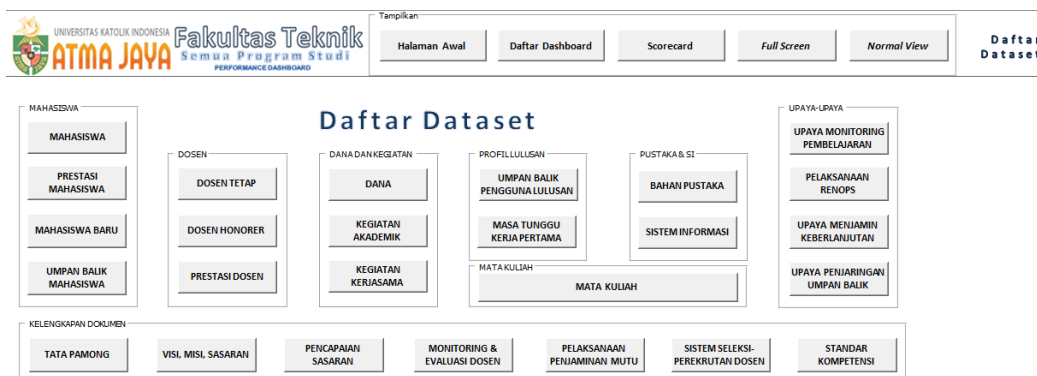


Figure 3. Dataset List of The Application

Penomoran					Aspek Penilaian	No. Butir Borang Akreditasi	Bobot (Referensi Borang)	Nilai Indikator	Deskripsi Nilai Indikator	Target Nilai Indikator	Selisih Realisasi Nilai terhadap Target	Skor	Predikat Skor Non Indikator	C h e c k	Harkat dan Peringkat Indikator					
Perp ektif	Sasaran Strategi	Sub Sasaran Strategi	Sub Sasaran Strategi	Indikator											0	1	2	3	4	
				1	Rasio mahasiswa baru reguler yang melakukan registrasi terhadap calon mahasiswa baru reguler yang lulus seleksi.	3.1.1.b	0.65	0.00%	Rasio Jumlah Mahasiswa Registrasi terhadap Calon Mahasiswa Lulus Seleksi (%)	95.00%	-95.00%	0		☐	☐	☐	☐	☐	☐	
				C	PERSPEKTIF INTERNAL BUSINESS PROCESS		2.58					1	👉							
				P	PROSES PERENCANAAN (Planning)		1.14					3	👉							
				1	Meningkatkan Efektivitas Perencanaan		0					0	👇							
				1	Meningkatkan kejelasan strategi		0					0	👇							
				1	Kejelasan dan Kerealisasian Visi, Misi, Tujuan, dan Sasaran Program Studi	1.1.a	1.04	4	Skor Indikator (Lihat Dataset)	4	0	4		☐						😊
				2	Ketersediaan Strategi Pencapaian Sasaran dengan Rentang Waktu yang jelas dan didukung oleh Dokumen	1.1.b	1.04	4	Skor Indikator (Lihat Dataset)	4	0	4		☐						😊
				2	Meningkatkan efektivitas strategi		0					0	👇							
				2	Perentase pelaksanaan perencanaan RENOPS		1.04	3	Jumlah Butir Renops Terlaksana	5	-2	2		☐						😞
				2	Meningkatkan Kualitas Kurikulum		1.14					3	👉							
				2	Meningkatkan kualitas isi mata kuliah		0.57					2	👉							
				1	Kesesuaian Mata Kuliah Dengan Standar Kompetensi	5.1.2.a	0.57	4	Skor Indikator (Lihat Dataset)	0	4	4		☐						😊

Figure 4. Input and Output Display Example of the Dashboard Application

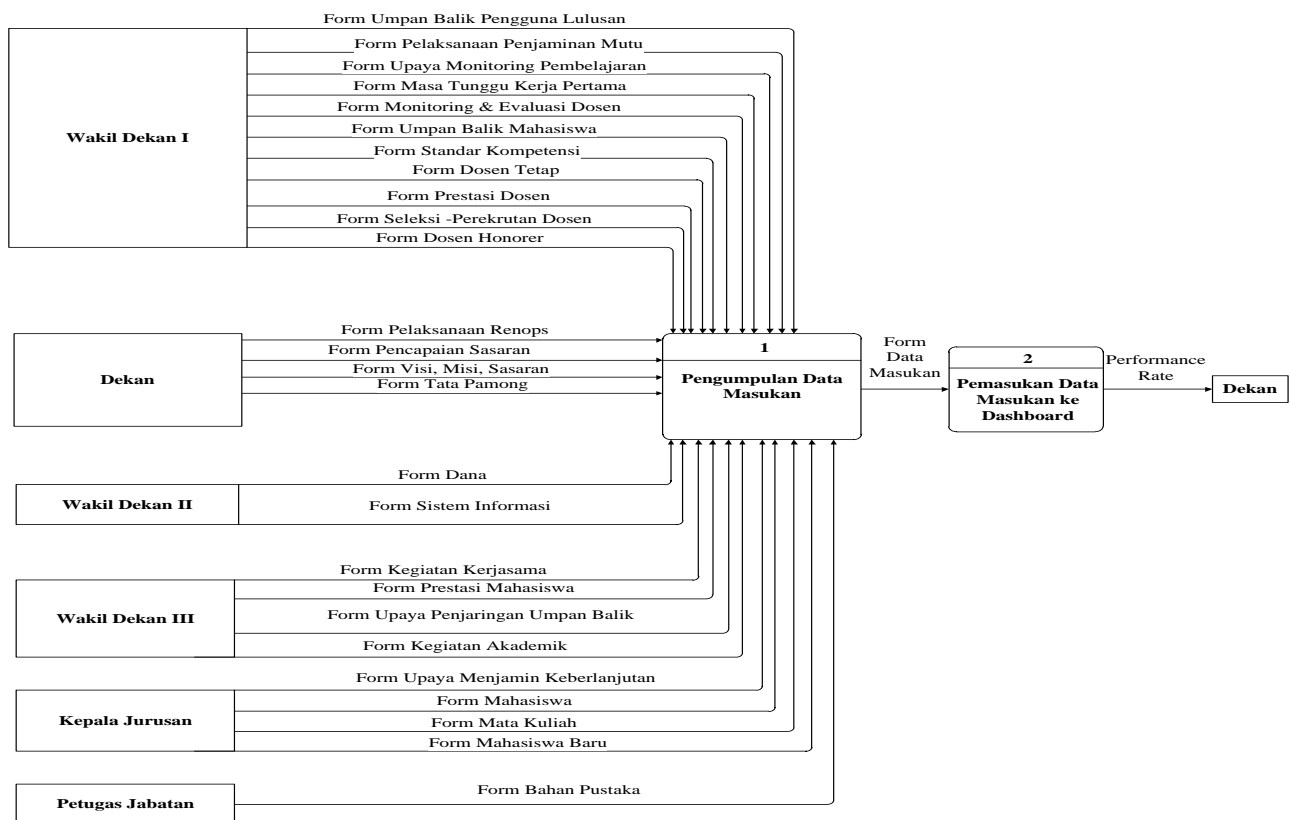


Figure 5. Proposed Business Process – Level 0 Diagram