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Research Paper

The Important Role of Microsoft Power Business Intelligence Tool for Analyzing Unit Cost

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Abstract

Problematic problems in calculating unit cost for institution can lead the wrong decision taken by management. Those problems such are lack data information for analyzing, difficulties in querying meta data, illiterates in using tools of technology, and still many other problems. Management's leader will be difficult to make decision if the meta data as the sources of information cannot be crystalized as requested. This research is conducted for answering the curiosity regarding determination of unit cost that be mining from meta data sources. The originality value of this research is for answering the curiosity in determining unit cost. This research takes place in the higher institutional education along with the name of State University of Jakarta. As Educational Institution, State University of Jakarta is not fully funded by the government of Indonesian Republic. This institution is considered as public entity that part of its funding come from government and the rest of funding come from the ability of institution in generating income. Economics, efficient, and effective are the most determination that should be achieved by State University of Jakarta that is not fully funded by The Indonesian Government. For this reason, State University of Jakarta should be aware in managing available income for institution survival. In analyzing meta data for the consumption of decision making, the researcher has explored the usage of Microsoft Power Business Intelligence (BI) tool for determining unit cost each unit in this institution. Through this tool, then researcher analyzing and describing the crystalized meta data that supported calculation for unit cost. The value result of this research shows that almost 65% of the total units cannot surviving its own entity. In the conclusion, this institution should be able to querying cost in each unit. Determination of direct cost and indirect cost for each unit should be placed proportionally. Also, tuition fee should be able to cover the idle capacity of unit that in the previous time suffering deficit.

Keywords: *Unit Cost, Microsoft Power BI, Meta data, Idle Capacity*

INTRODUCTION

It is necessary for the entity to have a monitoring system application that is integrated with units related to preparing Financial Reports, namely by using Big Data. Big data analysis is a process carried out to search (inspecting), transformation (transforming), and to find models with big data (discovery). The Financial Report audit process is carried out focusing on financial transactions, financial balances, as well as transaction disclosures that are required and in accordance with the Standard Guidelines in the Regulations.

Through this research, we would like to explore the tools that is called Microsoft Power BI for analyzing the problem of meta data in correspond to the decision that will be token by decision maker. Microsoft Power BI is used to assist in creating financial reports and decision making. Microsoft Power BI is software developed by Microsoft and can be used for several things in business intelligence, such as: (1) extracting, transforming and analyzing large amounts of data; (2)

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building rational models to combine data from various sources; (3) defining complex calculations using Data Analysis Expressions (DAX); and (4) data visualization with interactive reports and dashboards. In addition, Power BI also has other advantages such as a query editor, which is a tool in Power BI that allows data collection and transformation. The data used can come from various locations and sources ranging from text, excel files, databases, to the internet (Collie, Rob, Avi Singh, 2016).

Business Intelligence consists of five field concepts, namely domains, data, model, analysis, and visualization. Domain figures out in simple terms of business functions, such as: sales, marketing, manufacturing or production, logistics, research and development, purchasing, human resources, and accounting or finance. Data identify and obtain data that is relevant and related to the domain. The data source can be obtained from internal or external organizations. Model is references of one or more data sources used to support analysis and visualization, models have several functions, including: transforming and cleaning data, helping to determine the type of data in the source, and defining data categories for certain data types. Analysis is being used after selecting a domain and combining it with data sources into a model, the next step is to carry out analysis to estimate revenue and sales and minimize risks that will arise. The last one, visualization which is final stage, is being used for seeing the results of the analysis, it is depicted in the form of diagrams, reports and dashboards in the form of pie charts, bar graphs and other visual displays (Deckler, Greg.2019).

Furthermore, then research question arises such as how the obstacles faced by the Internal Control Unit in reviewing the University's Financial Reports should be solved. How does Internal Control Unit prepare a Financial Report Review so that it can present accountability of data that can be used as a consideration for decision making by the leader? How do researchers convey the results of this research to improve analysis in increasing the timeliness of submitting Financial Reports and decision making by University's Management?

LITERATURE REVIEW

Interest in big data analysis has increased in recent years, due to the large amount of data that must be examined and analyzed at the same time. This involves various interrelated stakeholders, the use of Big Data Analysis has the potential to support data-based decision making (Osman, Ahmed M. Shahat, Ahmed Elragal, 2021). The use of technology in analyzing and visualizing data has developed significantly, one of which is using Microsoft Power BI. Microsoft Power BI is a data visualization application software developed by a company in the field of Information Technology. The power of Business Intelligence (BI) is great by using cloud-based data analysis which is used for analyzing and reporting data (Muassar, Mifta Zulfahmi, 2022). Furthermore, Monitoring and Evaluation is one of the functions of management to assist in monitoring performance at a certain time and as a basis for determining observation status. The system is an important component of the monitoring and evaluation carried out because it will influence the results of performance targets (Okafor, Afomachukwu E, 2021).

Microsoft developed Power BI software can be used for big data management. Big data is a broad term commonly used as a reference to the large volumes of digital information generated by various businesses. Big data focuses on the problem of large amounts of data. Analyzing large amounts of data requires new tools and techniques compared to traditional (manual) methods, so tools are needed to make analyzing data easier. A bad input process will also have an impact on bad results, therefore there is the term Garbage In - Garbage Out theory to help in analyzing using machine learning, the steps that must be carried out.

Concern of this research is how financial reporting should be used for taking decision. Providing information to report users is one of the objectives of submitting Financial Reports which

are used in decision making so that this is a form of accountability and transparency in the management of state finances at the Jakarta State University and can realize good university governance. There are many obstacles faced by the Internal Control Unit in reviewing the Financial Reports of Jakarta State University. Slow submission of Financial Reports resulted in changes in the time experienced in carrying out the Review which had an impact on the submission of the Financial Report to the Ministry and the Results of the Review carried out by the Internal Auditor.

Financial reports and supporting documents are still manually compiled. The documents provided by Accounting and Reporting to the Internal Control Unit still use manual data, this makes the review process take longer because the Auditor has to check the documents one by one manually before disclosing them in the Financial Report Review Results. Data input that is still manual means that the Auditor has to check several different documents at one time, this results in not being able to optimize the use of time when carrying out the stages in the Review. Apart from that, not integrating data between units can also cause differences in the presentation of data in the Financial Report and reconciliation must be carried out periodically.

RESEARCH METHODOLOGY

This research was conducted at Jakarta State University, located at Jalan Rawamangun Muka, Pulogadung – East Jakarta. The research location was chosen because the process of reviewing the data provided still uses manual, this is based on direct observation when carrying out daily work. The research was conducted for two months, namely March – April 2023 and used 2022 Financial Report data. Researchers considered that this time was considered appropriate for conducting research. The research carried out will reveal existing obstacles and problems and try to provide the best solution to these problems.

To clarify the phenomenon at the research location, it is necessary to have an implementation stage which is divided into three stages. In the first stage, researchers carried out observations and analysis of documents prepared by the Accounting and Reporting Team. In this stage, the researcher checks the report provided with supporting documents. Next, in the second stage, conduct an in-depth interview (In-depth Interview) to dig up information and confirm the data presented in the Financial Report and ask for additional explanations if the data presented is doubtful in preparing the Review Working Paper which will later be used as a material for making Review Results Reports. In the third stage, the researcher integrated the data that had been obtained in Excel form into the Power BI application to describe the condition of the Financial Report which was depicted in several forms, one of which was a diagram. The Steps in optimizing power BI tools such as follow:

1. Import Function, import data sourced from an Excel file into Power BI.
2. Power Query, is data connectivity and uses technology in the data preparation process that allows users to import and describe data from various forms of Microsoft products, such as Excel, Power BI, Analysis Services and so on.
3. Data Analysis Expressions (DAX), is a combination of functions, operators and constants used in formulas to calculate and return one or more values so that they can help create new information from existing data.
4. Visualization Charts, displays information that has been found in the data. A Power BI report may have one visual or it may be a full page of visuals. In Power BI, visuals can be embedded from reports into dashboards.

FINDINGS AND DISCUSSION

The description of the research result shows that State University of Jakarta operations is the institution in the form of a Public Service Agency that give service to the community in terms of

education. In carrying out its operations, State University of Jakarta also carries out its mandate in serving the community. The implementation of State University of Jakarta operations is required to put forward good ideas so that the institution operations can have beneficial effects on the community as recipients of services, employees as human resources providing services, and the government of the Republic of Indonesia as the owner of state assets which are used as much as possible for the prosperity of the people.

Throughout the course of its operations, State University of Jakarta has income to sustain its operations. This income comes from tuition income as a form of receipt from educational services, and income originating from non-service results such as grants and other cash income from various parties other than educational services. Likewise, to support its operations, State University of Jakarta also spends in the form of payments for personnel expenses, goods expenditures and capital expenditures.

Thus, State University of Jakarta in carrying out its operations consists of income and expenditure which is expected to result in a greater difference in income than expenditure. The excess difference is called the remaining balance which can be used in the future as a means of improving service. This remaining balance is really needed in the development of Jakarta State University BLU, considering that BLU's role is expected to be able to provide optimal services to the community but not overly burden state expenditure.

Through the analysis of meta data by Microsoft Power BI, this research concludes how State University of Jakarta operates and how to maintain the survival of the organization by explaining revenue analysis as a controller of expenditure to contribute the remaining balance as a means of developing State University of Jakarta in the future. As an illustration of the analysis are the results of the Jakarta State University State University of Jakarta operational financial year for 2021. 2021 was chosen as the observation year because it is close to the real situation with future operations. As an illustration this year, State University of Jakarta experienced a deficit which resulted in reducing the opening balance of its operations.

In the operations of the Jakarta State University BLU, there was a loss of IDR 17,901,927,630. The loss figure is a collective loss for each Faculty. The faculties that experienced losses were the Faculty of Social Sciences, Faculty of Sports Sciences, Faculty of Economics, and Postgraduate Studies. Meanwhile, the faculties that received a surplus were the Faculty of Education, Faculty of Mathematics and Natural Sciences, Faculty of Languages and Arts, and Faculty of Psychological Sciences, and Faculty of Engineering.

Based on the loss situation, this research conducted a simulation analysis of income control in maintaining the stability of the surplus from existing expenditure. The faculty's loss-making situation is simulated to be able to recover by increasing the single tuition fee income from each study program. Control is emphasized at UKT because income from the non-tuition fee sector is very difficult at Jakarta State University. Existing assets have not been utilized optimally.

It is simulated that study programs that are losing money can cover their losses by increasing their tuition fee. Overcoming losses cannot be done through UKT, but the number of student admissions to the Study Program must be increased. Efforts are made to accept the number of students to utilize the existing idle capacity in each Study Program. By increasing the surplus in loss-making Study Programs, operational conditions could reach a surplus of IDR 41,838,863,405, - However, if all loss-making Study Programs could increase their operational surplus (even though it seems impossible), then the operational surplus of State University of Jakarta could reach IDR 71,581,467,647,-. An operational surplus condition like this is an ideal condition in the operational implementation of a university. In this case, hard work is still needed to achieve this ideal situation, because there are many challenges and obstacles that need to be studied in further research. These challenges can come from within campus organizations, and can also come from outside the

organization.

CONCLUSIONS AND FURTHER RESEARCH

Management of State University of Jakarta should be easily determining direct and indirect costs for each study program within the State university of Jakarta. For this reason, the institution need to determine reliable Activity Based Costing on each Study Program for knowing the effectiveness and efficiency of the study program. It is important to determine and to identify the activities in each Study Program based on the nature and size of the activities. Determination direct costs and indirect for each study program within the State university of Jakarta environment should be truly accurate.

By using special tools such as Microsoft Power BI, the institution can be easily to get crystalized meta data for decision making. In this study shows that 65% of the Units are still in the deficit conditions. That means based on financial report, the decision can be accurately taken. Decision made should be done quickly to determine operational activity policies for those 65% Units suffering losses, that must be carried out operations in a surplus condition. The quick and accurate decision is very important to determine the increasing tuition fee or increasing the number of student admissions to ensure that there is no idle class capacity in the class infrastructure.

Microsoft power BI is also optimizing the calculation cost per unit to help determining service rates in generating revenue. This is to maintain operational stability in accordance with the market's ability to pay tuition fee according to interest in studying for the study program. Solving this problem must also pay attention to previous recommendations. Not only avoid idle capacity in the class, Microsoft Power BI is also solving the problem of controlling income by maintaining a stable operational surplus.

Further research should be able to generalized the ability tools such Microsoft Power BI in determining unit cost efficiently. For the institution of higher education, ss much as possible, the income from each Study Program should not come from tuition fee. Thus, in the future, non-tuition fee income must be the mainstay of study program income. To fulfill this, each Study Program must have creative ideas in obtaining sources of income from a non-tuition fee perspective.

REFERENCES

Amanda, Rizki, Perdana. (2021). Penerapan metode projected unit credit tipe constant dollar pada perhitungan aktuaria dana pensiun: Buletin Ilmiah Math. Stat. dan Terapannya (Bimaster) Volume 10, No. 2 (2021), hal 203 – 208.

Arens, Alvin A., et al. (2020). Auditing and assurance services 17th edition. *Pearson*.

Aziza, Nurul. (2021). Akuntansi biaya. Konsep dasar dan manajemen. Diandra Kreatif.

Collie, Rob, Avi Singh. (2019). Power pivot and power BI. *Merritt Island.* Holy Macro:11

Deckler, Greg. (2019). Learn power BI. Livery: *Packt Publishing*

Easterita, Arwani. (2020). Pengembangan data warehouse dan online analytical processing (olap) untuk data artikel pada jurnal teknologi informasi dan ilmu computer. Jurnal *Sistem Informasi Teknologi Informasi dan Edukasi Sistem Informas.* https://doi.org/10.25126/justsi.v1i1.2.

Ferrari, Alberto, Marco Russo. (2017). Analyzing data with Microsoft Power BI and Power Pivot for Excel. Washington:Microsoft Press:12.

Gondodiyoto, Sanyoto. (2023). Audit sistem informasi + pendekatan cobit. Jakarta: *Mitra Wacana Media*.

Hariyani, Arum. (2022). Analisis sistem pengolahan data elektronik mengenai barang milik negara pada komisi aparatur sipil negara. *SERASI* Volume 20, Nomor 02, Oktober 2022.

Hermawan, Eviyanti. (2023). Analisis perhitungan biaya kualitas (cost of quality) untuk meningkatkan kualitas produk. *Jurnal Aktual Akuntansi Bisnis Terapan*. Vol. 6 No. 1 Mei 2023.

Irawan. (2019). Model Analisis Data dengan Power BI Deskstop. Jakarta: *Direktorat Pemeriksaan dan Penagihan* V.1: 18–24.

Jadhav, Monal D., Ashlesha B. Shelar, Assistant Prof. Sujeet More. (2022). HR people data analytics using power BI data visualization tool. *International Journal of Research Publication and Reviews*, Vol 3 No 4: 3335–3338.

Jessica S. (2023). Analisis perhitungan biaya produksi menggunakan metode variabel costing PT Asrindo Citrasubur Makmur (ACM). *Inspirasi Ekonomi Jurnal Ekonomi Manajemen* 5(2):74-83

Muassar, Mifta Zulfahmi. (2022). Implementation of dashboard power BI for data visualization of graduates during COVID-19 pandemic in the faculty of tarbiyah and teaching sciences IAIN Palopo. Palopo: *Journal of Information Technology and Its Utilization*, Vol 5.

Nur, Sri Wahyuni. (2020). Akuntansi dasar: Teori dan teknik penyusunan laporan keuangan. Makassar: Cendekia Publisher: 58.

Okafor, Afomachukwu E. (2021). Influence of monitoring and evaluation system on the performance of projects: IJRDO – *Journal of Social Science and Humanities Research*, ISSN: 2456–2971.

Osman, Ahmed M. Shahat, Ahmed Elragal. (2021). Smart cities and big data analytics: Data – Driven Decision – Making Use Case. Switzerland MDPI: 286-313.

Pamungkas, Ghozali I, et al. (2018). Corporate governance mechanisms in preventing accounting fraud: A study of fraud pentagon model. *Journal of Applied Economic Sciences* 13 (2), 549-560

Purwanti, Sudarto, Rusmana. (2022). Penerapan metode activity based costing dalam perhitungan unit cost sebagai metode alternatif pada penentuan tarif pemeriksaan laboratorium dan radiologi (studi kasus di RSOP). *Jurnal Ekonomi, Bisnis dan Akuntansi* (JEBA) Volume 24 No 1 Tahun 2022.

Purwanto, Watini. (2020). Analisis harga pokok produksi mmenggunakan metode full costing dalam penetapan harga jual (studi kasus unit usaha regar fruit). *Journal of Applied Managerial Accounting* vol. {4}, No. {2}, {2020}, {248-253} ISSN: {2548-9917} (online version).

Rahayu, Murtinah. (2022). Pelaksanaan pengadaan barang/jasa secara elektronik di unit layanan pengadaan biro umum, sekretariat presiden. *Journal of Business Administration Economics and Entrepreneurship* (JBEST) Vol. 5, No.2 (2023).

Roy, Sharma, et all. (2019). Pre-processing: A data preparation step. Reference Module in Life Sciences 2019.

Titarsole, Nangoy, Kalalo. (2019). Analisis dampak electronic data processing (edp) terhadap pelaksanaan audit internal pada PT. BPR Bank Prisma Dana Manado. *Jurnal Riset Ekonomi, Manajemen, Bisnis dan Akuntansi*, Vol. 7 No. 3 (2019): JE VOL 7 NO 3 (2019).

Tito IM. Hakim. (2018). Activity-based costing and its derivatives and significance in the cutting-edge environment. The International Journal of Applied Business. Volume 2 Nomor 2, November 2018.

Zunaidi, Arif, Andriani, Oktaria Ardika Putri. (2022). Peran monitoring dan evaluasi audit mutu internal dalam upaya mewujudkan good university governance IAIN Kediri. Kediri: *Abdimas Galuh*, Vol 4 No.1: 1–9.