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A Systematic Literature Review on Analytic of Costing System Design

Haervi Yunira[1], Emi Masyitah[2], Nurul Izzah Lubis[3], Citra Windy Lubis[4]
Universitas Potensi Utama, North Sumatra, Indonesia[1,2,3,4]
E-mail: haervi.yunira26@gmail.com[1], emi.masyitah@gmail.com[2] nurulizzah.potensi@gmail.com[3], citra.windylubis@gmail.com[4]

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Analytic of Costing System Design ; MADA; Balance Scorecard

ABSTRACT
This paper aims to find, discuss, and provide recommendations about the impact of business analysis and its elements on management accounting and the accounting profession. The management accountant's role and responsibilities have evolved from simply reporting overall historical figures, to include measuring organizational performance and providing information relevant to management decision making. proposes a Managerial Accounting Data Analytics (MADA) framework based on the balanced scorecard theory in the context of business intelligence. Information is derived from publications by the American Accounting Association, Emerald, Elsevier,. in international journals indexed by Scopus. The 2010-2022 sample included up to 30 articles on analytic of costing system design. This paper contributes to research by examining the influence of business analytics on managerial accounting in the context of enterprise systems. This study presents a Managerial Accounting Data Analytics (MADA) framework that integrates the Balanced Scorecard methodological approach.

INTRODUCTION

To meet business financial needs, an integrated cost system must be designed by considering several elements: data quality, external financial reporting, product or service costs, and operational and strategic control (Kaplan, 2020). Cost system planning analysis is the process used to find, collect, and analyze relevant cost information during the process of planning and controlling system or organization expenditures (Chang dkk., 2020). The purpose of this analysis is to gain a better understanding of the cost components involved in running a system, such as a production system, a construction project, or a business operation.

The following processes are included in a cost system planning analysis: Identification of Cost Elements: Identify and document each cost component associated with the system being analyzed. This can include costs of raw materials, labor, equipment, shipping, overhead, and so on (Ashraf dkk., 2023; Yang dkk., 2023). Collection of cost data: Information on costs can be obtained from budget reports, financial records, and operational data. Relevant departments, such as finance, accounting, or project management, can provide this information. Cost data analysis: Analyze the cost data collected for patterns, trends, and relationships between cost elements. This can include analytical techniques such as regression analysis, analysis of variance, or other relevant methods of cost analysis. Cost planning and control: To estimate and allocate the right budget for each individual, analysis can be used to plan costs (Mori dkk., 2023).

Cost system planning analysis can help organizations make better spending decisions, find opportunities to reduce costs, and improve operational efficiency. By understanding the cost

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components involved in the system, organizations can plan and manage financial resources more effectively.

In the past, people collaborated remotely. Jobs in various places and/or times are not new. However, the rapid development of electronic information and communication systems in recent years has made distributed work more commonplace (Maynard dkk., 2012) With advances in technologies such as video conferencing, cloud services, and mobile communications, more and more organizations are moving from working with people close to them to working with people all over the world. Around 66% of multinational organizations used Virtual Teams (VT) in 2012, and it is believed that this number will grow. In VT, members are in different locations or time zones, with limited opportunities for physical encounters. In contrast, in traditional teams, members work in close proximity to the environment, with frequent face-to-face communication opportunities (Arini, 2023).

The role of the management accountant has changed significantly over the years. Contemporary management accounting does four things to assist and participate in decision-making with management: assist in strategic cost management to achieve long-term goals; implementing management and operational controls to measure company performance; planning internal cost activities; and make financial reports (Brands & Holtzblatt, 2015).

In the information technology industry, the term "business analytics (BA)" is used to refer to the use of computing to derive insights from data. Data can come from company accounts, internal sources, data warehouses, third-party data providers, or public sources. The company seeks to support "fact-based" decision-making by leveraging digital data from automated business processes and transaction systems. As a result, business analytics is considered a subcategory of computing rather than a specific method, application, or product (Lustig et al., 2010). In many cases, the goal of business analytics is to make better business decisions than simply automating routine processes. This analytics business is an exciting new approach that performance management (PM) and management accounting (MA) can benefit from. Proper analytical skills, such as the ability to use interrelated data sets and mathematical optimization, are becoming increasingly important, according to a PM/MA survey.

To explain the impact of business analysis on management accounting (Fauziyyah, 2022) the management accountant data analytics framework (MADA) incorporates the BSC framework for management accountants to utilize data analytics to measure company performance. Finally, topics related to the application of MADA, such as the context of business intelligence, quality, and data integrity, are discussed to establish their relationship with contemporary business practices.

Some of the following things can occur related to Cost System Planning Analysis: Cost-benefit analysis is a phenomenon related to comparing the costs incurred to implement a system or project with the benefits derived from the system or project. This analysis helps in determining the cost-benefit and feasibility of a project.

METHODS

The methodology utilized in this study involved conducting a systematic literature review (SLR). SLR is a methodical and empirical approach to performing a review of existing literature. In this context, Systematic Literature Review (SLR) is an approach that aims to identify, review, and evaluate all relevant research, with the aim of providing answers to predetermined research questions (Triandini dkk., 2019).

The approach used for selecting the literature is as follows: 1. Utilizing search engines to locate relevant articles, 2. Limiting the search to publications published in peer-reviewed scientific journals, as these are considered the most trustworthy and credible sources, 3. Given that the main subject of this article pertains to analytic of costing system design, the searches were carried out using specific terms such as "virtual teams," " business analytics," and " management accountant data analytics framework," focusing on articles published between 2010 and 2022..

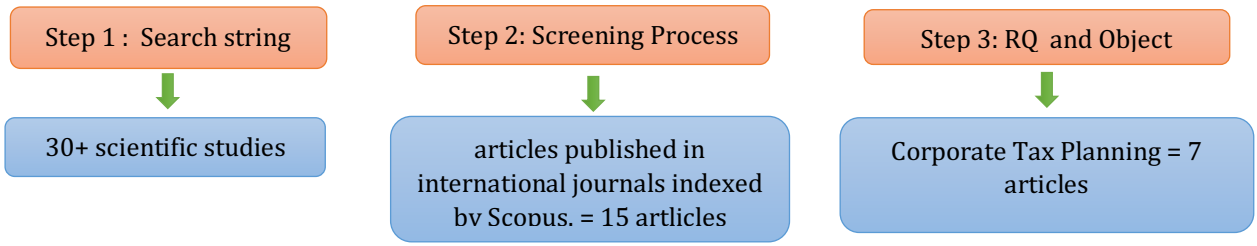

Figure 1. Search and selection process

In this study, a total of seven articles have been chosen for more detailed analysis and review. Among these articles, three were sourced from journals ranked in the Q1 category, three from a Q2-ranked journal, one from an international journal. All of the selected articles were published between the years 2017 and 2022 and will be discussed thoroughly in the Results and Discussion section of the study.

RESULTS

Articles are categorized based on the study methodology employed, the year of publication, and the name of the journal to address the question. The majority of the research methods employed in each article are quantitative as opposed to qualitative, systematic literature review and experimental. So, systematic literature review and qualitative or experimental approach can be used to conduct additional study on analytic of costing system design. An analysis of the research methodology employed in each of the articles that have been reviewed is shown in Figure 2 below

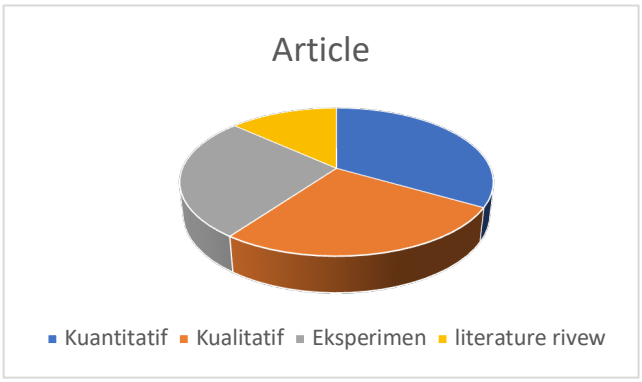

Figure 2. Article research results

Figure 2 illustrates that among the reviewed articles, there are 4 papers that utilized a qualitative technique, 5 articles employed a quantitative approach, 4 article adopted an experimental approach and 2 article adopted an literature review approach. This distribution highlights the prevalence of quantitative methods in the selected literature while indicating the relatively limited use of qualitative and experimental methodologies in addressing the research question on analytic of costing system design.

The patterns in article dissemination change over time. The highest number of publications occurred in 2017, totaling 3 articles. Conversely, the years 2018 through 2021 and 2022 witnessed the lowest number of publications, with only one article each. In 2020 and 2022, three articles were published in each year, while 2018 saw six publications. The decline in the number of publications can be attributed to the saturation of research on analytic of costing system design prompting a shift in focus towards other analytic of costing system design. or forms of analytic of costing system design. Figure 3 presents the research trends on company tax planning to illustrate these findings.

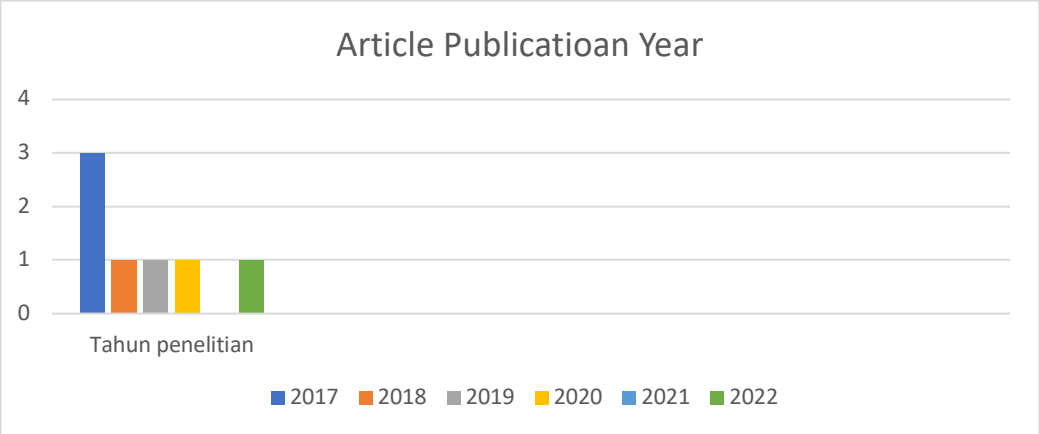

Figure 3. analytic of costing system design.

The findings of empirical research on analytic of costing system design, based on a sample of 15 papers, indicate that various publishing organizations have made significant contributions. Emerald Group Publishing Ltd. contributed 57.14%, The American Accounting Association accounted for 14.2% of the publications and Elsevier contributed 28.57%,

Regarding the content of the papers, the most prevalent sources of information and theories utilized in the research include secondary data and generally applied theories. These theories encompass Balance Score Card Theory

In terms of current control, the company still has deficiencies. It is visible from the lack of control activities such as adequate recording and reporting on all company lines. The division of work functions still has deficiencies in each cost flow. Apart from that, physical checking of assets and authorization for diesel fuel, spare parts, and Other costs in the company are still lacking. Thus, from the conditions of the four aspects above, it can be concluded at this time the company is in the first stage of Cooper's Four Cost System Design Stages and Kaplan.

Discussion

Companies or organizations can use the Balanced Scorecard as a tool to measure how well they are achieving their strategic goals. Robert Kaplan and David Norton created this theory in the early 1990s as a more equitable and comprehensive replacement for traditional approaches to measuring performance which focused solely on financial aspects.

According to the Balance Scorecard, four main interrelated perspectives should be used to measure organizational performance. Kaplan and Norton (2001) interpret the BSC as a framework for setting strategic goals and describe the four perspectives as follows: 1. Financial Perspective: It includes conventional financial metrics such as revenue, profit and return on investment. The aim is to ensure that the company does not experience financial problems in the long term. 2. Customer Perspective: This perspective is centered on customer needs and satisfaction. Organizations must identify important customer aspects, such as quality of goods or services, speed of service, and innovation. The extent to which a company meets customer expectations can be better understood through the use of this perspective measure. 3. Internal Process Perspective: This perspective examines the internal processes that are critical for an organization to achieve operational excellence. This perspective includes measuring efficiency, productivity, quality, and innovation in key organizational processes. 4. Learning and Growth Perspective: This perspective emphasizes an organization's ability to adapt, learn, and innovate. Aspects such as employee capabilities, organizational culture, information systems capabilities, and innovation capabilities are all components that fall into this category.

To measure company performance, BSC provides an opportunity to integrate data analytics methods into Enterprise Resource Planning systems or ERP systems. In particular, various types of data analytics can be supported by data warehouses, which combine big data from outside sources with enterprise data, which includes very large data streams.

Business analytics, also referred to as business analytics, is the process of collecting, analyzing, interpreting, and using data to gain useful insights and assist business decision making. Business analytics involves using statistical, mathematical, and predictive modeling techniques to find patterns, trends, and relationships in company data.

Business analytics helps uncover insights about business performance, customer behavior, market trends and more by analyzing historical and current data. The main goal of business analytics is to turn data into valuable and understandable information, which can be used to make better business decisions and support the achievement of organizational goals. In general, BA is divided into three or four main levels (Davenport & Kim, 2013; Trapsilasiwi & Kurniati, t.t.; Welter & Gartner, 2016). 1. Data Management: This includes the collection, integration and management of data from multiple sources to ensure high data quality and availability. This includes actions such as data collection, storage, processing and maintenance of data integrity. 2. Descriptive Analysis: This includes the use of statistical techniques and data visualization to explain business events. It also helps understand patterns, trends and behaviors that emerge from past data. 3. Predictive Analytics: This involves using statistical modeling techniques and machine teaching algorithms to predict future outcomes or behavior based on available data. This helps in determining opportunities and risks and supports more proactive decision making. 4. Prescriptive Analysis: This involves using simulation and optimization techniques to suggest what to do in a particular business situation. This helps in creating optimal strategies and action plans

Business analytics has become an important part of many modern organizations because it is able to provide deep insights into their business. Companies can use business analytics to manage risk, discover new opportunities, increase operational efficiency and increase customer satisfaction. Managerial Accounting Data Analysis (MADA) is an analytical approach used in the managerial accounting field to analyze and interpret business data to assist management decision making. The main objective of MADA is to provide relevant, accurate and data-driven information to help management plan, control and make better decisions.

The following are some common steps used to perform management accounting data analysis: 1. Data Collection: The first step in MADA is to collect accounting data from various sources, such as financial reports, transaction records, and the company's accounting system. This data may include information such as production costs, selling prices, and operational costs. 2. Data Cleaning: After data collection is complete, the next step is data cleaning. This involves ensuring data conforms to accounting standards, verifying data quality, and removing irrelevant or duplicate data. 3. Statistical Analysis: After the data has been cleaned, the next step is to perform a statistical analysis. This involves using methods such as regression analysis, analysis of variance, and cost-volume-profit analysis (cost-volume-profit analysis), among others, to find patterns, trends, variations, and correlations in data. 4. Interpretation and Understanding: Once the statistical analysis is complete, the next step is to interpret the results and understand how they impact the business. This includes making inferences about cost efficiency, operational performance, optimal prices, sales forecasts, and other matters. 5. Reporting and Communication: The results of analysis of managerial accounting data must be reported to management and interested parties. Performance analysis reports, financial reports, dashboards, graphs, or presentations can be used to show results and data analysis suggestions.

With MADA, companies can optimize the use of their accounting data to catch market trends, find opportunities, increase operational efficiency, and make better decisions based on data and evidence.

Despite the fact that a number of authors have described how analytics will influence future fields such as supply chain management (Liberatore & Luo, 2010), creating value (Kiron & Shockley, 2011) or improving decision making (Romanenko & Artamonov, 2014) the topic of BA has received little attention which discusses the BA framework.

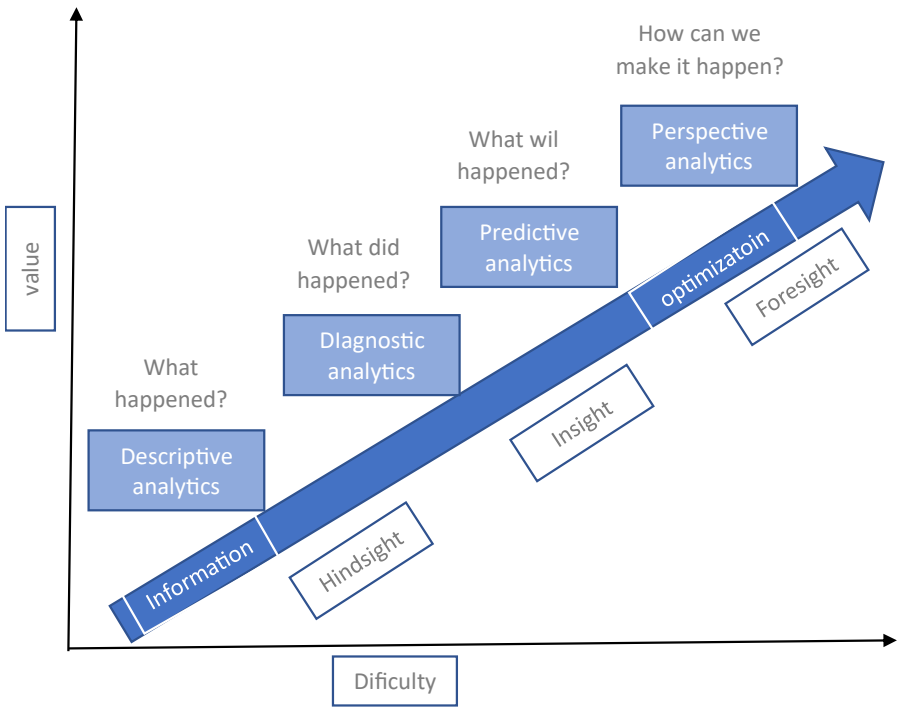

Figure 4. Frame Work Bussiness Analitik

With the use of appropriate computer models it is possible to take decisions and study them and test worldviews to gain insight into potential problems and side effects from before ideas are implemented (De Geus, 1992).

The BSC model cannot be evaluated using analytical methods alone because it is a complex real-world system consisting of several variables or features (KPI) and their relationships (Law and Kelton, 1991). Hence, under an expected set of operational conditions, such as profit maximization, RoCE or EVATM or cost minimization, simulation (or heuristic procedures, used, for example, by Leitch et al., 2005) is often the only possible form of investigation. A "Closed Loop Management System" was developed by Kaplan (2001) to build strong ties between strategy and other technologies, including ABC, Six Sigma, and lean, to track and understand how the BSC model is performing. Business analytics, or business analytics, offers a variety of solutions to address various emerging phenomena. These are some of the commonly used solutions: Use of Analytical Tools: This solution includes good data management and maintenance. In business analytics, this includes business analytics software, database management systems, and data visualization tools. With the help of these tools, companies can collect, process and analyze data more efficiently, allowing them to gain a better understanding of their operations. Companies can ensure that the data used in analysis is valid and reliable by implementing good data management practices, such as data collection standards, privacy policies, and data validation techniques (Modu dkk., 2023).

Analytical Model: This solution involves creating an appropriate analytical model to solve a specific problem or business objective. These models can be regression models, predictive models, or even sophisticated artificial intelligence (AI) models. Using this model, companies can perform predictions, customer segmentation, price optimization, and other analysis that helps their performance.

System Integration: This solution enables the integration of various systems within the organization. Various systems, including manufacturing, financial, and sales systems, often store business data. Companies can enhance their analytical capabilities and gain better visibility into their business operations by integrating these systems and building seamless data flows. Analytical Capacity Building: This solution involves enhancing the capabilities and expertise of the company's analytical

team. The development and training of analytical skills such as statistical understanding, data modeling and use of analytical tools will help analytical teams deal with complex analytical challenges. By enhancing internal analytical capabilities, companies can optimize data usage and make better business decisions based on analysis.

Change Management: This solution is essential for implementing business analytics. Business analytics often requires changing the culture and way companies work. Good change management, including effective communication, management support, and employee engagement, will help companies adopt end-to-end business analytics and optimize its benefits.

Research conducted on the impact of data-driven decision making on firm performance (Brynjolfsson dkk., 2011). Found that the more companies use data to drive their business, the higher their productivity. This is even the case even though the company faces a variety of challenges that may be confusing. Other than that, the difference is very significant. When the scale of data-driven decision-making increases by one standard deviation, company productivity increases by around 4-6%. Data-driven decision-making is also concerned with higher asset returns, return on equity, asset utilization and market value. This relationship seems to have strong causality.

CONCLUSION

The role of managerial accounting has evolved from a traditional focus on financially oriented decision analysis and budget control to a more strategic approach. This newer approach emphasizes identifying, measuring, and managing the main financial and operational factors that affect a company's shareholder value. As enterprise systems advance to give management accountants greater access to different types of data, larger data stores, and better computing power, these enterprise systems can now use data analytics techniques to answer more complex questions. Some of the questions that can be answered through data analytics include: 1. Descriptive Analysis: By aggregating more data, enterprise systems can provide a better understanding of what has been happening in the business. Through descriptive analysis, companies can identify relevant trends, patterns and characteristics from historical data to gain insight into the current business situation. 2. Predictive Analytics: Using the right analytical techniques, enterprise systems can predict what will happen in the future. Predictive analytics involves using statistical models and predictive methods to identify opportunities and risks that may occur in a business. This allows companies to take proactive actions and anticipate upcoming changes. Prescriptive Analytics: By integrating more data and using advanced analytical algorithms, enterprise systems can provide optimized solutions to business problems. Prescriptive analytics involves applying analytical models to provide specific action recommendations and strategies that can significantly improve business performance.

By incorporating these data analytics techniques in managerial accounting, companies can optimize the use of available data to make better decisions, plan more effective strategies, and increase shareholder value

A framework called Managerial Accounting Data Analytics (MADA) was proposed for management accountants to apply data analytics within enterprise systems environments. The MADA framework uses data analytics techniques that are based on Balanced Scorecard (BSC) theory. Through the application of descriptive, predictive and prescriptive analytics, company performance is measured from four main aspects: finance, customers, internal processes, and learning and growth. Data analytics also plays an important role in providing feedback and facilitating the learning process when companies design strategic management systems based on BSC theory.

This systematic literature review has limitations because it limits the search for articles to only the years 2017 – 2022. Generally, articles come with inherent limitations, and this particular article only examines a limited number of research papers that address the analytic of costing system design. to

Business analytics (BA). and Managerial Accounting Data Analysis (MADA) Future researchers can overcome these limitations by conducting comprehensive and systematic investigations of related studies in this domain.

REFERENCES

Arini, R. E. (2023). Merangkul Teknologi: Mengintegrasikan Realitas Virtual dalam Pengalaman Pembelajaran. *Jurnal Pendidikan West Science*, *1*(06), 350–356.

Ashraf, K., Moullec, Y. Le, Pardy, T., & Rang, T. (2023). Design of Cyber Bio-analytical Physical Systems: Formal methods, architectures, and multi-system interaction strategies. *Microprocessors and Microsystems*, *97*. https://doi.org/10.1016/J.MICPRO.2023.104780

Brands, K., & Holtzblatt, M. (2015). Business Analytics: Transforming the Role of Management Accountants. *Management Accounting Quarterly*, *16*(3).

Brynjolfsson, E., Hitt, L. M., & Kim, H. H. (2011). Strength in numbers: How does data-driven decisionmaking affect firm performance? *Available at SSRN 1819486*.

Chang, Z., Li, X., Falcoz, Q., Wang, Z., Neveu, P., & Fasquelle, T. (2020). Approximate analytical characterization and multi-parametric optimization design of single-tank thermocline heat storage system. *Applied Thermal Engineering*, *181*. https://doi.org/10.1016/J.APPLTHERMALENG.2020.116010

Davenport, T. H., & Kim, J. (2013). *Keeping up with the quants: Your guide to understanding and using analytics*. Harvard Business Review Press.

De Geus, A. P. (1992). Modelling to predict or to learn? *European Journal of Operational Research*, *59*(1), 1–5.

Fauziyyah, N. (2022). Efek Digitalisasi Terhadap Akuntansi Manajemen. *Jurnal Akuntansi Keuangan dan Bisnis*, *15*(1), 381–390. https://doi.org/10.35143/jakb.v15i1.5276

Kaplan, R. S. (2020). *The design of cost management systems*. Harvard Business School Press,.

Kaplan, R. S., & Norton, D. P. (2001). Transforming the balanced scorecard from performance measurement to strategic management: Part I. *Accounting horizons*, *15*(1), 87–104.

Kiron, D., & Shockley, R. (2011). Creating business value with analytics. *MIT Sloan Management Review*.

Liberatore, M. J., & Luo, W. (2010). The analytics movement: Implications for operations research. *Interfaces*, *40*(4), 313–324. https://doi.org/10.1287/inte.1100.0502

Maynard, M. T., Mathieu, J. E., Rapp, T. L., & Gilson, L. L. (2012). Something (s) old and something (s) new: Modeling drivers of global virtual team effectiveness. *Journal of Organizational Behavior*, *33*(3), 342–365.

Modu, B., Abdullah, M. P., Bukar, A. L., Hamza, M. F., & Adewolu, M. S. (2023). Energy management and capacity planning of photovoltaic-wind-biomass energy system considering hydrogen-battery storage. *Journal of Energy Storage*, *73*, 109294. https://doi.org/10.1016/J.EST.2023.109294

Mori, H., Abe, T., Sowa, N., & Kondou, T. (2023). Analytical method for suboptimal design of dynamic absorber for parametrically excited system. *Journal of Sound and Vibration*, *548*, 117557. https://doi.org/10.1016/J.JSV.2023.117557

Romanenko, A., & Artamonov, A. (2014). Using analytics to make powerful business decisions. *Analytics Magazine*, 34–44.

Trapsilasiwi, D., & Kurniati, D. (t.t.). PEMBELAJARAN QUICK ON THE DRAW SEBAGAI UPAYA MENINGKATKAN KEMAMPUAN MAHASISWA MENYELESAIKAN SOAL PADA MATA KULIAH ADVANCED REAL ANALYSIS DI PROGRAM STUDI MATEMATIKA. *PENINGKATAN KREATIFITAS BANGSA MELALUI MIPA DAN PEMBELAJAAN MIPA*.

Triandini, E., Jayanatha, S., Indrawan, A., Putra, G. W., & Iswara, B. (2019). Metode systematic literature review untuk identifikasi platform dan metode pengembangan sistem informasi di Indonesia. *Indonesian Journal of Information Systems*, *1*(2), 63–77.

Welter, F., & Gartner, W. B. (2016). *A research agenda for entrepreneurship and context.*

Yang, M., Alballa, T., & Khalifa, H. A. E. W. (2023). A comprehensive data analytics framework for risk management in photovoltaic system design projects. *Optik*, *295*. https://doi.org/10.1016/J.IJLEO.2023.171411