

Exploring the Nexus: Benchmarking and Educational Institution Performance

Safitri Khoirinindyah^{1*}, Ida Rindaningsih²

Islamic Educational Management Department, Universitas Muhammadiyah Sidoarjo,
East Java, Indonesia

Email : safitrikhoirinindyah1712@gmail.com¹, rindaningsih1@umsida.ac.id²

DOI: <http://doi.org/10.33650/al-tanzim.v7i4.6828>

Received: 25 August 2023; Recieved in Revised Form 11 September 2023, Accepted: 23 October 2023, Available online: 11 November 2023

Abstract:

Whether an educational institution develops or not depends on its performance. To improve this performance, many things are done, including how leaders help improve institutional performance in developing competitiveness, one of which is through benchmarking. From this, researchers want to know whether there is a relationship between benchmarking and institutional performance. This research aims to determine the relationship between benchmarking and performance at one State Madrasah Aliyah in East Java. The research method used in this research is a quantitative approach. The data collection method uses a Likert scale. The population and sample use a saturated sample technique or a total sample with 35 respondents. The data analysis technique uses Product Moment correlation. This research shows a relationship between benchmarking and institutional performance with evidence of a product-moment correlation value of 0.430 with a significance value of 0.010 ($p < 0.05$), which means that H_a is accepted and H_o is rejected. This research provides implications for benchmarking and institutional performance in competitiveness development.

Keywords: *Benchmarking, Performance, Competitiveness*

Abstrak:

Berkembang tidaknya suatu lembaga pendidikan tergantung dari kinerja di dalamnya. Untuk meningkatkan kinerja tersebut banyak hal yang dilakukan, diantaranya bagaimana pemimpin membantu meningkatkan kinerja lembaga di bidang pengembangan daya saing yang salah satunya melalui benchmarking. Dari hal tersebut, peneliti ingin mengetahui apakah ada hubungan antara benchmarking dengan kinerja lembaga. Penelitian ini bertujuan untuk mengetahui adanya hubungan benchmarking dengan kinerja di salah satu Madrasah Aliyah Negeri di Jawa Timur. Metode Penelitian yang digunakan dalam penelitian ini adalah pendekatan kuantitatif. Metode pengumpulan data menggunakan skala likert. Populasi dan sampel menggunakan Teknik sampel jenuh atau sampel total dengan jumlah seluruh responden 35. Teknik analisis data menggunakan korelasi Product Moment. Hasil penelitian ini diperoleh bahwa terdapat hubungan antara benchmarking dengan kinerja lembaga dengan bukti nilai hasil korelasi product moment sebesar 0.430 dengan nilai signifikansi sebesar 0,010 ($p < 0,05$) yang artinya H_a diterima dan H_o ditolak. Penelitian ini memberikan implikasi adanya hubungan benchmarking dengan kinerja lembaga dalam bidang pengembangan daya saing.

Kata Kunci: *Benchmarking, Kinerja, Daya Saing*

INTRODUCTION

Today's education has faced the era of Artificial Intelligence (AI); education is needed to form a creative, innovative and competitive generation; this can be achieved with quality education in Lemabag's performance (Stumbriene et al., 2020). As times progress, every field of life has increasingly fierce competition, including the world of education. Every educational institution competes to improve the quality and quantity of its institutions. In this case, the institution's performance is very influential. Whether an institution develops or not depends on the performance it has carried out (Salas-Velasco, 2020). Conditions like this trigger the world of education to be more concerned about the strategies used to improve institutional performance. Every institution strives to formulate and perfect its strategies to become superior.

Performance is a description of the level of achievement of the implementation of an activity program in realizing the goals, objectives, vision, and mission of an Institution, as outlined through the strategic planning of an Institution (Phadermrod et al., 2019; Syahputri et al., 2020). Performance or work performance is the result of work in terms of quality and quantity achieved by an employee in carrying out his duties according to the responsibilities given to him (Maryani et al., 2021; Iskanto et al., 2021). To improve the institution's performance, some things need to be done, namely providing guidance, training, involvement workshops, and benchmarking. Benchmarking is a strategy and method for improving performance systematically and logically through measuring and comparing performance and then using it to improve performance. Objective benchmarking to improve organizational performance and learn the secrets of their success in Institutional performance (Silva et al., 2020).

Benchmarking is also self-improvement, and the management process must be continuous to be effective (Kharlamova et al., 2020; Blettner et al., 2023).. Benchmarking cannot be executed just once and abandoned afterwards, in the belief that the task has been completed. Benchmarking is a continuous process, as industry practices are constantly changing (Potoczek, 2021; Hakim et al., 2021). Industry leaders are constantly becoming more muscular. Practices are continuously monitored to ensure that the best of them are found. You will successfully achieve the best performance in an organization that catches benchmarking with discipline. In a constantly changing environment, satisfaction is crucial. Benchmarking between institutions is often done by visiting other schools to conduct comparative studies and determine the school's performance (Bhattacharya et al., 2020). Benchmarking in education is a significant effort to compare what a school is doing and learn from exciting experiences at school to apply. This research is necessary because many studies have been found about benchmarking within the company (Gutierrez et al., 2019). Benchmarking research at the madrasah level has yet to be found.

In previous research, benchmarking is a strategy and method (Mukhtar et al., 2019) to improve performance systematically and logically (Maharani &

Rindaningsih, 2023), employee motivation through the visit and seeing competitors directly (Bhattacharya et al., 2020), measuring and comparing performance to achieve excellence or competitiveness (Silva et al., 2020). To realize superior quality performance in educational institutions (Mukhtar et al., 2019), a benchmarking strategy is needed to obtain an overview of existing institutions' performance conditions so that best practices can be adopted to achieve the desired targets. Researchers have carried out many studies on benchmarking (Skourdoumbis, 2014), including Eke Wince, who stated that human resource benchmarking tends to be in the external and functional categories. To achieve total quality, organizational resources must carry out optimal, professional, and proportional organization. Wardani stated that benchmarking is an activity that is carried out continuously to obtain the best benefits for improving the quality of human resources within it. Also, in the research entitled *Management of Islamic Higher Education Based on Benchmarking and Information Technology in the Revolutionary Era 4.0*, it is explained that the importance of developing the quality of higher education at Nurul Jadid Paiton University, Probolinggo cannot be separated from benchmarking as an approach and strategy to achieve this progress (Wahid et al., 2019).

Based on the author's observations, performance is the leading benchmark in improving the quality of institutions (Coupet & Ba, 2022). The performance of the MAN 1 Pasuruan institution is considered good because every year, it always experiences an increase in performance with different strategy changes. This can be proven by the existence of teacher and education staff report cards as a performance assessment which includes attendance, activeness, discipline, and administration (Le et al., 2021), as well as four essential teacher competencies, namely basic competencies for teachers, namely pedagogic, personality, social and professional competencies. Apart from that, the MAN 1 Pasuruan Institute constantly improves performance, which has yet to improve, to achieve integrated management (total quality management) (Camilleri, 2021) by looking at the strategies used by competing institutions.

With this research, each institution can implement this strategy to improve its performance (Maharani & Rindaningsih, 2023). According to Dwi Yuniati, head of curriculum, implementation benchmarking at MAN 1 Pasuruan is consistently implemented. Benchmarking This is done by visiting competing institutions to measure and compare performance, looking at the strategies used by competing institutions in improving the quality of their institutions, so that every year, MAN 1 Pasuruan always has new strategies implemented to improve its performance.

Based on the research results above, this research is unique and novel, especially in improving the performance of educational institutions. The researchers focused their study on the relationship between benchmarking and performance, as evidenced by the annual increase in institutional performance results. Benchmarking is very influential in improving performance. By implementing benchmarking, Institutions will know the weaknesses experienced during the performance improvement process to improve their performance to

become a superior institution. Based on the explanation above, researchers conducted research entitled The Relationship between Benchmarking and Institutional Performance at MAN 1 Pasuruan. The H_a hypothesis states there is a relationship between benchmarking and the performance of institutions at MAN 1 Pasuruan and H_o , which states that there was no relationship between benchmarking and the performance of the institutions at MAN 1 Pasuruan. The novelty in this research implementation of the benchmarking model in madrasah is that there is a relationship between benchmarking and institutional performance at MAN 1 Pasuruan.

RESEARCH METHODS

This research uses a quantitative approach method by looking at phenomena. This type of research is quantitative correlational, which aims to determine the relationship between the independent and dependent variables (Gupta & Thakkar, 2018). The x variable in this research is benchmarking, and variable y is institutional performance. The data collection method uses a Likert scale with four alternative answers, namely always, often, sometimes, and never, and is supported by interviews and observations (Hoła, 2023). The questionnaire in this research includes independent variable questionnaires and dependent variables using closed questionnaires. In this research, benchmarking is filled in by teachers and staff, and the dependent variable questionnaire is performance, which teachers and staff fill in. The population of this study were teachers and staff at MAN 1 Pasuruan. In this study, researchers used the entire population with a total sample of 35 respondents.

Table 1. Variable Research

Variable	Indicator
Benchmarking x	Cultural Change
	Performance Improvements
	Increasing Human Resource Capabilities
Institutional Performance y	Increasing Accountability
	Performance
	Increasing quality of governance institutional management

Techniques used in analyzing performance scale reliability results and benchmarking is a formula alpha Cronbach using the SPSS 16.0 program. The results of the validity and reliability trials of the performance variables contained 25 items that were tested, the results after being tested on respondents or samples that were used as research subjects, of the 25 items, there were 17 valid items and eight invalid items. Based on the reliability test results, it is 0.840, which means it is reliable. Meanwhile, the results of the variable validity and reliability trials benchmarking There are 38 items, 26 valid items, and 12 invalid items. Based on the reliability test results, it is 0.868, which means it is reliable.

RESULTS AND DISCUSSIONS

The scale preparation begins with choosing a theoretical definition and aspects, then an operational definition, to understand the related variables properly. These operations are formulated in the form of behavioural indicators. The stimulus format is described in the form of a blueprint scale. Blueprints serve as a reference in writing items in the form of statements. The final result of preparing the measuring instrument in this research is a scale. This research uses two scales, namely Institutional Performance and Benchmarking (Mengoni et al., 2011). The number of items in the Institution's performance scale is 25, while the scale benchmarking is 38. Both scales are contained in a sheet of paper entitled questionnaire. This research uses an institutional performance scale of 26 items and scales benchmarking of 17 items. The research was conducted at MAN 1 Pasuruan with 35 people.

Application benchmarking at MAN 1 Pasuruan implementing the APQC concept. The APQC study resulted in recognising four basic steps in the benchmarking process. These steps, which follow the four steps in the Deming cycle for management, are as follows: 1. Plan the project benchmarking, 2. Collect the necessary data; 3. Analyze data about performance gaps and determinants, and 4. Develop and adapt process determinants.

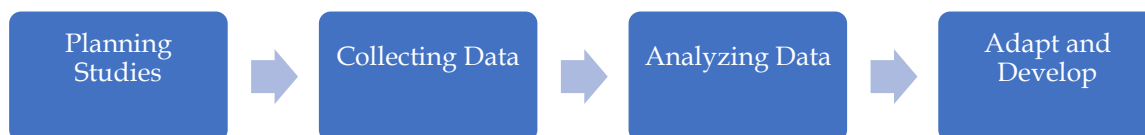


Figure 1. Benchmarking Process

Based on the description above, leaders and subordinates carry out implementation benchmarking in organisations (Bodner et al., 2013). In this research, practice benchmarking led by the head of the madrasah as a leader in the Board (Mukhtar et al., 2019), as well as educators and educational staff, are also included in the implementation benchmarking. The following is the process for implementing benchmarking, as shown in Figure 2.

The scale preparation begins with choosing a theoretical definition and aspects, then an operational definition, to understand the related variables properly. These operations are formulated in the form of behavioural indicators. The stimulus format is described in the form of a blueprint scale. Blueprints serve as a reference in writing items in the form of statements. The final result of preparing the measuring instrument in this research is a scale. This research uses two scales, namely Institutional Performance and Benchmarking (Mengoni et al., 2011). The number of items in the Institution's performance scale is 25, while the scale benchmarking is 38. Both scales are contained in a sheet of paper entitled questionnaire. This research uses an institutional performance scale of 26 items and scales benchmarking of 17 items. The research was conducted at MAN 1 Pasuruan with 35 people.

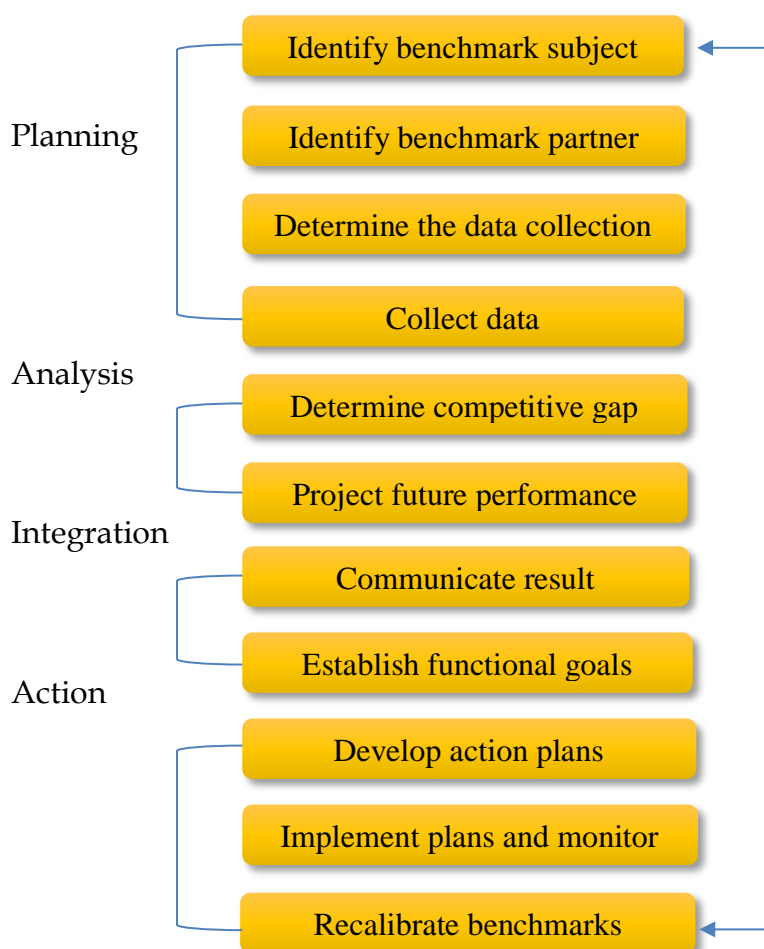


Figure 2. Benchmarking Implementation Model

Application benchmarking at MAN 1 Pasuruan implementing the APQC concept. The APQC study recognised four basic steps in the benchmarking process. These steps, which follow the four steps in the Deming cycle for management, are as follows: 1. Plan the project benchmarking, 2. Collect the necessary data; 3. Analyze data about performance gaps and determinants, and 4. Develop and adapt process determinants.

Table 2. Hypothesis Test Results

Variable	R	Sig. (2-tailed)	N
Institutional Performance and benchmarking	0,430	0,010	35

Correlation analysis test results Bivariate Pearson on the table output It was found that the Sig (2-tailed) value = 0.010 because the Sig (2-tailed) value < 0.05 concluded that there was a significant relationship between benchmarking and the performance of the institution.

Based on the rules correlation (Correlation Coefficient), if the significance is > 0.05, then Ho is accepted, and if the significance is < 0.05, then Ho is rejected. These results show a positive and directly proportional relationship between benchmarking and the institution's performance. This means it is getting higher

benchmarking, followed by higher institutional performance at the MAN 1 Pasuruan Institution and vice versa.

The results of this research are in line with the research conducted and have a significant influence on the performance of the Institution (Izadikhah & Farzipoor Saen, 2020). Influence benchmarking The result is positive, which means implementation benchmarking. The higher it is (Tran et al., 2020), the higher the institution's performance will be. Performance or work performance in an institution greatly influences (Hossain & Thakur, 2021) the quality of an institution. In this case, Institutional performance is defined as a result of an Institution's success in achieving target plans (Zhou et al., 2018). This can be done by holding training, benchmarking, and monitoring to achieve the plan's objectives.

Performance or achievement can be defined as a combination of the combined results of skill and motivation (Salas-Velasco, 2020), where skill is an individual's effort to carry out work and is a stable characteristic (Tran et al., 2020). At the same time, benchmarking can motivate employees through visits and seeing firsthand competitors' performance. By implementing this program, benchmarking can develop human resources (Welling & Ryding, 2021) to improve the performance standards of employees in their institutions. It means benchmarking as a continuous search for and accurate application of better practices that lead to superior competitive performance (Gutierrez et al., 2019).

The essence of benchmarking is comparing the performance of work processes to identify how they achieved success. Teachers can visit other Institutions and see how things are done (Coupet & Ba, 2022). Teachers can also study best practices that can be implemented in their Institutions. In this way, teachers can directly measure and compare their performance with the performance of competing institutions. In this way, teachers and staff are expected to truly understand the shortcomings of their performance so that teachers and staff are more creative, disciplined, and thorough in carrying out their duties (Agasisti et al., 2019).

Based on this research, apart from strategy benchmarking, which can improve performance, other factors can influence the implementation of good performance, namely factors originating from the workers or the organization. Such as employee abilities or competencies, while organizational factors are how well leaders empower their workers, reward workers, and help improve employees' performance capabilities through coaching, monitoring, benchmarking, and counselling (O'Reilly et al., 2015). Grouping subject scores show teachers' and staff's perceptions of implementation benchmarking in the medium category. This means that the institution's teachers and staff feel that benchmarking increases performance. Researchers conclude that benchmarking can improve the performance of an educational institution to achieve excellence or competitiveness.

Table 3. Research Finding

No.	Findings
1	human capabilities and competencies increas to achieve state madrasah aliyah that is superior in developing competitiveness
2	leaders empower human resources by giving rewards
3	theacher as fasilitator and student actor in participating in competitions in various national and international competitions

4	ITS PRODISTIK departement (applied ICT program)
5	Robotic class
6	Ma'had az-zahra

Implementing the results of benchmarking to human capabilities and competencies increases the achievement of state madrasah aliyah, which is superior in developing competitiveness; from an organizational perspective, leaders empower human resources by giving rewards. The results achieved from implementing benchmarking are the teacher as facilitator and student actor in participating in competitions in various national and international competitions, ITS PRODISTIK department (applied ICT program), robotic class, ma'had az-zahra. From the results achieved by MAN 1 Pasuruan, superior and competitive power development can be increased.

CONCLUSION

It can be seen that implementation benchmarking at MAN 1 Pasuruan is included in the excellent category; looking at the results of the answers and calculations from the Likert scale, which is a measuring tool in data collection, shows that the resulting answer scores are high and categorized as good. The performance of the institution, which includes teachers, employees, and staff at MAN 1 Pasuruan, is included in the excellent category by looking at the results of the answers and calculations from the Likert scale, which is a measuring tool in collecting data, showing that the answer scores obtained are high and classified as good.

The results of the data analysis show that there is a relationship between benchmarking and the performance of the Institution at MAN 1 Pasuruan. The degree of relationship between benchmarking and performance is included in the medium category. This can be proven from the results of correlation calculations product moment amounting to 0.430 with a significant value of 0.010 ($p < 0.05$). So, H_a is accepted, and H_o is rejected, meaning there is a relationship between benchmarking and the performance of institutions at MAN 1 Pasuruan.

ACKNOWLEDGEMENTS

Researchers would like to thank the Headmaster of MAN 1 Pasuruan, who has assisted in the form of morals to researchers so that this research was completed correctly.

REFERENCES

- Agasisti, T., Munda, G., & Hippe, R. (2019). Measuring the Efficiency of European Education Systems by Combining Data Envelopment Analysis and Multiple-Criteria Evaluation. *Journal of Productivity Analysis*, 51(2-3), 105-124. <https://doi.org/10.1007/s11123-019-00549-6>
- Bhattacharya, S., Momaya, K. S., & Iyer, K. C. (2020). Benchmarking Enablers to Achieve Growth Performance: A Conceptual Framework. *Benchmarking*, 27(4), 1475-1501. <https://doi.org/10.1108/BIJ-08-2019-0376>

- Blettner, D., Kotiloglu, S., & Lechler, T. G. (2023). Self-Assessment versus Self-Improvement Motives: How Does Social Reference Group Selection Influence Organizational Responses to Performance Feedback?. *British Journal of Management*. <https://doi.org/10.1111/1467-8551.12700>
- Bodner, M. E., Rhodes, R. E., Miller, W. C., & Dean, E. (2013). Benchmarking Curriculum Content in Entry-Level Health Professional Education with Special Reference to Health Promotion Practice in Physical Therapy: A Multi-Institutional International Study. *Advances in Health Sciences Education*, 18(4), 645–657. <https://doi.org/10.1007/s10459-012-9404-x>
- Camilleri, M. A. (2021). Evaluating Service Quality and Performance of Higher Education Institutions: A Systematic Review and A Post-Covid-19 Outlook. *International Journal of Quality and Service Sciences*, 13(2), 268–281. <https://doi.org/10.1108/IJQSS-03-2020-0034>
- Coupet, J., & Ba, Y. (2022). Benchmarking University Technology Transfer Performance with External Research Funding: A Stochastic Frontier Analysis. *Journal of Technology Transfer*, 47(2), 605–620. <https://doi.org/10.1007/s10961-021-09856-3>
- Gupta, V. K., & Thakkar, J. J. (2018). A Quantitative Risk Assessment Methodology For Construction Project. *Sadhana - Academy Proceedings in Engineering Sciences*, 43(7), 1–16. <https://doi.org/10.1007/s12046-018-0846-6>
- Gutierrez, A., Ansuategi, A., Susperregi, L., Tubío, C., Rankić, I., & Lenža, L. (2019). A Benchmarking of Learning Strategies for Pest Detection and Identification on Tomato Plants for Autonomous Scouting Robots Using Internal Databases. *Journal of Sensors*, 2019. <https://doi.org/10.1155/2019/5219471>
- Hakim, L., Diana, E., & Sholihah, W. (2021). Benchmarking; Enhancing The Advantages of Linguistic Competitiveness in Islamic Boarding Schools. *Al-Tanzim: Jurnal Manajemen Pendidikan Islam*, 5(3), 195-209.
- Hoła, A. (2023). Methodology of the Quantitative Assessment of The Moisture Content of Saline Brick Walls in Historic Buildings Using Machine Learning. *Archives of Civil and Mechanical Engineering*, 23(3), 1–15. <https://doi.org/10.1007/s43452-023-00679-7>
- Hossain, M. K., & Thakur, V. (2021). Benchmarking Health-Care Supply Chain by Implementing Industry 4.0: A Fuzzy-AHP-Dematel Approach. *Benchmarking*, 28(2), 556–581. <https://doi.org/10.1108/BIJ-05-2020-0268>
- Iskamto, D., Srimulatsih, M., Ansori, P. B., Ghazali, P. L., Foziah, N. H. M., Arifin, J., & Bon, A. T. (2021). Analysis of Relationship between Leadership and Employee Performance at Manufactur Company in Indoenesia. In *Proceedings of the 11th Annual International Conference on Industrial Engineering and Operations Management*. Singapore: IEOM Society International (Vol. 8, pp. 3262-3269). <https://doi.org/10.46254/AN11.20210593>
- Izadikhah, M., & Farzipoor Saen, R. (2020). Ranking Sustainable Suppliers by Context-Dependent Data Envelopment Analysis. In *Annals of Operations Research* (Vol. 293). Springer US. <https://doi.org/10.1007/s10479-019-03370-4>

- Kharlamova, O., Tkachenko, S., Poliakova, Y., Lipskyi, R., & Prokhorchuk, S. (2020). Management Accounting Using Benchmarking Tools. *Academy of Accounting and Financial Studies Journal*, 24(2), 1-7.
- Le, M. H., Afsharian, M., & Ahn, H. (2021). Inverse Frontier-based Benchmarking for Investigating the Efficiency and Achieving the Targets in the Vietnamese Education System. *Omega (United Kingdom)*, 103, 102427. <https://doi.org/10.1016/j.omega.2021.102427>
- Maharani, O., & Rindaningsih, I. (2023). Penilaian Kinerja sebagai Penentu Prestasi dan Kinerja Tenaga Kependidikan: Literature Review. *MAMEN: Jurnal Manajemen*, 2(1), 159-170. <https://doi.org/10.55123/mamen.v2i1.1626>
- Maryani, Y., Entang, M., & Tukiran, M. (2021). The Relationship between Work Motivation, Work Discipline and Employee Performance at the Regional Secretariat of Bogor City. *International Journal of Social and Management Studies*, 2(2), 1-16.
- Mengoni, M., Germani, M., & Peruzzini, M. (2011). Benchmarking of Virtual Reality Performance in Mechanics Education. *International Journal on Interactive Design and Manufacturing*, 5(2), 103-117. <https://doi.org/10.1007/s12008-011-0119-7>
- Mukhtar, H., Anwar, H. K., & Harahap, E. K. (2019). Benchmarking Head of Madrasah in Doing Madrasah Transformation in Jambi Province. *International Journal of Research -Granthaalayah*, 7(4), 281-299. <https://doi.org/10.29121/granthaalayah.v7.i4.2019.902>
- O'Reilly, J., Eichhorst, W., Gábos, A., Hadjivassiliou, K., Lain, D., Leschke, J., ... Villa, P. (2015). Five Characteristics of Youth Unemployment in Europe: Flexibility, Education, Migration, Family Legacies, and EU Policy. *SAGE Open*, 5(1). <https://doi.org/10.1177/2158244015574962>
- Phadermrod, B., Crowder, R. M., & Wills, G. B. (2019). Importance-Performance Analysis based SWOT analysis. *International Journal of Information Management*, 44, 194-203. <https://doi.org/10.1016/j.ijinfomgt.2016.03.009>
- Potoczek, N. (2021). The Use of Process Benchmarking in The Water Industry To Introduce Changes in The Digitization of The Company's Value Chain. *Journal of Entrepreneurship, Management and Innovation*, 17(4), 51-90. <https://doi.org/10.7341/20211743>
- Salas-Velasco, M. (2020). The Technical Efficiency Performance of The Higher Education Systems Based on Data Envelopment Analysis with An Illustration for the Spanish Case. *Educational Research for Policy and Practice*, 19(2), 159-180. <https://doi.org/10.1007/s10671-019-09254-5>
- Silva, M. C. A., Camanho, A. S., & Barbosa, F. (2020). Benchmarking of Secondary Schools Based on Students' Results in Higher Education. *Omega (United Kingdom)*, 95. <https://doi.org/10.1016/j.omega.2019.102119>
- Skourdombis, A. (2014). International "Benchmarking" Studies and The Identification of "Education Best Practice": A focus on Classroom Teachers and Their Practices. *Australian Educational Researcher*, 41(4), 411-423. <https://doi.org/10.1007/s13384-013-0142-8>

- Stolzer, A. J., Friend, M. A., Truong, D., Tuccio, W. A., & Aguiar, M. (2018). Measuring and Evaluating Safety Management System Effectiveness using Data Envelopment Analysis. *Safety Science*, 104(December 2017), 55–69. <https://doi.org/10.1016/j.ssci.2017.12.037>
- Stumbriene, D., Camanho, A. S., & Jakaitiene, A. (2020). The Performance of Education Systems in The Light of Europe 2020 Strategy. In *Annals of Operations Research* (Vol. 288). Springer US. <https://doi.org/10.1007/s10479-019-03329-5>
- Syahputri, Y., Pribadi, T., & Dalimunthe, H. (2020). The Implementation of Liability Accounting on Managerial Performance in PT. Telkom Tbk, Medan Branch. *Budapest International Research and Critics Institute (BIRCI-Journal): Humanities and Social Sciences*, 3(3), 2395-2402. <https://doi.org/10.33258/birci.v3i3.1199>
- Tran, P. P., Kuo, K. C., Lu, W. M., & Kweh, Q. L. (2020). Benchmarking in Vietnam Universities: Teaching and Research and Revenue Efficiencies. *Asia Pacific Education Review*, 21(2), 197–209. <https://doi.org/10.1007/s12564-019-09622-z>
- Wahid, A., Rahman, K., Najiburrahman, N., Fauzi, A., Baharun, H., & Muali, C. (2019, June). Management of Islamic Higher Education Based on Benchmarking and Information Technology in the Revolutionary Era 4.0. In *Proceedings of 1st Workshop on Environmental Science, Society, and Technology, WESTECH 2018, December 8th, 2018, Medan, Indonesia*. <https://doi.org/10.4108/eai.8-12-2018.2284035>
- Welling, S., & Ryding, S. O. (2021). Distribution of Environmental Performance in Life Cycle Assessments – Implications for Environmental Benchmarking. *International Journal of Life Cycle Assessment*, 26(2), 275–289. <https://doi.org/10.1007/s11367-020-01852-3>
- Zhou, H., Yang, Y., Chen, Y., & Zhu, J. (2018). Data Envelopment Analysis Application in Sustainability: The Origins, Development and Future Directions. *European Journal of Operational Research*, 264(1), 1–16. <https://doi.org/10.1016/j.ejor.2017.06.023>