

REFERENCES

- Adli, F. F., Qatrunnada, S. R., & Satmoko, Y. C. (2025). Sweet Success or Sour Struggles? Efficiency of the East Java Sugar Industry. *East Java Economic Journal*, 9(1), 55–81. <https://doi.org/10.53572/ejavec.v9i1.150>
- Amarta, N. W. D., & Hendrawaty, E. (2025). The Effect of Environmental, Social, and Governance (ESG) Disclosure on Investment Efficiency (an Empirical Study on Manufacturing Companies Listed on the Indonesia Stock Exchange in 2019–2023). *International Journal Of Education, Social Studies, And Management (IJESSM)*, 5(2), 599–613. <https://doi.org/10.52121/ijessm.v5i2.735>
- Andrian, H. (2022). Analisis Pengukuran Produktivitas Dengan Menggunakan Metode *American Productivity Center* (APC) Pada Umkm Rumah Briket. Universitas Medan Area.
- Anggara, Z. R., & Wikartika, I. (2025). Contribution Of Environment, Social, Governance And Financial Performance To Firm Value. *18*(2), 241–256.
- Bahrudin. (2025). Efficiency Analysis of Sugar Mills in Indonesia: A Data Envelopment Analysis Approach. *Jurnal Ekonomi Pembangunan*.
- Boroun, M., Ghahderijani, M., Naseri, A. A., & Beheshti, B. (2023). Use Of Imperialist Competitive Algorithm For Optimization Of Energy Productivity And Damage Assessment In Sugar Industry: A Case Study. *Environmental and Sustainability Indicators*, 19, 100263. <https://doi.org/10.1016/j.indic.2023.100263>
- Camanho, A. S., Silva, M. C., Piran, F. S., & Lacerda, D. P. (2024). A Literature Review Of Economic Efficiency Assessments Using Data Envelopment Analysis. *European Journal of Operational Research*, 315(1), 1–18. <https://doi.org/10.1016/j.ejor.2023.07.027>
- Charnes, A., Cooper, W. W., & Rhodes, E. (1978). Measuring The Efficiency Of Decision Making Units. *European Journal of Operational Research*, 2(6), 429–444. [https://doi.org/10.1016/0377-2217\(78\)90138-8](https://doi.org/10.1016/0377-2217(78)90138-8)
- Coelli, T. J., Rao, D. S. P., O'Donnell, C. J., & Battese, G. E. (2005). Index Numbers and Productivity Measurement. Dalam *An Introduction to Efficiency and Productivity Analysis* (hlm. 85–132). Springer-Verlag. https://doi.org/10.1007/0-387-25895-7_4
- Creswell, J. W., & Creswell, D. J. (2017). *Research Design. Qualitative, Quantitative, And Mixed Methods Approaches* (5th edition (international student edition)). SAGE Publications.

- Data Laporan Impor Gula 10 Tahun Terakhir BPS.* (2025). Badan Pusat Statistik. <https://www.bps.go.id/id/publication/2025/02/28/8cfe1a589ad3693396d3db9f/statistik-indonesia-2025.html>
- De Bruijn, J. M. D. B. (2020). Technical accounting: Sugar extraction and losses. *Sugar Industry*, 712–721. <https://doi.org/10.36961/si25654>
- Eccles, R. G., Ioannou, I., & Serafeim, G. (2011). The Impact of a Corporate Culture of Sustainability on Corporate Behavior and Performance. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.1964011>
- Evanthi, A., & Azhar, R. M. (2023). Uncovering The Relationships Between Strategic Capability, Strategic Flexibility, And Performance. *International Journal of Science, Technology & Management*, 4(1), 30–38. <https://doi.org/10.46729/ijstm.v4i1.722>
- Gunawan, Darmein, Mardiyanto, A., Syahputra, R., & R, A. (2021). Penilaian Proses Produksi Gula Berbasis Kinerja dan Penggunaan Energi. Vol.5 No.1.
- Hafidz, A. (2025, Desember). PG Tjoekir Jombang Catat Produksi Gula Tertinggi Sejak 2016, Segini Hasil Musim Giling 2025. *Jawa Pos*. <https://jombangbanget.jawapos.com/bisnis/2136912705/pg-tjoekir-jombang-catat-produksi-gula-tertinggi-sejak-2016-segini-hasil-musim-giling-2025?page=2>
- Handayani, W., & Susilowati, N. (2021). Analisis Pengukuran Produktivitas Di Bagian Pengecoran PT Apie Indo Karunia Dengan Metode Objective Matrix. *Jurnal MEBIS (Manajemen dan Bisnis)*, 6(1), 1–13. <https://doi.org/10.33005/mebis.v6i1.201>
- Hanifa, H., & Pramono, S. E. (2025). Analisis Efisiensi dan Produktivitas Pengelolaan Dana Wakaf di Indonesia: Pendekatan Data Envelopment Analysis (DEA) dan Malmquist Productivity Index (MPI). *Ekonomis: Journal of Economics and Business*, 9(1), 92. <https://doi.org/10.33087/ekonomis.v9i1.2061>
- Hartatie, D., Taufika, R., & Achmad, P. B. (2021). Pengaruh Curah Hujan dan Pemupukan terhadap Produksi Tebu (*Saccharum officinarum* L.) di Pabrik Gula Asembagus Kabupaten Situbondo. *Jurnal Ilmiah Inovasi*, 21(2), 66–72. <https://doi.org/10.25047/jii.v21i2.2592>
- ID FOOD. (2024). *Perbandingan Produksi dan Konsumsi Gula Indonesia*. <https://idfood.co.id/>
- Khairani, K., & Sisdianto, E. (2024). Implementasi Akuntansi Lingkungan untuk Mewujudkan Manajemen Lingkungan yang Efektif. *Jurnal Ilmiah Ekonomi*,

Manajemen, Bisnis Dan Akuntansi, 2(1), 419–432.
<https://doi.org/10.61722/jemba.v2i1.651>

Khalif, M., & Handayani, W. (2023). Analisis Proses Reverse Logistics menggunakan Metode Produktivitas Ramah Lingkungan pada CV. Sunflower Amerta. *Jurnal Samudra Ekonomi dan Bisnis*, 14(2), 367–380.
<https://doi.org/10.33059/jseb.v14i2.6801>

Krišťáková, S., Neykov, N., Antov, P., Sedliačiková, M., Reh, R., Halalisan, A.-F., & Hajdúchová, I. (2021). Efficiency of Wood-Processing Enterprises—Evaluation Based on DEA and MPI: A Comparison between Slovakia and Bulgaria for the Period 2014–2018. *Forests*, 12(8), 1026. <https://doi.org/10.3390/f12081026>

Kurniawan, M., Ramadhan, W., & Effendi, U. (2021). Pengukuran Efektivitas Mesin Produksi Gula Di PG Kremboong Sidoarjo. *Jurnal Teknologi Pertanian*, 22(1), 57–68. <https://doi.org/10.21776/ub.jtp.2021.022.01.6>

Li, Y., & Li, J. (2023). The Relationship between Environmental, Social, Governance, and Export Performance in Manufacturing Companies: A Literature Review. *Theoretical and Practical Research in Economic Fields*, 14(2), 345. [https://doi.org/10.14505/tpref.v14.2\(28\).14](https://doi.org/10.14505/tpref.v14.2(28).14)

Lou, Y., Yang, G., Guan, Z., Chen, X., Pan, H., Wang, T., & Zheng, H. (2024). A Parallel Data Envelopment Analysis And Malmquist Productivity Index Model Of Virtual Frontier For Evaluating Scientific And Technological Innovation Efficiency At Universities. *Decision Analytics Journal*, 10, 100384. <https://doi.org/10.1016/j.dajour.2023.100384>

Maharani, S., & Suhartini, D. (2025). CSR as a Moderation: Improving Financial Performance Through Green Investments and Good Corporate Governance. *Ekspektra : Jurnal Bisnis dan Manajemen*, 9(2), 172–186. <https://doi.org/10.25139/ekt.v9i2.10643>

Mardiyana, S., & Susanti, N. (2022). Analisis Efisiensi Kinerja Operasional Menggunakan Metode *Data Envelopment Analysis* (DEA). *Jurnal Manajemen Industri dan Logistik*, 6(1), 45–58.

Marodiyah, I., Wahyuni, H. C., & Nurmalasari, I. R. (2023). Green Productivity in Increasing the Productivity of Sugar Cane Farmers and Reducing Impacts on the Environment. *Indonesian Journal of Cultural and Community Development*, 14(2). <https://doi.org/10.21070/ijccd.v14i2.954>

Marta, S., & Erza, O. (2017). Analisis Efisiensi Industri Gula Di Indonesia Dengan Metode *Data Envelopment Analysis* (DEA) TAHUN 2001 – 2010. *Media Ekonomi*, 18(3), 1–19. <https://doi.org/10.25105/me.v18i3.845>

- Martin-Gamboa, M., & Iribarren, D. (2021). Coupled Life Cycle Thinking And Data Envelopment Analysis For Quantitative Sustainability Improvement. Dalam *Methods in Sustainability Science* (hlm. 295–320). Elsevier. <https://doi.org/10.1016/B978-0-12-823987-2.00003-9>
- Masso, J., & Tiwari, A. K. (2024). Productivity Impacts Of R&D And Non-R&D Modes Of Technological Change For Incumbents And Entrants In A Catching-Up Economy. *Technological Forecasting and Social Change*, 199, 123015. <https://doi.org/10.1016/j.techfore.2023.123015>
- Maulidina, R. (2024). Analisis Produktivitas Pada Bank Umum Syariah Menggunakan Metode *Malmquist Productivity Index* Pada Periode 2019-2023. Universitas Islam Negeri Raden Intan Lampung.
- Mishra, V., Singh, J., Kulkarni, S., & Yadav, S. (2024). Analysis Of Profit Efficiency Of Corporate Hospitals In India During COVID-19 – An DEA-MPI Based Approach. *International Journal of Healthcare Management*, 17(1), 177–185. <https://doi.org/10.1080/20479700.2022.2163866>
- Muhtadi, M. M., Sitawati, S., & Suryanto, A. (2024). Effect of Sugarcane Varieties and Milling Delay Time on Cane Sugar Yield. *Jurnal Teknik Pertanian Lampung (Journal of Agricultural Engineering)*, 13(2), 506. <https://doi.org/10.23960/jtep-l.v13i2.506-511>
- Najar, B. W. (2020). Efficiency and/or Effectiveness in Managing Organizations. *Journal of Education and Culture Studies*, 4(2), p131. <https://doi.org/10.22158/jecs.v4n2p131>
- OECD. (2023). *Corporate Governance and Climate Transition: OECD Business and Finance Outlook*.
- Ogolla, O., Michael O. (2022). *An Empirical Assessment Of Technical Efficiency In The Kenya Sugar Industry: Data Envelopment Analysis (Dea) Approach* [Thesis, University of Nairobi]. Diambil https://erepository.uonbi.ac.ke/discover?filtertype=subject&filter_relational_operator=equals&filter=Technical+Efficiency+In+The+Kenya+Sugar+Industry
- Primatami, A., & Primadhita, Y. (2020). *Efisiensi UMKM Makanan Dengan Pendekatan Data Envelopment Analysis*. (22(01)), 1–10.
- Purnomo, Y. S., Rahmadaniati, F. E. P., & Sitogasa, P. S. A. (2025). *Analisis Penerapan Efisiensi Energi (Studi Kasus: Gedung III Fakultas Teknik dan Sains UPN “Veteran” Jawa Timur)*. X No.2, 13051–13058.

- Raharjo, R., Azizah, A., & Bimantoro, A. (2023). *Penerapan Enterprise Resource Planning Dalam Supply Chain Management Pada Minimarket Family Cukir*. <https://doi.org/10.5281/zenodo.8263447>
- Rahman, A., & Setiawan. (2023). *Pengukuran kinerja organisasi dengan model multiple input dan multiple output menggunakan DEA*. 4, 15–29.
- Rustyani, S., Sofiawati, D., & Rahmawati, B. (2023). Efisiensi dan Produktivitas BPJS Kesehatan Tahun 2014 – 2021 (Metode Data Envelopment Analysis dan Malmquist Index). *Jurnal Jaminan Kesehatan Nasional*, 3(2), 102–120. <https://doi.org/10.53756/jjkn.v3i2.145>
- Sachs, J. D., Schmidt-Traub, G., Mazzucato, M., Messner, D., Nakicenovic, N., & Rockström, J. (2019). Six Transformations to achieve the Sustainable Development Goals. *Nature Sustainability*, 2(9), 805–814. <https://doi.org/10.1038/s41893-019-0352-9>
- Silalahi, A. V. (2024). Kebijakan Pengembangan Tebu Menuju Swasembada Gula Konsumsi. *Jurnal Perencanaan Pembangunan Pertanian*, 1 (1), 75–86.
- Sitorus, A. P., Nurkholik, A., Oktavia, S., Simanjuntak, L. F., & Rusiadi. (2025). ESG Implications in Improving Green Business to Support Green Economy Strategy. *Jurnal EMT KITA*, 9(3), 795–804. <https://doi.org/10.35870/emt.v9i3.4079>
- Slack, N., Brandon-Jones, A., & Burgess, N. (2022). *Operations management* (Tenth edition). Pearson.
- Sun, L., & Saat, N. A. M. (2023). How Does Intelligent Manufacturing Affect the ESG Performance of Manufacturing Firms? Evidence from China. *Sustainability*, 15(4), 2898. <https://doi.org/10.3390/su15042898>
- Susilo, D., & Yuniati, S. (2020). Kebijakan Perdagangan Gula Indonesia Dan Kesejahteraan Petani Tebu.
- Tritisari, A. (2023). Karakteristik Gula Semut Nira Tebu Dengan Penambahan Pengawet Alami. *Jurnal Agroindustri Pangan*, 2(2), 44–55. <https://doi.org/10.47767/agroindustri.v2i2.542>
- Uula, M. M. (2024). Analisis Efisiensi Dan Produktivitas Sektor Perkebunan Di Sumatra: *Data Envelopment Analysis* (DEA) Dan *Malmquist Productivity Index* (MPI).
- Veana, F., Martínez-Hernández, J. L., Aguilar, C. N., Rodríguez-Herrera, R., & Michelena, G. (2014). Utilization Of Molasses And Sugar Cane Bagasse For Production Of Fungal Invertase In Solid State Fermentation Using *Aspergillus*

- Niger GH1. *Brazilian Journal of Microbiology*, 45(2), 373–377. <https://doi.org/10.1590/S1517-83822014000200002>
- Wahyu, N., & Elvina, N. A. (2024). Analisis Tingkat Kinerja Eko-Efisiensi di 5 Negara ASEAN dengan Metode Data Envelopment Analysis. (15(2)), 87–93. <https://doi.org/10.20961/qfxxx355>
- Wang, X., & Zhang, X. (2021). Study on Sugarcane Production Efficiency Based on DEA-Malmquist Index: A Case Study of 8 Cities in Guangdong Province. *Discrete Dynamics in Nature and Society*, 2021, 1–10. <https://doi.org/10.1155/2021/7957040>
- Widyaningsih, N. (2022). Pengukuran Efisiensi Teknis dengan Pendekatan Frontier.
- Yusuf, M. T., Jamhari, J., & Irham, I. (2020). Technical Efficiency of State-Owned Sugarcane Production in East Java. *Agro Ekonomi*, 31(1). <https://doi.org/10.22146/ae.50004>
- Zhu, C., Zhu, N., Emrouznejad, A., & Ye, T. (2024). A New Malmquist Productivity Index With An Application To Commercial Banks. *IMA Journal of Management Mathematics*, 35(2), 215–240. <https://doi.org/10.1093/imaman/dpad015>