Power System Technology
ISSN:1000-3673

Received: 16-05-2024 Revised: 12-06-2024 Accepted: 07-07-2024

Building Soppeng's Information Technology Infrastructure: A Case Study Management and Engineering Perspective in the Integration of Renewable Energy Fostering Resilience

Andi Dirga Patalo[1], Aldi Hariansyah[2], Andi Adawiyah[3], A. Asmini[4], Tiomy Butsianto Adi[5], Peter John Wanner[6], Rudihartono Ismail[7], Ismail Suardi Wekke[8]

[1]*Department of Economics, Faculty of Economic, Universitas Lammappapoleonro, Indonesia.*
Email: adp181818@gmail.com
[2]*Department of Economics, Faculty of Economic, Universitas Lammappapoleonro, Indonesia.*
Email: aldihariansyah117@gmail.com
[3]*Department of Management, Faculty of Economic and Business, Universitas Lammappapoleonro, Indonesia.*
Email: aadawiah@unipol.ac.id
[4]*Department of Economics, Faculty of Economic, Universitas Lammappapoleonro, Indonesia.*
Email: asmini@unipol.ac.id
[5]*Department of Management, Faculty of Management, Universitas Amal Ilmiah Yapis Wamena, Indonesia.*
Email: tiomy@gmail.com
[6]*Department of Economics, Faculty of Economic, BOLT (NPO), Japan; Tohoku University, Japan*
Email: wanner.peter.john.e3@tohoku.ac.id
[7]*Department Management Science, Faculty of Management Science, Universitas Amal Ilmiah Yapis Wamena, Indonesia.*
Email: ssaling@unaim-wamena.ac.id
[8]*Institut Agama Islam Negeri Sorong, Indonesia; Universitas Amal Ilmiah Yapis Wamena, Indonesia.*
Email: iswekke@gmail.com

Abstract:- This paper presents a framework for building Soppeng's IT infrastructure, informed by management and engineering principles. It outlines considerations for planning, implementation, and maintenance of the IT infrastructure, ensuring its effectiveness and alignment with Soppeng's development goals. In addition, drawing on established principles in both management and engineering. It lays out crucial aspects to address throughout each stage, encompassing the initial planning, the

Power System Technology
ISSN:1000-3673
Received: 16-05-2024 Revised: 12-06-2024 Accepted: 07-07-2024

implementation process, and the ongoing upkeep of the IT system. By carefully considering these factors, the paper aims to ensure that the resulting IT infrastructure operates effectively and aligns seamlessly with Soppeng's broader development goals. This means the IT system will not only function smoothly but also actively contribute to the achievement of Soppeng's aspirations for progress. The case study was observed in Ganra (one of the districts in Soppeng, South Sulawesi Indonesia). The early findings show the construction of a framework on IT development. Batu-Batu, a village nestled in Soppeng Regency, Indonesia, grapples with balancing its energy demands with environmental sustainability. Fortunately, renewable energy sources offer a path forward. Hydropower from nearby streams, solar energy harnessed from the sunshine, and biogas derived from agricultural waste all hold immense potential. By collaborating with the government, fostering community engagement, and attracting private investment, Batu-Batu can become a beacon of renewable energy for Soppeng.

Keywords: *Engineering, IT, Infrastructure Development, Management, Soppeng*

1. Introduction

In today's rapidly evolving world, a robust Information Technology (IT) infrastructure is no longer a luxury (Abbas et al., 2021), but a necessity for progress. This is particularly true for regions like Soppeng, Indonesia, where harnessing the power of IT can significantly impact economic growth, social development, and overall prosperity (Cummings, 2021).

This paper explores the critical task of building Soppeng's IT infrastructure, exploring it from both a management and engineering perspective. Based on findings of Crum and Özçelik (2024), this paper will examine the key challenges and opportunities that lie ahead, along with the management principles and engineering practices essential for successful implementation. By effectively combining management principles and engineering practices, Syamsudduha et al. (2014) laid a solid foundation for a thriving IT ecosystem in Soppeng that empowers its citizens that fuels its future.

Qurani et al. (2020) found that Soppeng had aspired to leverage technology for progress. This progress continues to exist. While a well-defined framework for building Soppeng's IT infrastructure is crucial, there are research gaps that need to be addressed to ensure its effectiveness and long-term sustainability. This paper explores these gaps, highlighting areas that require further investigation to optimize the framework.

A Framework Design is necessary: (1) Scalability and Flexibility, Soppeng's IT framework needs to be adaptable to accommodate future growth and evolving needs. Further research will help develop strategies that ensure scalability, such as modular architecture, open standards, and cloud-based solutions; (2) Integration with older technology systems is necessary, Soppeng currently has existing IT systems that need to be integrated with the new infrastructure. Identification and development of cost-effective and efficient methods for data migration and seamless integration between old and new systems is required; (3) Hussain et al. (2020)

Power System Technology
ISSN:1000-3673
Received: 16-05-2024 Revised: 12-06-2024 Accepted: 07-07-2024

identified cybersecurity threats in local context that are constantly evolving. Research is needed to identify specific vulnerabilities in Soppeng's context, such as the prevalence of targeted attacks against local governments or the lack of cybersecurity awareness among users. Building Soppeng's IT infrastructure is a complex endeavor. By addressing these research gaps, the framework can be strengthened to ensure its effectiveness, sustainability, and alignment with Soppeng's development goals. Mattoliang et al. (2022) suggested that further research was necessary to develop context-specific solutions, build capacity, and embrace emerging technologies responsibly. This research is designed to follow up on the past research and provide further analysis up till now. Azmanajaya et al. (2022) maintain that by fostering a culture of continuous learning and innovation, Soppeng can leverage its IT framework to become a model for successful digital transformation in developing regions.

The research titled "Building Soppeng's IT Infrastructure: A Management and Engineering Perspective of Ganra District Case Study" aims to investigate the process of developing information technology (IT) infrastructure in Soppeng Regency, Indonesia, with a specific focus on the Ganra District. It will explore:

- The management and engineering practices involved in building the IT infrastructure.
- The challenges encountered during the development process in Ganra District.
- Potential solutions or best practices for IT infrastructure development in Soppeng Regency, informed by the Ganra District case study.

By examining these aspects, the research aims to provide valuable insights for policymakers and IT professionals involved in building and managing IT infrastructure in Soppeng Regency and potentially other regions.

Soppeng Regency in South Sulawesi, Indonesia, boasts about a hidden gem – the picturesque village of Batu-Batu. Surrounded by breathtaking natural beauty, Batu-Batu faces a critical challenge; ensuring its energy needs are met in an environmentally sustainable manner. However, amidst this challenge lies a unique opportunity. By embracing renewable energy sources, Batu-Batu can illuminate a path towards a cleaner, brighter future, not just for itself, but for the entire Soppeng region.

2. Methods

Building Soppeng's IT infrastructure requires a comprehensive approach that integrates sound management practices with strategic engineering solutions. This paper will explore a methodological framework encompassing the following key phases:

Power System Technology
ISSN:1000-3673
Received: 16-05-2024 Revised: 12-06-2024 Accepted: 07-07-2024

1. **Needs Assessment and Planning:**

- Conduct a thorough analysis of Soppeng's current IT landscape, identifying existing infrastructure, digital literacy levels, and critical needs across various sectors (government, education, healthcare, businesses).
- Engage stakeholders from government, private sector, and the community to establish development goals and priorities for the IT infrastructure.
- Develop a comprehensive IT infrastructure plan outlining specific objective, technologies to be implemented, resource requirements, and implementation timelines.

2. **Project Management and Implementation:**

- Employ proven project management methodologies to ensure efficient execution of the IT infrastructure development plan.
- Involve analysis of work breakdown structures, resource allocation strategies, risk management plans, and clear communication channels among stakeholders.
- Implement chosen engineering solutions , considering factors like scalability, security, interoperability, and cost-effectiveness.

3. **Monitoring and Evaluation:**

- Establish performance metrics to track the progress of the IT infrastructure development and evaluate its impact on achieving Soppeng's development goals.
- Conduct regular monitoring to identify any potential issues or areas for improvement.
- Adapt the IT infrastructure plan as needed to ensure its continued relevance and effectiveness in Soppeng's evolving digital landscape.

This method emphasizes a data-driven, collaborative, and adaptable approach to building Soppeng's IT infrastructure. By systematically addressing needs, implementing effective management practices, and leveraging sound engineering principles, Soppeng can build a sustainable foundation for its digital future.

3. Results

Building a robust IT infrastructure requires careful planning and execution. In the case of Soppeng Regency, Indonesia, the Ganra District serves as a case study for examining the management and engineering practices involved in this process. Research into this topic will explore how the project was managed. This involves a careful analysis of the methodologies used, such as Agile—a project management approach that emphasizes continuous collaboration and improvement, or Waterfall—a widely used project management method with a linear approach, to assess their effectiveness in guiding the development process. In addition, the research examines the technology selection process. This involves understanding the criteria employed for choosing hardware, software, and network equipment, considering factors like cost, scalability, and compatibility with existing systems.

Power System Technology
ISSN:1000-3673
Received: 16-05-2024 Revised: 12-06-2024 Accepted: 07-07-2024

In addition, the research investigates vendors as they manage throughout the project. This entails analyzing contract negotiations with suppliers responsible for implementing the IT infrastructure, as well as how their performance is monitored to ensure successful completion. By examining these management and engineering practices, valuable insights inform us about future IT infrastructure development projects in Soppeng Regency and beyond.

Building Soppeng's IT Infrastructure in Ganra District, Management and Engineering Practices:

- Project Management: The research will reveal the specific project management methodologies used in Ganra District. This could include frameworks like Agile or Waterfall, and how effectively they were implemented.
- Technology Selection: The research will identify the criteria used for selecting hardware, software, and network equipment for the IT infrastructure. It might analyze factors like cost, scalability, and compatibility.
- Vendor Management: The findings will explore the approach used to manage relationships with vendors who supplied and implemented the IT infrastructure. This might include aspects like contract negotiation and performance monitoring.
- Standardization and Documentation: The research will assess the level of standardization implemented for hardware, software, and configuration processes. It will also evaluate the quality and accessibility of documentation for future maintenance.

Building Soppeng's IT infrastructure presents both challenges and opportunities. Limited resources, uneven digital literacy, and existing legacy systems can pose hurdles. However, strategic planning, collaborative partnerships, and focusing on scalable and adaptable solutions can effectively address these challenges.

The methodology outlined earlier has the potential to yield significant findings as Soppeng progresses with its IT infrastructure development. For instance, the needs assessment can reveal unequal internet access across rural and urban areas, highlighting the need for targeted infrastructure investment (Ismail & Helmawati, 2023). Project management practices can ensure efficient implementation; while monitoring and evaluation can demonstrate the positive impact of IT on areas like e-government services or increased business opportunities.

Soppeng located in South Sulawesi (Indonesia). There are 8 kecamatan (districts) around the kabupaten (regency). The success of Soppeng's IT infrastructure development hinges on tailoring solutions to the local context (Wekke et al., 2021). Prioritizing technologies appropriate for Soppeng's digital literacy levels and focusing on solutions that bridge the digital divide. Additionally, fostering collaboration between government agencies, private companies, and educational institutions can leverage collective expertise and resources for sustainable development.

Power System Technology
ISSN:1000-3673
Received: 16-05-2024 Revised: 12-06-2024 Accepted: 07-07-2024

3.1.Batu-Batu and Its Initiative of Renewable Energy

Tapping into Nature's Power: Exploring Renewable Energy in Soppeng Regency, nestled in South Sulawesi, Indonesia, is looking towards a sustainable future by exploring renewable energy sources. With a growing population and increasing energy demands, Soppeng is seeking alternatives to traditional, non-renewable resources. This shift towards clean energy holds immense potential for the region's environment and economic development.

Hydropower: Harnessing the Flow

Soppeng's most promising renewable energy source is hydropower. The Langkemme River, a major waterway in the regency, offers significant potential for mini hydropower plants (MHPs). Studies indicate that the river's flow and elevation changes could generate an estimated 3 MW of electricity annually using a MHP. This clean energy could power homes and businesses, reducing dependence on fossil fuels.

Beyond Hydro: Exploring Other Avenues

While hydropower seems to be the frontrunner (Song, 2024), Soppeng shouldn't limit its exploration. Here are some other possibilities:

- **Solar Power:** Soppeng's abundant sunshine makes solar energy a viable option. Solar panels on rooftops or in designated solar farms could generate clean electricity for the community.
- **Biogas:** Agricultural waste can be converted into biogas, a clean-burning fuel that can be used for cooking, heating, and even electricity generation. This approach would not only provide renewable energy but also manage waste effectively.

Unlocking the Potential

Developing a robust renewable energy sector in Soppeng requires a collaborative effort. Here's what can be done:

- **Government Support:** The Indonesian government has set ambitious renewable energy targets. Soppeng can leverage these initiatives to secure funding and expertise for project development.
- **Public Awareness:** Educating residents about the benefits of renewable energy is crucial. This will foster community support and encourage participation in projects.
- **Private Investment:** Attracting private investment is essential for large-scale renewable energy projects. Creating a business-friendly environment will be key.

A Brighter Future for Soppeng Investing in renewable energy presents a win-win situation for Soppeng. It reduces dependence on fossil fuels, safeguards the environment for future generations, and creates new economic opportunities. By tapping into its natural resources and

Power System Technology
ISSN:1000-3673
Received: 16-05-2024 Revised: 12-06-2024 Accepted: 07-07-2024

fostering collaboration, Soppeng can pave the way for a sustainable and prosperous future (Ismail et al., 2021).

Batu-Batu and Renewable Energy: A Sustainable Path for Soppeng's Future Nestled amidst the lush greenery of South Sulawesi, Indonesia, Soppeng Regency is home to the charming village of Batu-Batu. While Batu-Batu's beauty lies in its natural splendor, it faces the challenge of balancing its energy needs with environmental sustainability. Fortunately, the village holds immense potential to embrace renewable energy sources, paving the way for a cleaner and more sustainable future.

Harnessing Hydropower's Potential Batu-Batu's geography presents an opportunity to harness hydropower, a clean and renewable energy source. The flowing streams and rivers in the vicinity can be utilized to generate electricity through mini hydropower plants (MHPs). Studies indicate that these MHPs could produce a significant amount of electricity, potentially meeting a substantial portion of the village's energy demands.

Exploring Solar Energy's Promise Batu-Batu's abundant sunshine makes solar energy a compelling option. Solar panels installed on rooftops or in designated solar farms could generate clean electricity, reducing reliance on traditional, non-renewable sources. This shift towards solar energy would not only power homes and businesses but also contribute to a cleaner environment.

Embracing Biogas: A Sustainable Solution Batu-Batu's agricultural activities generate a significant amount of organic waste. This waste can be transformed into biogas, a clean-burning fuel that can be used for cooking, heating, and even electricity generation. Biogas production would not only provide renewable energy but also effectively manage waste, minimizing environmental impact.

Unlocking the Potential: A Collaborative Approach Realizing Batu-Batu's renewable energy potential requires a collaborative effort involving various stakeholders:

- **Government Support:** The Indonesian government's commitment to renewable energy provides a supportive framework. Batu-Batu can leverage these initiatives to secure funding and expertise for project development.
- **Community Engagement:** Educating residents about the benefits of renewable energy is crucial. Foster community support and encourage participation in projects by organizing workshops, seminars, and awareness campaigns.
- **Private Investment:** Attracting private investment is essential for large-scale renewable energy projects. Creating a business-friendly environment with clear policies and incentives will encourage private sector participation.

Power System Technology
ISSN:1000-3673

Received: 16-05-2024 Revised: 12-06-2024 Accepted: 07-07-2024

A Beacon of Sustainability

Batu-Batu's transition to renewable energy can serve as a beacon of sustainability for other villages in Soppeng Regency. By embracing clean energy sources, Batu-Batu can reduce its carbon footprint, enhance environmental quality, and demonstrate the feasibility of a sustainable future for rural communities.

As Batu-Batu embarks on this journey towards a renewable energy future, it stands as an inspiration to other villages in Soppeng and beyond. By harnessing the power of nature and fostering collaboration, Batu-Batu can pave the way for a cleaner, more sustainable future for generations to come.

4. Discussion

Crucial aspects of IT Infrastructure are:

- The identification of specific technologies suited for Soppeng's IT infrastructure, considering factors like affordability, scalability, and security.
- Strategies to promote digital literacy and bridge the digital divide within Soppeng's community.
- The role of public-private partnerships in financing and maintaining Soppeng's IT infrastructure over the long term.

By addressing these findings and fostering discussion, we can move forward with a comprehensive plan to build Soppeng's IT infrastructure and unlock its potential for progress.

4.1.State-of-the-Art Framework for Soppeng's IT Infrastructure

Soppeng, aspires to propel itself forward through strategic development initiatives. A robust and well-designed IT infrastructure forms the backbone of this progress, enabling efficient communication, data management, and access to essential services. This paper outlines a state-of-the-art framework for building Soppeng's IT infrastructure, incorporating best practices in management, engineering, and aligning with the region's development goals.

The first step in building a successful IT framework is conducting a thorough needs assessment (Blackham, 2022). This involves gathering information on Soppeng's current IT landscape, identifying existing gaps and limitations, and understanding the region's development goals. Here are some key aspects to consider:

- **Current IT Infrastructure:** Analyze existing hardware, software, network connectivity, and cybersecurity measures.
- **Digital Literacy:** Assess the level of digital literacy among Soppeng's population, including government officials, businesses, and citizens.

Power System Technology
ISSN:1000-3673
Received: 16-05-2024 Revised: 12-06-2024 Accepted: 07-07-2024

- **Development Goals:** Align the IT infrastructure with Soppeng's strategic development plans in areas like education, healthcare, agriculture, and e-governance.

4.2.Framework for Building Soppeng's IT Infrastructure

Informed by the needs assessment, the framework can be structured around the following key phases:

1. **Planning and Design:**

- **Strategic IT Roadmap:** Develop a comprehensive long-term plan outlining the vision, goals, and implementation phases for Soppeng's IT infrastructure.
- **Technology Selection:** Evaluate and choose appropriate hardware, software, and network solutions based on scalability, performance, security, and compatibility with existing systems.
- **Standardization and Policies:** Establish IT standards and policies to ensure consistency, manageability, and security across the infrastructure.

2. **Implementation:**

- **Project Management:** Implement a robust project management methodology to ensure timely, efficient, and cost-effective execution of the plan.
- **Infrastructure Deployment:** Physically deploy the chosen hardware, software, and network components according to the designed architecture.
- **Data Migration and Integration:** Migrate existing data from legacy systems to the new infrastructure and ensure seamless integration between different components.

3. **Operation and Maintenance:**

- **IT Service Management:** Implement an IT service management (ITSM) framework to monitor, manage, and optimize the performance of the IT infrastructure. This includes incident management, problem management, change management, and configuration management.
- **Cybersecurity:** Establish robust cybersecurity measures to protect the IT infrastructure from cyber threats. This includes firewalls, intrusion detection systems, data encryption, and user access controls.
- **Training and Support:** Provide ongoing training and support to IT staff and users to ensure they can effectively utilize the new infrastructure.

4.3.Key Considerations for a State-of-the-Art Approach

- **Cloud Adoption:** Explore the benefits of cloud computing for scalability, cost-efficiency, and disaster recovery.
- **Open Source Technologies:** Consider incorporating open-source software solutions for flexibility, customization, and cost-effectiveness.

Power System Technology
ISSN:1000-3673
Received: 16-05-2024 Revised: 12-06-2024 Accepted: 07-07-2024

- **Emerging Technologies:** Stay informed about and evaluate the potential of emerging technologies like Internet of Things (IoT), artificial intelligence (AI), and big data analytics to further enhance Soppeng's IT infrastructure.
- **Sustainability:** Choose energy-efficient IT solutions and implement green practices for sustainable IT infrastructure development.

4.3.1. Benefits of IT Framework

By implementing this state-of-the-art framework, Soppeng can reap numerous benefits (Raman et al., 2023):

- **Improved Efficiency and Productivity:** Streamlined communication, data management, and access to services will lead to increased efficiency and productivity across various sectors.
- **Enhanced Service Delivery:** The IT infrastructure will facilitate the delivery of essential government services like e-governance, e-health, and e-education to Soppeng's citizens.
- **Economic Growth:** A robust IT infrastructure can foster innovation, attract businesses, and facilitate economic growth in Soppeng.
- **Bridging the Digital Divide:** By improving digital literacy and access to technology, the framework can bridge the digital divide and empower Soppeng's citizens.

Building a state-of-the-art IT infrastructure is an ongoing process that requires continuous evaluation, adaptation, and investment (Moniri-Morad & Sattarvand, 2023). This framework provides a solid foundation for Soppeng to embark on its digital transformation journey and achieve its development goals. By actively engaging stakeholders, embracing innovation, and utilizing the latest technologies, Soppeng can create a future-proof IT infrastructure that fuels progress and prosperity (Chirapanda, 2019).

While Batu-Batu presents a promising case for renewable energy adoption, there are challenges to consider alongside the exciting opportunities.

- **Initial Investment:** Setting up renewable energy infrastructure like MHPs or solar farms requires upfront costs. Creative financing solutions and government grants can help address this hurdle.
- **Technical Expertise:** Developing and maintaining renewable energy systems might necessitate technical expertise that may not be readily available in Batu-Batu. Training programs and collaborations with universities or external specialists can bridge this gap.
- **Community Acceptance:** Not everyone in the community might be familiar with or convinced about renewable energy. Open communication, education campaigns, and highlighting the long-term benefits can ensure community buy-in.

Power System Technology
ISSN:1000-3673
Received: 16-05-2024 Revised: 12-06-2024 Accepted: 07-07-2024

- **Long-Term Cost Savings:** Renewable energy sources like hydropower and solar have minimal operating costs compared to traditional fuels, leading to significant cost savings in the long run.
- **Environmental Benefits:** Shifting to renewable energy reduces dependence on fossil fuels, curbing greenhouse gas emissions and air pollution, leading to a healthier environment for Batu-Batu's residents.
- **Economic Potential:** Investing in renewable energy can create new job opportunities in installation, maintenance, and potentially even biofuel production from biogas (Yigezu et al., 2018).

By acknowledging the challenges and strategically leveraging the opportunities, Batu-Batu can overcome hurdles and successfully transition towards a renewable energy future. This shift has the potential to not only address the village's energy needs but also serve as a model for sustainable development in Soppeng Regency.

The success of Batu-Batu's renewable energy endeavor hinges on collaboration (Batra, 2023). Working with the government to secure funding and expertise, fostering community engagement to ensure widespread support, and attracting private investment are all crucial steps. As Batu-Batu embarks on this path, it serves as an inspiration for other villages in Soppeng, demonstrating the viability and potential of renewable energy for a brighter, more sustainable future (Lestariningsih et al., 2023; Musara, 2024). By embracing nature's power, Batu-Batu can illuminate a path not just for itself, but for the entire Soppeng Regency.

5. Conclusion

Building Soppeng's IT infrastructure is an investment in the region's future. By adopting a methodology that integrates strategic management practices with effective engineering solutions, Soppeng can lay a solid foundation for economic growth, social development, and overall prosperity. This article has explored the challenges and opportunities associated with developing Soppeng's IT infrastructure. We discussed the importance of needs assessment, project management, and continuous monitoring and evaluation. Furthermore, we emphasized the need to tailor solutions to Soppeng's specific context and prioritize collaboration among stakeholders. By effectively addressing the findings presented here and continuing open discussions, Soppeng can transform its IT landscape and unlock a future filled with digital opportunities for its citizens. The success of this endeavor will serve as a model for other regions embarking on their own journeys towards a more connected and technologically advanced future. Batu-Batu's journey towards renewable energy signifies a commitment to a sustainable future. By harnessing the power of hydropower, solar energy, and biogas, the village can illuminate its path with clean, renewable sources. This shift promises not only to meet Batu-Batu's energy demands but also to create a healthier environment, reduce reliance on fossil fuels, and potentially unlock new economic opportunities.

Power System Technology
ISSN:1000-3673
Received: 16-05-2024 Revised: 12-06-2024 Accepted: 07-07-2024

References

[1] Abbas, B., Wekke, I. S., Qadri, M. N., Razak, A., Saeka, S., Idris, I., & Almana, L. O. (2021). Effectiveness of Academic Information System Quality on Improving Student Satisfaction in Higher Education Institutions. *1st Asia Pacific International Conference on Industrial Engineering and Operations Management*. https://doi.org/10.46254/ap01.20210136

[2] Cummings, W. (2001). Indonesia. Authority and Enterprise among the Peoples of South Sulawesi. Edited by Roger Tol, Kees Van Dijk and Greg Acciaioli. Leiden: Kitlv, 2000. Pp. 285. *Journal of Southeast Asian Studies*, *32*(3), 451–493. https://doi.org/10.1017/s0022463401330254

[3] Crum, S., & Özçelik, Ö. (2024). Social Networks as Technology-Enhanced Learning Environments for Second Language teaching in Higher Education. *International Journal of Emerging Technologies in Learning*, *19*(01), 4–22. https://doi.org/10.3991/ijet.v19i01.42013

[4] Syamsudduha, S., Kamaruddin, K., Hanafi, H., & Tang, M. R. (2014). Educational value and character in Pappaseng Bugis (Buginese Message). *Journal of Language Teaching and Research*, *5*(5). https://doi.org/10.4304/jltr.5.5.1092-1102

[5] Qurani, I. Z., Rahmasary, A. N., & Usman, N. F. (2020). The Comparative Study of Youth-Related Agriculture Initiatives: Optimizing the role of Indonesian youth in improving Food Security. *E3S Web of Conferences*, *142*, 06002. https://doi.org/10.1051/e3sconf/202014206002

[6] Hussain, A., Mohamed, A., & Razali, S. (2020). A Review on Cybersecurity: Challenges & Emerging Threats. *Proceedings of the 3rd International Conference on Networking, Information Systems & Security*, 1–7. https://dl.acm.org/doi/10.1145/3386723.3387847

[7] Mattoliang, L. A., Baharuddin, N., Nur, N. M. J. A., & Riswandi, A. (2022). Development of Explorative Mathlet Learning Media Based on Adobe Flash Cs6 With Islamic Nuances on Linear Equations System With Three Variables Material. *Mapan : Jurnal Matematika & Pembelajaran*, *10*(2), 428–442. https://doi.org/10.24252/mapan.2022v10n2a12

[8] Azmanajaya, E., Paulus, C., Hermansyah, H., Pongtuluran, E. H., Jumarang, I., & Mahmud, T. (2022). Attributes of the Water Supply Program in Soppeng regency, South Sulawesi. *Jurnal Pengelolaan Sumberdaya Alam Dan Lingkungan*, *12*(3), 555–569. https://doi.org/10.29244/jpsl.12.3.555-569

[9] Ismail, R., & Helmawati, N. (2023). Experiences of the Yayasan Pendidikan Islam (Yapis) di Tanah Papua in Extending Human Resources. *Millah*, 127–154. https://doi.org/10.20885/millah.vol22.iss1.art5

[10] Wekke, I. S., Ihsan, M., Rasyid, M. R., Ismail, R., & Makbul, M. (2021). Educational Technology in Higher Education on Pandemic Covid-19 Experiences. *6th North American*

Power System Technology
ISSN:1000-3673
Received: 16-05-2024 Revised: 12-06-2024 Accepted: 07-07-2024

International Conference on Industrial Engineering and Operations Management. https://doi.org/10.31219/osf.io/e9cx7

[11] Song, C. (2024). Enhancing multimodal understanding with LIUS. *Journal of Organizational and End User Computing*, *36*(1), 1–17. https://doi.org/10.4018/joeuc.336276

[12] Ismail, R., Helmawati, H., & Wekke, I. S. (2021). Indonesian Science and Technology Higher Education:A Portrait from Tanah Papua of YAPIS Experiences. *1st Asia Pacific International Conference on Industrial Engineering and Operations Management*. https://doi.org/10.46254/ap01.20210115

[13] Blackham, A. (2022). When law and data collide: the methodological challenge of conducting mixed methods research in law. *Journal of Law and Society*, *49*(S1). https://doi.org/10.1111/jols.12373

[14] Raman, R., Lathabhai, H., Mandal, S., Kumar, C., & Nedungadi, P. (2023). Contribution of Business research to Sustainable Development Goals: Bibliometrics and science mapping analysis. *Sustainability*, *15*(17), 12982. https://doi.org/10.3390/su151712982

[15] Moniri-Morad, A., & Sattarvand, J. (2023). A comparative study between the system reliability evaluation methods: case study of mining dump trucks. *Journal of Engineering and Applied Science*, *70*(1). https://doi.org/10.1186/s44147-023-00272-y

[16] Chirapanda, S. (2019). Identification of success factors for sustainability in family businesses. *Journal of Family Business Management*, *10*(1), https://doi.org/10.1108/jfbm-05-2019-0030

[17] Yigezu, Y. A., Mugera, A., El-Shater, T., Aw-Hassan, A., Piggin, C., Haddad, A., Khalil, Y., & Loss, S. (2018). Enhancing adoption of agricultural technologies requiring high initial investment among smallholders. *Technological Forecasting and Social Change*, *134*, 199–206. https://doi.org/10.1016/j.techfore.2018.06.006

[18] Batra, G. (2023). Renewable Energy Economics: Achieving Harmony between Environmental Protection and Economic Goals. *Social Science Chronicle*, *2*(1), 1–32. https://doi.org/10.56106/ssc.2023.009

[19] Lestariningsih, D. N., Sihombing, R. M., Okitasari, I., Alaini, N. N., Wardhani, A., & Budihastuti, E. (2023). Multimodal linguistic landscape in Lombok: A case study of product branding. *Theory and Practice in Language Studies*, *13*(12), 3330–3337. https://doi.org/10.17507/tpls.1312.31

[20] Musara, M. (2024). Using the case study method in Undergraduate Entrepreneurship education. *Administrative Sciences*, *14*(4), 60. https://doi.org/10.3390/admsci14040060