

# International Jurnal Islamic Education, Research and Multiclturalism (IJIERM)

Available online https://journal.yaspim.org/index.php/IJIERM/index

# INNOVATION IN ISLAMIC EDUCATIONAL ADMINISTRATION: INTEGRATING ISLAMIC VALUES AND MODERN MANAGEMENT

# Ilwan<sup>1</sup>, Faisal Ali<sup>2</sup>, Fakri<sup>3</sup>

<sup>1,2,3</sup> Madrasah Tsanawiyah Negeri 10 Bireuen <sup>1,2,3</sup> Email: <u>ilwanaceh@gmail.com, faisalleubu74@gmail.com, fakri.spd16@gmail.com</u>

## Abstrak

Penelitian ini membahas inovasi administrasi pendidikan Islam yang menekankan integrasi nilai-nilai dasar Islam dengan pendekatan manajemen modern. Tujuan utama penelitian adalah menganalisis peran inovasi dalam meningkatkan efektivitas administrasi pendidikan Islam, khususnya pada komponen kurikulum, tenaga pendidik, metode pembelajaran, serta sarana prasarana. Metode penelitian yang digunakan adalah penelitian kepustakaan dengan pendekatan menggunakan sumber berupa buku, artikel jurnal, dan dokumen akademik yang relevan. Hasil penelitian menunjukkan bahwa kepala sekolah atau madrasah sebagai administrator memiliki peran sentral menciptakan inovasi manajerial yang kreatif, adaptif, dan kritis terhadap perubahan. Implementasi inovasi terbukti meningkatkan kualitas layanan pendidikan, memperkuat organisasi sekolah, serta mengoptimalkan pemanfaatan teknologi dalam pembelajaran dan manajemen. Kesimpulan penelitian menegaskan bahwa inovasi administrasi pendidikan Islam merupakan strategi penting untuk mewujudkan lembaga pendidikan yang unggul, adaptif terhadap perkembangan zaman, sekaligus tetap berlandaskan nilai-nilai Islam.

Kata Kunci: Inovasi, Administrasi Pendidikan Islam, Manajemen Modern, Kepala Sekolah, Mutu Pendidikan

#### Abstract

This study explores innovation in Islamic educational administration, focusing on the integration of fundamental Islamic values with modern management approaches. The main objective is to examine the role of innovation in enhancing the effectiveness of Islamic educational administration, particularly in curriculum development, teacher

Corresponding	Ilwan		
Author			
Article History	Submitted: 26	Accepted: 16	Published: 24
	April 2025	September 2025	September 2025

professionalism, learning methods, and educational facilities. The study employed a qualitative library research method, drawing on books, journal articles, and relevant academic documents. The findings reveal that school or madrasah principals, as administrators, play a central role in fostering managerial innovation that is creative, adaptive, and responsive to change. The implementation of innovation has been shown to improve the quality of educational services, strengthen institutional organization, and optimize the use of technology in both teaching and management. The study concludes that innovation in Islamic educational administration is a crucial strategy for establishing high-performing educational institutions that remain adaptive to contemporary challenges while firmly grounded in Islamic values.

Keywords: Innovation, Islamic Educational Administration, Modern Management, School Principal, Educational Quality

#### INTRODUCTION

Education plays a central role in shaping human civilization, not only as a means of transferring knowledge but also as a transformative force in cultural and social life. In the context of Islamic education, administration is a crucial component that ensures the effectiveness and sustainability of the teaching and learning process. The rapid development of science, technology, and globalization has presented new challenges for Islamic educational institutions to remain relevant and competitive. Therefore, educational administration must undergo continuous innovation, particularly in curriculum design, teacher management, and institutional governance, while still upholding Islamic principles and values. This is essential for producing graduates who are not only intellectually competent but also morally grounded.

Previous studies have highlighted the importance of innovative educational administration in improving institutional performance (Tilaar, 2002; Danim, 2002). However, many Islamic schools and madrasahs still rely on conventional administrative practices that are less responsive to digital transformation and modern management approaches. While some research has examined the integration of technology in Islamic education, fewer studies have explicitly addressed how Islamic values can be harmonized with administrative innovation in a systematic manner. This research gap underscores the urgency of analyzing how Islamic educational



administration can adopt new strategies while maintaining its foundational values derived from the Qur'an and Hadith.

The main objective of this study is to analyze innovation in Islamic educational administration as a strategic response to contemporary challenges. Specifically, the study seeks to: (1) identify the role of school or madrasah principals as educational administrators in fostering innovation; (2) evaluate the impact of innovative administrative practices on institutional effectiveness and educational quality; and (3) explore the integration of Islamic values with modern management principles in the context of educational leadership. Through these objectives, the study provides a conceptual framework for strengthening the quality of Islamic educational institutions.

This paper argues that innovation in Islamic educational administration is not merely an option but a necessity in the digital era. The novelty of this research lies in its emphasis on the dual integration of Islamic values – such as tawhid, balance, and lifelong learning - with contemporary management innovations, including technology-based learning platforms and financial technology applications. By offering a model that combines tradition and modernity, this study contributes to the broader discourse on Islamic education reform. Ultimately, innovation in administration can serve as a catalyst for building resilient, inclusive, and high-quality Islamic educational institutions that prepare learners to thrive in both local and global contexts.

## LITERATURE REVIEW

Innovation in education is defined as the introduction of new methods, systems, or approaches to improve the effectiveness of the teaching and learning process. According to the Center for Educational Research and Innovation (1973), innovation encompasses both minor improvements and large-scale systemic changes. In the context of Islamic education, innovation should not only address efficiency but also ensure alignment with Islamic values. Scholars such as Junius Mauegha (1982) and Hamijoyo (Wijaya et al., 1992) emphasize that innovation must be understood as both qualitative improvement and organizational renewal. Thus, innovation in educational administration is not limited to technology adoption but also involves rethinking management structures, leadership styles, and institutional policies that directly affect educational outcomes (Aruman et al., 2024; Muthoifin et al., 2025; S.A.P. et al., 2021).



Islamic educational administration refers to the systematic management of institutions guided by Islamic principles. Fitria (2023) argues that effective administration in Islamic schools must be rooted in the Qur'an and Hadith, while also applying principles of planning, organizing, and supervision. Scholars such as Hasbiyallah et al. (2019) emphasize that administration in Islamic education is not only technical but also spiritual, since its ultimate goal is to nurture learners who embody Islamic values in knowledge, character, and practice. Therefore, administrative innovation in Islamic education requires balancing two dimensions: modern managerial efficiency and the moral-ethical framework of Islam. This dual orientation distinguishes Islamic educational administration from secular educational management models. (Amsal Qori Dalimunthe et al., 2024; Khairani et al., 2023; Muhlison, 2022)

Leadership plays a critical role in driving innovation within educational administration. Research by Kristiawan et al. (2018) and Danim & Suparno (2009) shows that school principals and madrasah heads act as change agents, responsible for creating an environment conducive to innovation. In Islamic education, principals are expected to demonstrate not only managerial competence but also religious integrity. An innovative principal integrates technology, data-driven decision-making, and participatory governance while ensuring that all practices reflect Islamic ethics. This leadership model positions the school leader as a role model, motivator, and strategic planner whose vision determines the success of institutional innovation (Fadhilah, 2024; Muhammad Syahripin, Candra Wijaya, 2021; Nizar et al., 2020; Sholihuddin, 2020).

The rise of digital technology has significantly impacted educational administration. Studies by Melisawati (2024) and Yusuf (2023) highlight how technology-based training, online platforms, and financial technology (fintech) applications can enhance efficiency, transparency, and accessibility in Islamic educational institutions. Suherman (2023) adds that the use of ICT tools improves teacher–student interactions and broadens access to Islamic learning resources. However, the adoption of digital tools must be carefully contextualized within the framework of Islamic ethics, ensuring that technological efficiency does not compromise the integrity of religious education. This creates both opportunities and challenges for



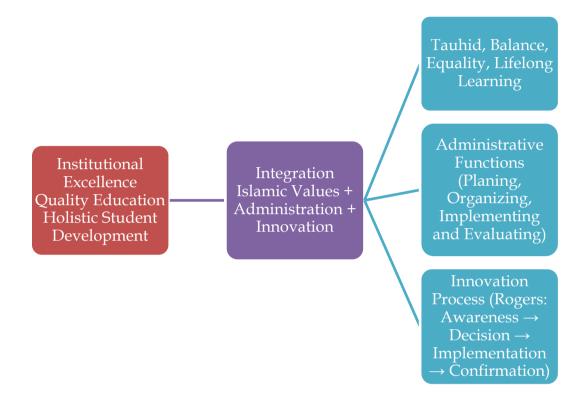
Islamic schools seeking to modernize their administrative systems (Abas et al., 2024; Bukhari, 2021; Syifa Nur Salsabila & Satriyadi, 2025).

Beyond technical and managerial aspects, innovation in Islamic educational administration must also address social and cultural contexts. Ibrahim et al. (2022) demonstrate that community involvement through innovative religious study programs strengthens social participation in education. Similarly, Abdullah et al. (2020) stress the importance of teachers' creativity in adapting learning techniques to meet diverse student needs. These findings underline that innovation must be inclusive, engaging not only administrators and teachers but also parents, communities, and other stakeholders. By embedding social and cultural sensitivity into innovation, Islamic education can achieve sustainability and relevance in diverse societies (As'ad & Firmansyah, 2022; Syafi'i & Fitriyah, 2020; Wijaya et al., 2021)

Although previous studies have explored educational innovation, few have systematically examined the integration of Islamic values with modern administrative practices. Much of the existing literature either focuses on management innovation in secular contexts or discusses Islamic education without sufficient emphasis on administrative reform. This research seeks to bridge that gap by proposing a model of Islamic educational administration that harmonizes spiritual principles with contemporary management innovations. By doing so, it contributes to both the academic discourse on educational reform and the practical improvement of Islamic institutions. This dual perspective provides the theoretical foundation for the present study and guides the analysis of innovation in Islamic educational administration.

Figure 1. Theorecal Framework of Innovation in Islamic Education

Adminstration



# **RESEARCH METHODS**

This study employs a qualitative approach with a library research design, focusing on the analysis and synthesis of existing literature relevant to Islamic educational administration. Library research is appropriate for conceptual studies that aim to explore theories, principles, and best practices without direct fieldwork. Data were collected from a variety of academic sources, including books, peer-reviewed journal articles, research reports, and official documents. These sources were selected based on their relevance, credibility, and publication within the past decade to ensure the validity and currency of the findings. The qualitative nature of this study allows for an in-depth exploration of how innovation in Islamic educational administration can integrate Islamic values with modern management practices.

1205



The data analysis followed a systematic procedure of content analysis and thematic categorization. First, the literature was reviewed and coded into categories such as leadership roles, technological innovation, social participation, and Islamic value integration. Second, themes were synthesized to identify patterns and gaps in the literature. Finally, the findings were interpreted within the framework of Islamic educational administration to generate conclusions that are both theoretically grounded and practically relevant. This methodological approach ensures that the study not only compiles existing knowledge but also provides a critical and integrative perspective on innovation in Islamic educational administration.

## Discussion

The findings indicate that innovation in Islamic educational administration is not merely about adopting new technologies but also about reorganizing systems, policies, and practices to achieve greater efficiency and quality. Innovation is understood as a qualitative transformation that enhances organizational performance and improves the learning experience. This aligns with Hamijoyo's view that innovation is not only "new" in form but must be beneficial and contextually relevant.

The results show that principals and madrasah heads serve as the main agents of change. Their ability to act as creative, adaptive, and critical leaders directly influences the acceptance and success of administrative innovation. A visionary leader can integrate modern management tools with Islamic values, ensuring that innovation strengthens both efficiency and ethical integrity.

In the reviewed literature, curriculum reform emerges as a crucial component of administrative innovation. By integrating digital resources and adopting flexible learning strategies, Islamic schools can provide a more engaging learning experience. Teachers play a pivotal role by adopting adaptive pedagogical methods that reflect creativity and align with students' social and cultural contexts.

The findings emphasize that innovation in teacher management—through training, continuous professional development, and technology-based learning platforms—significantly improves instructional quality.



Teachers who are empowered with innovative tools and pedagogical skills contribute to better student outcomes and institutional performance.

One of the strongest results highlights the importance of ICT in enhancing administrative efficiency. The adoption of e-learning platforms, digital communication systems, and financial technology (fintech) applications contributes to transparent and efficient management in Islamic educational institutions. The literature shows that community participation is a critical element of innovation. Parental involvement, donor contributions, and community-based programs reinforce institutional sustainability. Innovations that engage communities foster stronger trust and inclusivity in Islamic education.

Another result indicates that Islamic educational administration innovation must remain grounded in core Islamic values such as tawhid, balance, equality, and lifelong learning. These values ensure that innovation does not drift into secularization but remains authentic to the mission of Islamic education. The implementation of innovation has been shown to elevate the status of schools and madrasahs by improving organizational efficiency, accountability, and competitiveness. Institutions that embrace innovation are better positioned to achieve excellence and recognition in society. Overall, the results demonstrate that innovation in Islamic educational administration has a holistic impact: it improves service quality, strengthens leadership capacity, enhances teacher professionalism, and creates inclusive and sustainable educational environments.

## Discussion

The results confirm previous assertions that innovation in educational administration is essential for institutional progress (Tilaar, 2002; Coombs, 1978). However, unlike secular institutions, Islamic educational administration innovation requires a dual focus on managerial efficiency and spiritual development. This duality strengthens the uniqueness of Islamic education in facing global challenges.

Leadership emerges as a determining factor in the success of innovation. Consistent with Kristiawan et al. (2018), innovative principals function not only as administrators but also as role models for ethical and spiritual guidance. This highlights the need for leadership development programs that integrate managerial competence with Islamic ethics.



While ICT and fintech offer clear benefits, their application in Islamic schools faces challenges such as limited infrastructure, digital literacy, and cultural resistance. This suggests that innovation must be gradual, accompanied by training and contextual adaptation to ensure sustainability. Innovation must also be socially and culturally sensitive. Programs that involve communities, as shown by Ibrahim et al. (2022), strengthen the inclusivity and acceptance of educational reform. This confirms that successful innovation cannot be isolated within institutions but must engage all stakeholders.

The novelty of this research lies in synthesizing Islamic values with modern management strategies, offering a model that balances tradition and innovation. Unlike studies that focus solely on technological adoption, this study emphasizes a holistic approach to innovation rooted in faith-based principles. To visualize the overall findings, the research can be represented in a flowchart showing the process of innovation in Islamic educational administration:

Figure 2. Innovation in Islamic Education Adminstration



#### Conclusion

This study concludes that innovation in Islamic educational administration is a strategic necessity for strengthening the quality and



1208

This work is licensed under a <u>Creative Commons Attribution-NonCommercial-</u> ShareAlike 4.0 International License. competitiveness of Islamic schools and madrasahs in the digital era. The findings show that principals and educational leaders serve as key actors in driving administrative reform through creative, adaptive, and critical leadership. Innovation in administration covers curriculum reform, teacher professionalism, technological integration, community involvement, and the embedding of Islamic values in every management process. These components collectively enhance institutional effectiveness, foster inclusivity, and improve educational quality while ensuring that Islamic education remains faithful to its foundational principles.

The main contribution of this research lies in proposing a model of innovation that harmonizes Islamic values with modern management approaches. Unlike conventional educational reforms that emphasize technical efficiency alone, this study emphasizes the integration of tawhid, balance, equality, and lifelong learning as guiding principles of administrative innovation. By combining spiritual values with managerial innovations such as digital platforms and financial technology, Islamic educational institutions can achieve excellence that is both ethically grounded and globally competitive. This framework offers valuable insights for policymakers, school administrators, and researchers in the field of Islamic education.

While this study provides a conceptual synthesis, it is limited by its reliance on secondary data through library research. Future studies should incorporate empirical data from case studies or field research in Islamic schools to validate and enrich the proposed framework. Further research can also examine the impact of innovation in different contexts, such as rural versus urban madrasahs or public versus private institutions. Practically, Islamic schools are recommended to adopt gradual innovation strategies that align with their resources and community contexts, while prioritizing leadership development and teacher training. Ultimately, innovation in Islamic educational administration should be viewed not as a disruption but as a pathway to achieving holistic education that prepares competent, ethical, and globally aware Muslim learners.

#### **BIBLIOGRAPHY**

- 1) Abas, M. K. J., Saper, M. N., & Mohd Daud, N. A. (2024). EXPLORING SCHOOL COUNSELORS' KNOWLEDGE OF ISLAMIC COUNSELING. International Journal of Education, Psychology and Counseling, 9(54), 568–580. https://doi.org/10.35631/IJEPC.954043
- 2) Abdullah, W., Razak, K., Hamzah, M., & Zhaffar, N. The Concept of Innovation According to the Views of Innovative Teachers of Islamic Education. (Attarbawiy Malaysian Online Journal of Education, 4(1), 2020).13-21. DOI: https://doi.org/10.53840/attarbawiy.v4i1.24
- 3) Amsal Qori Dalimunthe, Salminawati, Usiono, & Neng Nurcahyati Sinulingga. (2024). Islamic Education in the Perspective of the International World Muslim Conference on Education Ontological, Epistemological, axiological examination. *International Journal of Islamic Education, Research and Multiculturalism (IJIERM)*, 6(1), 1–17. https://doi.org/10.47006/ijierm.v6i1.286
- 4) Aruman, I., Hasbi, H., Firman, F., & Ilham, D. (2024). Strategic Management in Strengthening Religious Moderation. *International Journal of Asian Education*, 5(4), 274–286. https://doi.org/10.46966/ijae.v5i4.455
- 5) As'ad, A., & Firmansyah, F. (2022). A New Paradigm on Human Resources Management in State Islamic University. *AL-ISHLAH: Jurnal Pendidikan*, 14(1), 71–84. https://doi.org/10.35445/alishlah.v14i1.1513
- 6) Bukhari. (2021). Innovation of Islamic Religious Learning Based on Multiculturalism. *International Journal of Islamic Education, Research and Multiculturalism (IJIERM)*, 3(2), 61–62. https://doi.org/10.47006/ijierm.v3i2.88
- 7) E. Mulyasa, School-Based Management, (Bandung: Remaja Rosdakarya, 2003), 3rd ed.,
- 8) \_\_\_\_\_\_, Character Education Management, (Jakarta: PT Bumi Aksara, 2013)
- 9) Fadhilah, N. (2024). Education Management in Multicultural Schools: Building Tolerance and Inclusion. *Gestion Educativa*, 1(1). https://doi.org/10.62872/vredaq68

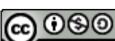




- 10) Firman. Innovation in Islamic Education Management to Improve the Quality of Learning in the Era of Digital Education. (Journal of Education and Teaching Review, Volume 7 Number 3, 2024). DOI: <a href="https://doi.org/10.31004/jrpp.v7i3.36641">https://doi.org/10.31004/jrpp.v7i3.36641</a>
- 11) Fitria, N. Study of Basic Principles of Islamic Education Management, (Jiip-Scientific Journal of Educational Sciences, 6(8), 2023), 6116-6124. DOI: https://doi.org/10.30739/jmpid.v7i1.3619
- 12) Hasbiyallah, et al. Educational Administration from an Islamic Science Perspective, (Bandung, IPI, 2019).
- 13) Husaini Usman, Management: Theory, Practice, and Educational Research 3rd Ed. (Jakarta: Bumi Aksara, 2011)
- 14) Ibrohim, I, Fadhli, R., Iskandar, E., Mukhlishah, M., Muhtadin, M., & Kartika, M. PAI STAI Muhammadiyah Bandung Strengthens Community Service Through Innovation in Organizing Religious Studies in Sumbersari Village. (Journal of Community Service (Superior Wetland Innovation), 2(1),2022), 138.
- 15) Ilwan, Islamic Educational Administration, Introduction to Theory and Practice, (Medan: Cv. Scientific Corner Publishing, 2024), First Edition.
- 16) Khairani, M., Maisah, & Kasful Anwar Us. (2023). Islamic Boarding School Leaders' Policy Analysis in Raising The Standard of Islamic Education in Jambi Province. *International Journal of Islamic Education, Research and Multiculturalism* (*IJIERM*), 5(1), 213–242. https://doi.org/10.47006/ijierm.v5i1.230
- 17) Kusnandi. Educational Innovation Model with Implementation Strategy of "Dare To Be Different" Concept, (Wahana Pendidikan Journal, Volume 4.1, January 2017). DOI: <a href="http://dx.doi.org/10.25157/wa.v4i1.391">http://dx.doi.org/10.25157/wa.v4i1.391</a>
- 18) Made Pidarta, Indonesian Educational Management, (Jakarta: Bina Aksara, 1988), 1st ed.
- 19) Mahmud, Educational Research Methods, (Bandung: Pustaka Setia, 2011).
- 20) Masrifa Hidayani. Innovation in Educational Administration, (At-Ta'lim Journal, Vol. 11, No. 1, January 2012).



- 21) Melisawati. Building a Superior Generation: Exploring HR Development Strategies in Islamic Educational Institutions in the Digital Era, (Jiip Scientific Journal of Educational Sciences, 7(6), 2024), 5689-5697. DOI: <a href="https://doi.org/10.54371/jiip.v7i6.4519">https://doi.org/10.54371/jiip.v7i6.4519</a>.
- 22) Muhammad Kristiawan, et al. Educational Innovation. (Ponorogo: Wade Group Publisher, 2018).
- 23) Muhammad Syahripin, Candra Wijaya, S. N. (2021). Principal Planning Management in Increasing Teacher Work Productivity. *International Journal of Islamic Education, Research and Multiculturalism* (*IJIERM*), 3(3), 184–187. https://doi.org/10.47006/ijierm.v3i3.121
- 24) Muhlison, F. A. (2022). LIBERALIZATION OF ISLAMIC EDUCATION. International Journal of Islamic Education, Research and Multiculturalism (IJIERM), 3(3), 172–183. https://doi.org/10.47006/ijierm.v3i3.91
- 25) Muthoifin, M., Elbanna, M., Barry, A., Afiyah, I., Nirwana, A., Bernardlauwers, B., & Islam, R. (2025). Islamic Education Management in Promoting Multiculturalism, Democracy and Harmony. *Journal of Management World*, 2025(1), 445–456. https://doi.org/10.53935/jomw.v2024i4.713
- 26) Nizar, A., Nurdyansyah, N., & Wahyuni, A. (2020). Quality Management of Islamic Education in Hasan Langgulung's Perspective. *Proceedings of The ICECRS*, 6. <a href="https://doi.org/10.21070/icecrs2020376">https://doi.org/10.21070/icecrs2020376</a>
- 27) Nanang Fattah, Foundations of Educational Management (Bandung: Remaja Rosda Karya, 2004), 2nd ed.
- 28) Rahim, A. Improving Innovation and Creativity in Teacher Learning at RA Muslimat NU. (PARTICIPATORY: JPM, 1(1), 2022), 44-55.
- 29) Saiful Sagala, School and Community Based Management: Strategies to Win Quality Competition (Jakarta: Nimas Multima, 2005), First Edition
- 30) Sudarwan Danim and Suparno, Principal Transformational Management and Leadership: Vision and Strategy for Success in the Era of Technology, Crisis Situations, and Internationalization of Education, (Jakarta: Rineka Cipta. 2009).



- 31) Suherman, Indra, H. The Role of Information Technology in Increasing the Effectiveness of Islamic Educational Leadership. (Multidisciplinary Scientific Journal, 1(10), 2023), 680-684.
- 32) Syafaruddin, et al. Educational Innovation (An Analysis of New Education Policies. (Medan: Perdana Publishing, 2012).
- 33) Suharsimi Arikunto and Lia Yuliana, Management Education, (Yogyakarta: Aditya Media, 2008)
- 34) S.A.P., R. S., Husna, D., & Winarti, D. (2021). Management Quality Control in Islamic Education. *Mudir: Jurnal Manajemen Pendidikan*, 3(2). <a href="https://doi.org/10.55352/mudir.v3i2.214">https://doi.org/10.55352/mudir.v3i2.214</a>
- 35) Sholihuddin, M. (2020). Internalization of Principal Curriculum Management in Primary School and Madrasah Ibtidaiyah. *International Journal of Islamic Education, Research and Multiculturalism* (*IJIERM*), 2(3), 222–233. https://doi.org/10.47006/ijierm.v2i3.118
- 36) Syafi'i, I., & Fitriyah, L. (2020). The Implementation of Total Quality Management as a Solution for the Development of Islamic Education Institutions in teh Era of Industrial Revolution 4.0. *Jurnal Pedagogik*, 07(02). https://doi.org/10.33650/pjp.v7i2.1224
- 37) Syifa Nur Salsabila, & Satriyadi. (2025). Internalisation of Islamic Religious Education Values through Best Practice Programmes. *International Journal of Islamic Education, Research and Multiculturalism* (*IJIERM*), 7(1), 411–425. <a href="https://doi.org/10.47006/ijierm.v7i1.455">https://doi.org/10.47006/ijierm.v7i1.455</a>
- 38) Wiwik Wijayanti. The Power of Innovation, (Teaching Module for the Department of Educational Administration, 2020).
- 39) Yusuf, M. Financial Technology Innovation (Fintech) in the Financial Management of Islamic Educational Institutions, (Diksi, 2(2),2023), 159-182.
- 40) Wijaya, C., Abdurrahman, Saputra, E., & Firmansyah. (2021). Management of Islamic Education Based on Interreligious Dialogue in The Learning Process in Schools as An Effort to Moderate Religion in Indonesia. *Review of International Geographical Education Online*, 11(5), 4306–4314. <a href="https://doi.org/10.48047/rigeo.11.05.310">https://doi.org/10.48047/rigeo.11.05.310</a>