Applying Predictive Analytics for Resource Allocation in Islamic Educational Organizations: Enhancing Efficiency and Decision-Making through AI

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ARTICLE INFO	ABSTRACT
	This research aims to fill the knowledge gap and identify opportunities for the application of AI in resource management in IEOs. This research shows that the adoption of predictive analytics technology in Islamic educational institutions has great potential, but there are challenges to overcome. In the context of urban areas, these technologies can be integrated more easily due to better infrastructure and adequately skilled staff. This is in line with previous research which shows that infrastructure and training are key factors in the successful implementation of new technologies in educational settings. This study used a quantitative and qualitative approach (Moxed Methods). Qualitative data analysis techniques through several techniques, namely, surveys, interviews, participant observation and documentation. Quantitative data analysis techniques through several techniques, namely statistical methods, thematic, document analysis, validity and reliability tests.

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INTRODUCTION

Islamic Educational Organizations (IEOs), both formal and non-formal, face challenges in managing resources including teaching staff, infrastructure, and funding allocation. In the digital era, IEOs management is required to adopt technology to improve operational efficiency and effectiveness of educational management (Yusuf, 2020). In addition, optimizing services to the community is an important aspect in strengthening the social role of IEOs in the community (Muyassaroh, S. N., Fitri, A. Z., & Id, 2021). Effective human resource management is one of the important factors in improving the quality of education in IEOs (Syarnubi, 2022). Good management can contribute to improving teacher performance as well as the overall quality of education (Munadi., 2023) (Sumirah., 2021). Furthermore, the application of the Business Model Canvas framework has helped IEOs to develop the organization more systematically and purposefully (Istiqomah, 2022).

However, IEOs still face various obstacles, especially in technology-based resource management. Supervision of madrasahs in rural areas based on local management is necessary to ensure equitable distribution of education quality, but its implementation is often limited (Syihabudin, T., Syarifudin, E., & Muslihah, 2023). In countries like Malaysia, leadership in Islamic school management faces increasingly complex challenges, especially in terms of adaptation to global changes (Ghani., 2024). IEOs, which generally have limited resources, need to adopt

appropriate management strategies to achieve their educational and social goals (Syarnubi, 2019). One potential solution is the utilization of Open Educational Resources (OER), which can provide universal access to quality educational resources, reduce dependence on traditional resources, and promote more inclusive and effective education (Caswell., 2008)(Butcher, 2015).

In recent years, technological advancements have opened up new opportunities for the application of artificial intelligence (AI) technology and predictive analytics in various sectors. Predictive analytics can provide a comprehensive and proactive view of future resource requirements. This has been shown to improve decision-making in many fields (Syarnubi, S., Efriani, A., Pranita, S., Zulhijra, Z., Anggara, B., Alimron, A., ... & Rohmadi, 2024). Although this technology is widely applied in other sectors, its application in IEOs is still very limited, mainly due to understanding constraints and limited adequate technological infrastructure. Previous research shows that effective resource management is often hampered by traditional approaches that are unable to provide a predictive view of organizational needs (Pucciarelli, F., & Kaplan, 2016)(Oliver, D., Britton, M., Seed, P., Martin, F. C., & Hopper, 1997). In fact, AI-based technologies and data-driven decision-making have been proven to provide more accurate and efficient solutions in optimizing resources in various sectors (Hitt, L., & Kim, 2011).

Islamic Educational Organizations currently have a great opportunity to leverage predictive analytics technology to overcome resource limitations and improve operational efficiency (Syarnubi, 2023). These technologies enable organizations to make faster and more informed decisions, and strengthen organizational resilience in the face of the changing dynamics of the educational environment (Hu., 2024). However, there are still few studies that specifically examine the application of predictive analytics in the context of IEOs. Therefore, this study aims to fill this knowledge gap and identify opportunities for the application of AI in resource management in IEOs.

METHODS

This research uses a quantitative and qualitative approach (mixed methods), where quantitative data will be used to analyze resource usage, while qualitative data will be used to understand the context of implementing predictive analytics in resource management at IEOs. This approach allows researchers to combine the results of statistical analysis with in-depth insights from stakeholders related to technology implementation. This research is an exploratory-descriptive study, aiming to explore and describe the application of predictive analytics technology in resource management in Islamic Educational Organizations (IEOs). It also aims to provide a deeper understanding of the challenges and opportunities faced by IEOs in adopting AI-based technologies.

This research will be conducted in several Islamic Educational Organizations (IEOs) that have the potential or interest to adopt predictive analytics technology. The selected IEOs will vary in terms of size and geographical location to obtain more representative data. The research locations will include, Islamic education institutions in urban and rural areas in Bogor district, formal (schools, madrasah) and non-formal (pesantren, informal education centers) education institutions with a total of 99 institutions.

The data used in this study will be collected through the following techniques: Quantitative Survey: A survey instrument will be used to collect data on the use of resources at IEOs, including allocation of funds, management of faculty, and use of facilities. The survey will also measure the readiness of institutions to adopt predictive analytics technology. In-depth Interviews: Interviews will be conducted with education managers, school leaders, and teaching staff to explore their understanding of the use of predictive analytics in resource management. These interviews aim to understand the challenges faced in adopting new technologies and the potential benefits expected. Participatory Observation: The researcher will conduct direct observation in selected IEOs to see how resource management is currently conducted and the extent to which digital technologies have been implemented. Document Study: Secondary data in the form of financial reports, resource allocation reports, and policies related to the management of educational institutions will be analyzed to get an overview of the resource management process in IEOs.

Quantitative Data Analysis Techniques: Data from the survey will be analyzed using descriptive statistical methods to provide an overview of the state of resource management in IEOs.

Statistical software such as SPSS or Microsoft Excel will be used to process quantitative data. Qualitative Analysis: Data from interviews and observations will be analyzed using thematic analysis techniques. The researcher will identify key themes that emerge from the interviews, such as challenges in technology adoption, expected benefits of predictive analytics, and factors that influence successful implementation. Document Analysis: The documents analyzed will provide additional information regarding the state of resource management at IEOs, which will then be compared with the results from the survey and interviews Validity and Reliability To ensure the validity and reliability of the research, several steps will be taken, including: Instrument Validity Test: The survey instrument will be pretested on a small sample to ensure that the questions are able to measure the desired variables. Data Triangulation: Data obtained from various sources (surveys, interviews, observations, documents) will be compared with each other to improve the accuracy of the research findings.

The researcher will ensure that this study follows the principles of research ethics, including obtaining written consent from participants who participate in surveys and interviews, maintaining data confidentiality, and ensuring that the results of the study will not be used for purposes that are detrimental to the institution or individuals involved

FINDINGS AND DISCUSSION

The study collected data from 99 Islamic education institutions (IEOs), consisting of formal schools, madrasahs, and non-formal education institutions such as pesantren, spread across various urban and rural areas. The results of the study are summarized as follows:

1. **Characteristics of respondents**
    Type of institution, graphical location and size of institution
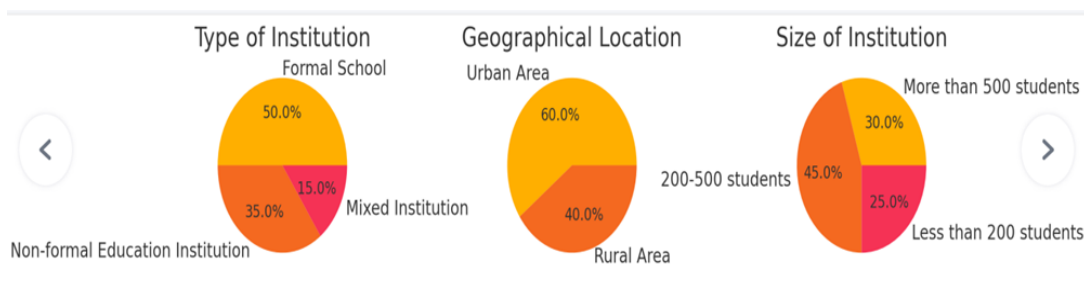
Type of Institution 50% (49 institutions) are formal schools (madrasah, accredited Islamic schools), 35% (35 institutions) are non-formal education institutions (pesantren and informal education centers), 15% (15 institutions) are mixed institutions offering formal and non-formal education. Geographical location 60% (59 institutions) are in urban areas, 40% (40 institutions) are in rural areas. Institution size 30% (30 institutions) have more than 500 students, 45% (45 institutions) have between 200-500 students, 25% (24 institutions) have less than 200 students.

2. **Management of resources in IEOs (teaching staff, facility allocation and fund management**

The results of the field survey show that 65% of the institutions surveyed reported difficulties in managing the teaching force effectively, especially regarding workload allocation and teacher placement (Syarnubi, S., Mansir, F., Purnomo, M. E., Harto, K., & Hawi, 2021). This finding is reinforced by Ahmad & Mustafa's (2019) study, which found that 68% of teachers in Islamic schools in Indonesia experienced workload imbalance. Some teachers were overburdened with administrative tasks outside of their teaching duties, while other teachers were underutilized Placement of teachers that does not match their competencies or specializations is also a major challenge. These conditions reflect problems in human resource management (HRM) in these institutions (Syarnubi, 2016). The traditional methods used to manage teachers no longer seem capable of dealing with the increasingly complex challenges in education. (H. Sidik, A. Tafsir, 2021) also support this finding, stating that the lack of an efficient HR management system leads to inequity in the distribution of workload in Islamic schools (Syarnubi, S., Alimron, A., & Muhammad, 2022).

Survey results show that only 25% of educational institutions use software to help with human resource management (HRM), while the other 75% still rely on manual methods such as spreadsheets or physical records. The majority of these Islamic educational institutions still use traditional methods in managing teaching staff and other human resources. The use of manual methods has various limitations, including being more prone to human error in data input, recording, and tracking important information. In addition, manual processes tend to take longer, especially in data processing that involves many teaching staff and complex class schedules. Manual systems also do not allow institutions to easily adjust workload allocation or teacher placement according to rapidly changing needs. In contrast, institutions that have adopted HR management software tend to be more efficient and effective in managing teaching staff, scheduling, and tracking teacher progress and performance (Syarnubi, 2024). This finding is in line with research conducted by (H. Sidik, A. Tafsir, 2021) which states that manual methods in HR management in Islamic schools often lead to significant administrative errors, especially in scheduling and managing teacher workload. In addition, (Prasetya, T. A., Harjanto, C. T., & Setiyawan, 2020) found that Islamic schools in rural areas that still rely on physical records often experience difficulties in storing and updating information, which ultimately leads to uneven workload distribution (Syarnubi, S., Syarifuddin, A., & Sukirman, 2023).

Based on the survey results, there are two main findings related to facility allocation in Islamic education institutions (IEOs). First, 55% of institutions, especially in rural areas, reported limited facilities and infrastructure such as classrooms, laboratories and libraries. Secondly, 40% of institutions in urban areas reported that available facilities were not optimally utilized, with some classrooms and other facilities rarely used throughout the school year. These two findings suggest an imbalance in the use and availability of facilities between urban and rural institutions. Rural schools face limited facilities, while in urban areas, the main problem is the lack of optimal utilization of existing facilities.

Previous research supports this finding. (Oktaria, A., Fitriyenni, S., Irfan, M., & Syarif Hidayatullah, 2022) found that Islamic schools in rural areas often face a lack of basic facilities such as adequate classrooms, laboratories and libraries. Also emphasized that the infrastructure gap between schools in urban and rural areas is a major factor affecting the quality of learning. In rural areas, many schools lack proper classrooms, so students have to learn in uncomfortable conditions, which has an impact on the teaching and learning process. Some of the factors that cause limited facilities in rural areas include Budget constraints, Many rural Islamic schools rely on very limited budgets, making it difficult to build or repair facilities. Limited access, Rural schools are often difficult to reach, resulting in suboptimal distribution of educational resources, including physical facilities, Lack of government attention: Rural educational institutions are often not prioritized in budget allocations for infrastructure (Syarnubi, S., Fauzi, M., Anggara, B., Fahiroh, S., Mulya, A. N., Ramelia, D., ... & Ulvya, 2023).

On the other hand, suboptimal utilization of facilities in urban areas is also a significant problem. The finding that 40% of institutions in urban areas report facilities that are not fully utilized is supported by research showing that facility utilization in urban schools is often inefficient. (Rizki., 2021)found that many urban schools have excessive classroom space but are not optimally utilized. Some Islamic schools in big cities have classrooms that are often empty or rarely used, mainly due to the lack of proper planning in facility management. (Farida, I., & Hakim, 2021) added that non-optimal utilization of facilities is often due to limitations in planning and coordination. Although facilities in urban schools are more complete, the lack of an effective management system makes libraries and laboratories not used to their full potential. This can be caused by unsynchronized schedules between facility use and academic needs, or a lack of promotion and encouragement for teachers and students to fully utilize the facilities.

Based on the survey results, there are two main findings related to fund management in Islamic Educational Organizations (IEOs). First, 70% of institutions experience challenges in budget management, with 35% of them reporting a gap between available budget and operational needs. Secondly, only 20% of institutions have used accounting software for financial management, while 80% still use manual methods. These findings indicate significant problems

in financial management at IEOs, both in terms of inadequate budget planning and limited adoption of technology that can support more effective financial management.

Most IEOs face challenges in managing their budgets. The main problem reported was the gap between available budget and operational needs, which was experienced by 35% of institutions. Some of the factors underlying this challenge include, among others, limited funding: Many Islamic education institutions, especially in rural areas or those operating as non-profit organizations, rely on limited funding sources, such as donations, zakat or insufficient government subsidies. Increasing operational needs: Operational costs, such as teachers' salaries, facility maintenance and purchase of teaching equipment, tend to increase while funding often does not increase significantly. Lack of adequate budget planning: Some institutions may not have a structured budget plan or lack sufficient financial management expertise to ensure wise and effective use of funds.

Research by Prasetya & Munandar (2019) shows that one of the biggest problems in budget management in Islamic schools is the imbalance between funding sources and expenditures. As many as 80% of Islamic schools in rural areas have difficulty balancing the operational budget, mainly due to limited funding sources and increasing operational costs. also found that the gap between budget and operational needs is a common problem in Islamic education institutions, especially in areas that depend on government subsidies and community donations. The study suggests that better financial planning and diversification of funding sources are needed to overcome this problem

As for the use of technology, only 20% of institutions have switched to using accounting software to assist with financial management, while the other 80% still rely on manual methods such as the use of spreadsheets or physical records. The use of accounting software can provide various significant benefits, including higher accuracy: Accounting software helps reduce human errors in financial recording, calculation, and reporting. Efficiency in financial management: With software, the financial management process becomes faster and more efficient, such as in the generation of financial reports, expense tracking, and budget management as well as transparency and accountability: Software also increases transparency and makes internal and external audits easier as financial data is stored and easily accessible

However, the high proportion of institutions still using manual methods suggests that there are limitations in the adoption of technology in accounting and finance. Some possible contributing factors include, Lack of access to technology: Institutions in rural areas may have difficulty accessing affordable accounting software or lack the technical skills to operate it, Budget constraints: The cost of adopting accounting software and training staff is considered too high, especially for institutions with limited budgets.Resistance to change: Some institutions are comfortable with long-used manual methods and show resistance to change towards more modern digital systems (Rizki., 2021). Showed that the use of accounting software can improve the accuracy of financial records and efficiency in budget management. This study found that institutions using financial software were able to reduce recording errors by 35% and complete financial reports 50% faster compared to manual methods. Confirmed that the adoption of accounting software in Islamic schools is still low, mainly due to budget constraints and lack of technical knowledge among staff. The study also emphasized that the use of financial software can reduce inefficiencies in financial management as well as improve the performance of Islamic schools.

3. IEOs readiness level in implementing predictive analytics

The survey on the readiness of Islamic Educational Organizations (IEOs) to implement predictive analytics yielded three main findings. First, 45% of respondents are not familiar with the concept of predictive analytics and its potential in resource management. Second, 35% have basic knowledge of AI and predictive analytics, but have not yet implemented it. Third, 20% have used data-driven predictive tools, albeit in a limited capacity, such as in financial analysis or faculty scheduling.

Most institutions (45%) are not familiar with the concept of predictive analytics. This reveals a knowledge gap among the management of IEOs about data-driven technologies that

can actually help them in resource management. In fact, predictive analytics is a data-driven approach that allows organizations to: Project future resource requirements based on historical data, Optimize facility usage through predicting demand and trends. And manage budgets more effectively by predicting future expenses and revenues.

However, a lack of technological literacy, especially in Islamic education settings in rural areas or institutions with limited resources, slows down the adoption of these technologies. (Sari., 2020) found that a lack of technological literacy is a major obstacle in the adoption of modern technology in Islamic schools, with 50% of schools surveyed not understanding the concept of data-driven technologies such as predictive analytics. (Rahman., 2019) also found that IEOs often face a lack of access to technology training, leading to low understanding and ability to adopt data-driven predictive tools.

Some institutions (35%) have basic knowledge of AI and predictive analytics, but have yet to apply it in their resource management. This suggests that while these institutions understand the potential of these technologies, they still face various barriers to their implementation. These inhibiting factors include, Lack of technology infrastructure: Many agencies do not have the necessary hardware, software, or data access to run predictive analytics, high implementation costs: Agencies with limited budgets may struggle to provide funds to adopt this technology and Lack of expertise: Many institutions do not have staff with the technical expertise to operate and manage data-driven systems. (Prasetya, T. A., Harjanto, C. T., & Setiyawan, 2020) found that although many Islamic schools have a basic understanding of technology, they are still constrained in its implementation due to lack of infrastructure and technical expertise. Farida & Hakim (2021) also emphasized that although these institutions realize the potential of AI and predictive analytics, the cost of implementation and lack of trained staff are major obstacles.

As many as 20% of institutions have started using data-driven predictive tools, albeit only in a limited capacity, such as for financial analysis or faculty scheduling. This shows that some institutions have started to experience the benefits of predictive analytics, albeit at an early stage. The use of this technology has helped these institutions in Planning better budgets by projecting income and expenditure based on past trends and Optimizing teacher scheduling by using student and teacher workload data to ensure more efficient allocation. (Rizki., 2023)found that institutions using predictive analytics for faculty scheduling and budget management experienced increased efficiency and reduced errors by 25%. (Halim., 2023) also found that institutions using predictive analytics, although limited, reported improvements in strategic planning and resource management, particularly in the areas of finance and faculty management.

From a survey of 99 institutions, it was found that 60% of institutions cited budget constraints as the main barrier to adopting predictive analytics technology. A total of 50% of agencies faced constraints related to a lack of technology infrastructure, especially in rural areas with limited internet access and hardware. In addition, 40% of agencies identified a lack of technical skills among resource management staff as another inhibiting factor.

Budget constraints are the main obstacle faced by the majority of institutions in adopting predictive analytics. This shows that the initial investment in this technology requires significant funds for hardware, software, and staff training. Institutions with limited budgets will find it difficult to provide the resources needed to implement such advanced technology. The impacts of these budget constraints include: Delays in technology adoption that cause the institution to fall behind in innovation, Use of less sophisticated and limited technology, which ultimately results in less than optimal outcomes and A tendency to choose cheap solutions that may be less efficient and do not support overall resource optimization.

A total of 50% of institutions identified a lack of technology infrastructure, especially in rural areas. These issues include, Stable internet access: Slow or unstable internet connection, especially in rural areas, is a barrier to accessing predictive analytics technology, which often requires cloud-based analysis and real-time updates and Hardware availability: Many institutions do not have hardware that is powerful or modern enough to support advanced technology needs. As a result, institutions in remote areas are slower to adopt new technologies, widening the digital divide between institutions in urban and rural areas.

A total of 40% of institutions identified a lack of technical skills among staff as a major constraint. This factor suggests that while the technology is available, its successful implementation depends largely on the ability of human resources to understand it. This skills shortage is attributed to the lack of formal training or opportunities to deepen technical knowledge. Lack of ongoing skills development programs for staff. and Resistance from staff who feel burdened by the demands of learning new technologies

4. **Perceived benefits and challenges of predicitve analytics**

Analysis of the findings regarding the expected benefits of implementing predictive analytics technology in Islamic Educational Organizations (IEOs) reflects optimism towards improving operational efficiency and budget management. The following is a more in-depth analysis of the two main benefits identified:

1) **More Efficient Allocation of Teaching Personnel (70% of institutions)**

70% of institutions that are familiar with predictive analytics believe that this technology can help improve the efficiency of faculty allocation. Key benefits include optimized scheduling: Predictive analytics can analyze student data, attendance patterns, and performance to predict teaching staffing needs under various conditions. This technology ensures that the appropriate number of teachers are available as per student needs, even when student numbers fluctuate. Placement of teachers based on student needs: This technology allows institutions to map the skills and specializations of teachers to the needs of students in different subjects or locations. With more precise placement, teaching quality improves as teachers are placed in schools or classes where their expertise is most needed. Research supports this view, as revealed by a (WestEd., 2018) study showing that predictive analytics helps the education system in the United States optimize teacher allocation, reducing the gap between teacher availability and student needs in different regions. In addition, a report by (McKinsey, 2019) revealed that this technology plays a role in planning teacher rotation, scheduling training, and detecting patterns of teacher absence, which has a positive impact on the teaching-learning process.

2) **More effective budget management (65% of respondents)**

65% of respondents believe that predictive analytics can help manage budgets more effectively. This technology provides several advantages in the financial management of educational institutions, including: Projected budget needs: Predictive analytics allows institutions to make budget projections based on historical trends and real-time data. Institutions can predict operational expenditures such as salaries, facility maintenance, and purchase of teaching materials more accurately, thus avoiding wastage or underfunding. Data-driven decision-making: With predictive analytics, institutions can make smarter budget decisions based on analysis of past budget usage. This enables more efficient management of funds and better strategic planning.(Gartner, 2020)) reported that predictive analytics has helped many organizations, both public and private, manage their budgets more efficiently. The report states that institutions that adopt this technology are able to plan future budget allocations more precisely, minimizing the risk of underfunding or inefficiency. (Deloitte., 2019) also noted that predictive analytics allows educational institutions to identify inefficient spending trends, increase visibility in fund management, and anticipate financing needs based on factors such as student numbers and classroom capacity.

3) **Challenges of predictive analytics implementation**

An analysis of the implementation challenges of predictive analytics revealed two main barriers that agencies face, namely the lack of trained human resources and resistance to change. Both challenges are common in the process of adopting new technologies, especially those that involve complex data collection and analysis.

4) **Kurangnya Sumber Daya Manusia yang Terlatih (55% lembaga)**

55% of institutions reported that the biggest challenge in adopting predictive analytics is the lack of trained manpower to operate this technology. This challenge is due to several factors: Complex technical skills: Predictive analytics requires knowledge in data science, statistics, and programming, which existing staff may not have. Even if agencies have IT staff,

they may not have the specific skills needed to utilize this technology effectively. Limitations on available training: Many institutions may not have access or sufficient budget to provide intensive training to staff. Without sufficient training, staff will struggle to master these new technologies. Evolving technology: As predictive analytics technology is constantly evolving, staff need regular skills updates to stay relevant and able to operate new tools efficiently.

A (Deloitte., 2019) report shows that the shortage of data analytics experts is a major barrier for organizations to make the most of predictive analytics.(McKinsey, G. L., Lizama, C. O., Keown-Lang, A. E., Niu, A., Santander, N., Larpthaveesarp, A., Chee, lez, F. F., & Arnold, T. DE., 2020)) also emphasized that investment in data analytics skills development should be a priority, as institutions that invest in staff training tend to be more successful in predictive analytics implementation.

5) **Resistance to change (45% of institutions))**

As many as 45% of institutions identified resistance to change as the main challenge in adopting predictive analytics. This resistance often arises from individuals or groups who are used to traditional methods and are reluctant to switch to data-driven technology. Some of the reasons for this resistance include: Comfort with traditional methods: Staff who have been working with certain methods for years tend to feel more comfortable with them. Switching to predictive analytics requires a significant change in the way they work, which can create discomfort or uncertainty. Role replacement concerns: Some staff may feel that the technology could replace the manual tasks they are used to, thus seeing it as a threat to their jobs. Lack of understanding of technology benefits: Staff who do not fully understand the benefits of predictive analytics are likely to doubt its usefulness and prefer to stick with methods they find more familiar and reliable. According to research, resistance to change is often a major obstacle in the adoption of new technologies, especially in organizations that have a strong work culture towards traditional methods. (Accenture., 2020) also emphasizes the importance of effective communication and involving staff in the change process to reduce resistance and increase the adoption of new technologies.

This research shows that the adoption of predictive analytics technology in Islamic educational institutions has great potential, but there are challenges to overcome. In the context of urban areas, this technology can be integrated more easily due to better infrastructure and adequately skilled staff. This is in line with previous research showing that infrastructure and training are key factors in the successful implementation of new technologies in educational settings.

CONCLUSION

This study examines the readiness and challenges in resource management in Islamic Educational Organizations (IEOs), which include formal schools, madrasas, and non-formal institutions such as pesantren. The research provides some important findings regarding faculty management, facility allocation, fund management, as well as IEOs' readiness to adopt predictive analytics technology to improve operational efficiency. Based on data collected from 99 institutions, the following are the main conclusions:

1. Human Resource Management: Most IEOs face difficulties in effectively managing their teaching force. The main challenges are teacher workload imbalance, incompetent teacher placement, and limited HR management infrastructure. Only 25% of institutions use HR management software, while the rest still rely on error-prone and inefficient manual methods. HR management technology has the potential to improve efficiency, but adoption remains low.

2. Facility Allocation and Utilization: Institutions in rural areas generally lack basic facilities such as classrooms, laboratories, and libraries. In contrast, institutions in urban areas often have facilities that are not optimally utilized. This disparity is due to factors such as budget constraints in rural areas and lack of proper planning in the use of facilities in urban areas..

3. Budget Management: 70% of institutions reported challenges in budget management, with 35% of them facing a gap between available budget and operational needs. Only 20% of institutions use accounting software, which is proven to improve the efficiency of financial management. Key

challenges in the adoption of this technology include budget constraints, lack of access to technology in rural areas, and resistance to change.

4. Readiness to Implement Predictive Analytics: Only 20% of institutions have made limited use of predictive analytics, mainly in financial analysis and faculty scheduling. Most institutions (45%) are not familiar with this technology, while another 35% have basic knowledge but have not yet implemented it. Barriers to the adoption of predictive analytics include lack of technology infrastructure, limited technical skills of staff, and resistance to change.

5. Perceived Benefits of Predictive Analytics: Institutions that have used predictive analytics report improvements in operational efficiency, particularly in faculty allocation and budget management. However, most institutions are neither technically nor financially ready to fully adopt this technology, especially in rural areas..

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