

Aligning organizational systems: A study of madrasah leadership in the era of industry 4.0

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Abstract

The industry 4.0 era demands that educational institutions, including madrasas, be able to align their organizational systems in an adaptive, innovative, and technology-based manner. Leadership plays a strategic role in integrating these changes to align with the institution's vision, culture, and goals. This study aims to examine the role of leadership in aligning the organizational system at MAN 1 Kendari in the Industry 4.0 era. This research used a qualitative approach with a case study method. Data collection techniques included in-depth interviews with the madrasah principal, vice principal, teachers, and education staff, observations of managerial activities, and documentation studies. Data analysis was conducted through data reduction, data presentation, and conclusion drawing. The results indicate that leadership at MAN 1 Kendari plays an active role in aligning the organizational system by strengthening its digital vision, optimizing the use of information technology in madrasah management, developing human resource competencies, and implementing participatory and collaborative leadership patterns. However, obstacles remain, including limited technological infrastructure and varying digital skills among madrasah members. This study concludes that adaptive and responsive leadership to technological developments is a key factor in aligning the madrasah organizational system in the industry 4.0 era.

Keywords

Madrasah leadership, Organization system, Era 4.0

Introduction

The development of the Industry 4.0 era is marked by rapid advances in digital technology, automation, and information systems, which have significantly impacted organizational governance, including educational institutions [1];[2]. Madrasah, as Islamic-based educational institutions, are required to adapt to these changes without neglecting their distinctive character, culture, and spiritual values [3];[4]. Therefore, aligning organizational systems is a strategic necessity to ensure madrasah remain relevant, effective, and competitive in the digital age.

Madrasah organizational systems encompass institutional structures, work mechanisms, communication patterns, decision-making, and the use of technology to

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support managerial and learning processes [5];[6]. A lack of synchronization between organizational systems and the demands of the industry 4.0 era has the potential to lead to inefficiency, weak coordination, and low responsiveness to change. In this context, madrasah leadership plays a central role as the primary driver in directing, integrating, and harmonizing all organizational components to enable systemic adaptation.

MAN 1 Kendari, as one of the leading madrasah in Southeast Sulawesi, faces both challenges and opportunities in implementing organizational systems aligned with the developments of the industry 4.0 era. Efforts to digitize management, strengthen a collaborative work culture, and improve human resource competency are important agendas that require visionary, adaptive, and participatory leadership. However, the reality on the ground shows that this alignment process does not always run smoothly, particularly regarding infrastructure readiness, digital literacy among madrasah residents, and resistance to change.

The novelty of this research lies in the following aspects: First, Focus on Aligning Madrasah Organizational Systems in the Industry 4.0 Era. This research not only examines leadership in general, but also specifically examines the role of leadership in aligning madrasah organizational systems with the demands of the industry 4.0 era. Second, Contextualization of Madrasah Leadership Based on Values and Technology. This study integrates the dimensions of leadership based on Islamic values with the demands of digital leadership, which are still relatively rarely studied in the madrasah context. Third, Identification of Adaptive and Participatory Leadership Strategies. The novelty also lies in the mapping of adaptive, collaborative, and participatory leadership strategies in harmonizing the madrasah's organizational structure, work culture, and digital systems.

Method

This research is qualitative with a phenomenological approach [7]. This approach was chosen to deeply understand the experiences, perceptions, and meanings constructed by the research subjects regarding the role of leadership in aligning madrasah organizational systems in the industry 4.0 era. The research focuses on the real-life experiences of educational actors in facing and managing digital-based organizational change.

The research was conducted at MAN 1 Kendari, Southeast Sulawesi. The location was chosen based on the consideration that the madrasah had begun implementing various managerial innovations and utilizing technology in organizational governance. The research was conducted over a period of time tailored to the needs of data collection and in-depth analysis.

Research informants were determined using purposive sampling, with the criteria being direct involvement in the leadership and management of the madrasah organizational system. Informants included: 1) Madrasah principals; 2) Deputy madrasah principals; 3)

Senior teachers and teachers involved in digital system development; 4) Education staff; 5) Madrasah information system operators or managers.

Data collection was conducted using the following techniques: 1) In-depth interviews to explore informants' experiences, perspectives, and interpretations regarding leadership practices and organizational system alignment in the 4.0 era; 2) Participant observation, specifically on managerial activities, coordination meetings, and the use of technology in madrasah governance; 3) Documentation studies, including policy documents, organizational structures, work programs, activity reports, and other supporting digital documents.

Data analysis was conducted simultaneously and continuously following a phenomenological analysis model, which includes: 1) Epoche (bracketing), which suspends the researcher's assumptions to gain a thorough understanding of the informants' experiences; 2) Phenomenological reduction, by identifying key statements relevant to the research focus; 3) Grouping meaning units, to identify essential themes related to leadership and organizational system alignment; 4) Textural and structural descriptions, to describe what and how the leadership phenomenon is experienced by the informants; 5) Synthesis of the essence of the phenomenon, as a core conclusion from the informants' collective experiences. To ensure data validity, this study employed source and technique triangulation, member checking, and observational diligence. These steps were taken to ensure the credibility, dependability, and confirmability of the research findings.

Results

The results of this study reveal the experiences and meanings of informants regarding the role of leadership in aligning organizational systems at MAN 1 Kendari in the Industry 4.0 era. The research findings are presented in several main themes that represent the essence of the phenomenon of leadership and the transformation of madrasah organizations.

Leadership vision in aligning organizational systems

Interviews revealed that madrasah principals possess a leadership vision oriented toward strengthening technology-based organizational systems without neglecting Islamic values. This vision is realized through affirming the direction of madrasah policies toward digitalization of management, transparency of work, and improving the quality of educational services. Informants interpreted this vision as a crucial foundation for unifying the perceptions of all madrasah members, ensuring a unified approach to facing the challenges of the 4.0 era.

Digitalization of Madrasah Management System

Research findings indicate that the leadership at MAN 1 Kendari has encouraged the implementation of digital technology in various aspects of organizational management, such as academic administration, personnel management, student data management,

and reporting systems. The use of online applications and madrasah information systems is viewed by informants as a concrete effort to align previously manual work systems with more efficiency and integration. However, the digitalization process is still ongoing in stages and adaptively.

Participative and collaborative leadership patterns

The research revealed that the leadership style applied tended to be participatory and collaborative. The principal involved teachers and other educational staff in planning, decision-making, and evaluating work programs. Informants interpreted this leadership style as a strategy to build a sense of belonging and increase the commitment of the madrasa community to support the alignment of organizational systems in the 4.0 era.

Human resource development based on digital literacy

Research findings indicate that strengthening human resource competencies is a primary leadership focus in aligning organizational systems. Various training programs, mentoring, and familiarization programs in the use of information technology are implemented to improve the digital literacy of teachers and education personnel. However, the study also found differences in the level of digital readiness and capabilities among madrasah members, requiring a persuasive and sustainable leadership approach.

Alignment of organizational structure and culture

The research results indicate that the leadership at MAN 1 Kendari is striving to adapt its organizational structure and work culture to align with the demands of the 4.0 era. Restructuring tasks and functions, strengthening cross-sector coordination, and fostering a technology-responsive work culture are part of the leadership strategy. Informants interpreted this change as an organizational adaptation process that requires mental and cultural readiness, not simply technical change.

Leadership strategies in facing the challenges of the 4.0 era

The research results show that madrasah leadership responded to these challenges with adaptive strategies, such as persuasive approaches, strengthening internal communications, providing role models in technology use, and continuous evaluation of organizational systems. These strategies were understood by informants as an effort to maintain a balance between the demands of innovation and the real conditions of madrasah residents.

Discussion

The discussion of this research focuses on the role of leadership in aligning organizational systems at MAN 1 Kendari in the Industry 4.0 era. The research findings indicate that the success of organizational system alignment is largely determined by the leadership's ability to integrate the vision, technology, human resources, and organizational culture of the madrasah.

Visionary leadership in organizational transformation

The research results show that the leadership at MAN 1 Kendari has a clear vision in directing the transformation of the organizational system towards digitalization and work efficiency. This finding aligns with the theory of visionary leadership, which emphasizes the importance of strategic direction and the leader's ability to articulate the organization's future vision. In the 4.0 era, leadership vision is a key factor in aligning organizational systems to adapt to technological changes and external environmental demands.

Digitalization as an instrument for aligning organizational systems

The digitalization of madrasah management systems found in this study reinforces the view that technology serves as a strategic tool in aligning organizational systems. The use of madrasah information systems, administrative applications, and digital platforms reflects leadership efforts to improve organizational effectiveness, transparency, and accountability [8]. This aligns with the concept of digital leadership, which requires leaders not only to understand technology but also to be able to integrate it into the organization's work systems.

Participative leadership and collaborative culture

Research findings indicate that participatory leadership styles contribute significantly to the success of organizational system alignment. The involvement of teachers and education personnel in decision-making strengthens commitment and ownership of organizational change [9]. This supports participatory leadership theory, which asserts that the involvement of organizational members improves the quality of decisions and the effectiveness of policy implementation, particularly in the context of change and innovation.

Human resource development as the main pillar of the 4.0 era

This research confirms that organizational system alignment is inseparable from human resource competency development. The digital literacy improvement program implemented at MAN 1 Kendari reflects leadership awareness that human resource readiness is a key prerequisite for successful organizational transformation. This finding aligns with change management theory, which positions humans as the primary actor in the process of organizational adaptation to the 4.0 era.

Alignment of organizational structure and culture

The research results show that the leadership at MAN 1 Kendari is striving to align its organizational structure and work culture to meet the demands of the digital era. The restructuring of tasks, strengthening coordination, and the adoption of a technology-based work culture indicate a systemic process of organizational change. These findings reinforce the view that organizational transformation encompasses not only structural aspects but also cultural dimensions and the values embraced by organizational members.

Conclusion

This study concludes that leadership plays a strategic role in aligning madrasah organizational systems in the industry 4.0 era, as reflected in leadership practices at MAN 1 Kendari. Visionary, adaptive, and participatory leadership has proven capable of guiding organizational transformation toward a more effective, integrated, and technology-based work system without neglecting the Islamic values that characterize madrasah. The alignment of the organizational system at MAN 1 Kendari is realized through strengthening the digital vision, implementing an information technology-based management system, developing human resource competencies, and adjusting the organizational structure and culture to be responsive to change. This process is not only technical but also involves changing the mindset and work culture of madrasah members. However, this study identified challenges in the form of limited technological infrastructure, variations in digital literacy, and resistance to change. Madrasah leadership responded to these challenges through effective communication strategies, persuasive approaches, role models, and continuous evaluation. Overall, this study confirms that the success of aligning madrasah organizational systems in the industry 4.0 era depends heavily on the quality of leadership capable of leading inclusive and sustainable change. It is hoped that these findings can be a reference for developing madrasa leadership in facing the dynamics of digital transformation in the future.

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