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Agile Leadership in Thai Higher Education: Developing Administrators for the Digital Education Era

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Abstract

Background and Aim: This research investigated the nature of agile leadership within Rajamangala University of Technology (RMUT) administration, aiming to define its characteristics and components, and to propose development guidelines aligned with Thailand's Higher Education Qualification Framework (TQF: HEEd) for the digital education era.

Materials and Methods: A comprehensive mixed-methods research design was employed. The study involved 599 personnel from nine RMUT institutions, specifically 27 administrators and 572 faculty and staff, selected using multi-stage sampling. Primary data collection tools included questionnaires, in-depth interviews, and focus group discussions. Quantitative data underwent exploratory factor analysis, while qualitative data was analyzed using descriptive content analysis. Findings were robustly validated through data triangulation and expert focus group discussions.

Results: The findings revealed that agile leadership is underpinned by three key characteristics: personal attributes, holistic organizational development, and the promotion of agile personnel potential. Furthermore, nine distinct components, encompassing 90 specific indicators, were identified. These components range from "Powerful Influence and Charisma" to "Digital Skills and Competency Development" and "Embracing New Perspectives and Lifelong Learning." Practical development guidelines were formulated, proposing six key methods including self-directed learning, AI-assisted learning, and coaching. Critically, an effective development process was established using the PIERI framework: Planning, Implementation, Evaluation, Reflection, and Improvement.

Conclusion: This research provides a clear delineation of agile leadership, identifying its fundamental characteristics and detailed components. The proposed development guidelines, featuring diverse methods and a structured PIERI framework, offer a vital roadmap. These findings are intended to be integrated into annual policies and action plans, significantly enhancing RMUT administrators' agile and adaptive leadership competencies. Ultimately, this will drive institutional excellence and ensure alignment with Thailand's Higher Education Qualification framework (TQF: HEEd) in the dynamic digital landscape.

Keywords: Agile Leadership, Rajamangala University of Technology, Administrator, Higher Education Qualification Standards Framework, Digital Education

Introduction

Recent educational disruption has significantly impacted higher education institutions, affecting operations, goal attainment, adaptability, and risk management. This disruption has intensified competition both nationally and internationally in the era of digital education (Wilkins, 2020). Despite these challenges, many university administrators face numerous obstacles in leading their institutions to success. This often results in graduates possessing competencies below standard or not aligning with 21st-century skills. High-level leaders must adopt new ways of thinking and management to keep pace with these rapid changes (Karia & Abu Hassan Asaari, 2019). The digital education era, in particular, demands comprehensive mechanisms, strategies, and full adaptation across the entire organizational landscape. This has led to the implementation of modern strategic approaches such as flexible organizational structures, positive organizational cultures, the application of ICT systems for education,

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digital empowerment of teams, educational innovation, online learning management, open educational communication, and the integration of artificial intelligence (AI) for strategic control and evaluation. High-level leaders are directly responsible for every step of strategic management to foster agility within higher education institutions (Soewarno & Tjahjadi, 2020; Fernandez & Shaw, 2020; Fernandes et al., 2023; Phakamach, 2023).

Rajamangala University of Technology (RMUT) was established under the Rajamangala University of Technology Act B.E. 2548 (2005), granting state educational institutions autonomy to manage their affairs independently. This autonomy allows them to develop their own unique administrative systems, ensuring agility, academic freedom, and oversight by the University Council. Administrators of Rajamangala University of Technology play a crucial role in setting effective policies and management guidelines. Successful institutional management requires a key component: demonstrating collaboration with personnel, society, communities, and businesses to foster acceptance, cooperation, and goal attainment. The success hinges primarily on the administrators themselves, given their direct roles, duties, and responsibilities as agile change leaders for the entire system. Generally, effective and efficient organizations have six key components: (1) leadership, (2) goal setting, (3) communication, (4) decision-making, (5) motivation, and (6) performance control. Therefore, administrators must exhibit management behaviors appropriate for all six components to lead their institutions to success by the Thailand Qualifications Framework for Higher Education (TQF: HEEd) B.E. 2565 (2022) in the digital education era (Phakamach et al., 2022; Fernandes et al., 2023; Phakamach, 2023).

The management of education at Rajamangala University of Technology, in line with the Thailand Qualifications Framework for Higher Education B.E. 2565 (2022), particularly the administration and development of academics, research, personnel potential, and organizational competency, is central to educational management and student quality development. University administrators or leaders significantly influence institutional effectiveness and student success. Effective administrators must possess diverse knowledge, abilities, and characteristics. A crucial characteristic is leadership agility, where leaders are aware, stimulate, promote, support, and drive personnel to achieve goals. It can be said that "the leadership of educational institution administrators is related to student academic achievement." Thus, administrators who lead change towards educational quality are modern leaders who must truly focus on reform according to the Thailand Qualifications Framework for Higher Education, as leaders lacking knowledge, ability, or understanding of quality aspects may lead the organization to failure and misdirection (Fumasoli et al., 2020; Phakamach et al., 2023b). Amidst the changes in the digital education era, the success and survival of educational organizations largely depend on creativity, continuous learning and adaptation, change and risk management, managerial agility, discovery, and educational innovation. This necessitates developing new management models that foster agility and competitive advantage, applying educational technology and innovation, and truly cultivating an innovative mindset within the organization (Tran & Nghia, 2020; Fernandes et al., 2023; Phakamach, 2023).

Despite the urgent need for adaptability in the digital era, robust empirical research specifically on agile leadership within the context of Thai higher education remains a significant gap in the current literature. While global studies acknowledge the importance of agile leadership in navigating disruption, and some Thai research touches upon general leadership or digital transformation, there is a notable absence of focused inquiry that: 1) rigorously defines the characteristics and components of agile leadership tailored to the unique cultural and structural nuances of Thai universities (especially higher education institutions like RMUT); 2) empirically identifies the specific challenges Thai administrators face in adopting agile practices; and 3) proposes validated, actionable development frameworks (such as the PIERI model in this study) designed for this specific educational landscape. This research directly addresses this void, providing crucial insights into cultivating adaptive leadership vital for advancing Thai higher education in alignment with national qualification frameworks and the demands of the digital economy (Phakamach et al., 2022; Phakamach et al., 2023b). Administrators at RMUT face distinct challenges in the digital education era. These include bridging the digital skill gap among diverse faculty, many accustomed to traditional methods, and rapidly adapting curricula to ever-

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changing industry demands for skills like AI and data analytics. They grapple with securing sufficient funding for robust digital infrastructure and ensuring quality assurance in new online learning and assessment environments. Furthermore, managing resistance to technological change among personnel and fostering an institution-wide digital culture are ongoing hurdles.

Considering the abrupt changes in the economic and social environment, organizations must proactively adapt for agility and survival. As Phakamach et al. (2023b) stated, modern education administrators need the potential to effectively use leadership to build relationships for shared goals, foster trust and provide goal-oriented support, and employ the art and process of influencing individuals or teams. This creates faith, credibility, and confidence in performance, while also building an ecosystem and encouraging cooperation for optimal performance. However, the COVID-19 crisis and educational disruption are critical factors driving significant changes in higher education. The future trend of Thai higher education will rapidly shift towards a competitive global education system. The adaptability of higher education institutions serves as another indicator of organizational competency (Singla & Kaushal, 2022). Moreover, the potential or competency of faculty members and the skills or competencies of students have become decisive factors for choosing higher education institutions. Many universities are beginning to see the possibility of extensive organizational landscape improvements, a continuous adaptation effort that may present opportunities for educational transformation or advancement in the future (Fernandes et al., 2023; Phakamach et al., 2023a).

Agile leadership among administrators of Rajamangala University of Technology in accordance with the TQF: HEEd is a vital characteristic that can empower administrators to effectively and efficiently manage their institutions in the digital education era. Therefore, the researchers are interested in investigating the characteristics, components, and development guidelines for agile leadership among administrators of Rajamangala University of Technology, utilizing a mixed-methods research approach combining quantitative and qualitative methods. The findings can serve as guidelines for developing administrators to possess agile leadership, potentially leading to the achievement of educational goals in the digital education era and fostering desired qualities in students. Furthermore, administrators of Rajamangala University of Technology in Thailand are comparable to senior executives in business organizations who possess decision-making authority and agility in planning, budget allocation, personnel development, and building national and international academic and research collaboration networks. This requires knowledge and management skills to align with global societal realities. The Office of the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation (MHESI), has consistently prioritized developing administrators' potential, promoting essential skills at all levels, fostering managerial agility, and enabling survival in a rapidly changing educational landscape.

Objectives

1) To investigate and define the characteristics of agile leadership among administrators at Rajamangala University of Technology aligned with Thailand's Higher Education Qualification Framework (TQF: HEEd) for the digital education era.

2) To identify and delineate the key components of agile leadership within the context of Rajamangala University of Technology administration aligned with Thailand's Higher Education Qualification Framework (TQF: HEEd) for the digital education era.

3) To propose comprehensive development guidelines for agile leadership among administrators of Rajamangala University of Technology, specifically aligned with Thailand's Higher Education Qualification Framework (TQF: HEEd) for the digital education era.

Literature review

The landscape of education, particularly higher education, is undergoing a profound transformation driven by rapid technological advancements and unforeseen disruptions, such as global pandemics. This educational disruption has created an urgent need for educational institutions to adapt and evolve, pushing traditional leadership models to their limits (Wilkins, 2020). In response, agile leadership, originating from the business and technology sectors, has emerged as a crucial paradigm for

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navigating volatility, uncertainty, complexity, and ambiguity (VUCA) (Horney & O'Shea, 2015; Akkaya & Yazici, 2020). Agile leadership is not merely "good leadership"; it is "great leadership" that is continuously improving and adapting (McPherson, 2016; Samad et al., 2022; Agile Business Consortium, 2024). Adhiatma et al. (2022), Phakamach et al. (2023a), and Samodien (2024) argue that key characteristics of agile leaders in educational settings include: (1) Adaptability and Flexibility: Agile leaders recognize that change is constant and are willing to adjust their strategies based on new information. This involves a focus on continuous learning and a willingness to embrace new approaches rather than adhering rigidly to outdated methods. (2) Visionary and Strategic Thinking: While embracing flexibility, agile leaders maintain a clear long-term vision for the institution, even amidst short-term uncertainties. They can guide their teams through change, spotting emerging opportunities and threats. (3) Empowerment and Collaboration: Agile leaders foster a culture of trust, empowering faculty and staff to take ownership and make decisions. They emphasize collaboration, teamwork, and open communication across all levels of the institution, breaking down traditional silos. This collaborative approach extends to involving students in aspects of curriculum design and classroom management. (4) Human-Centered Approach: Agile leadership prioritizes the well-being and development of people. It focuses on fostering psychological safety within teams, ensuring that all voices are heard and respected, which in turn boosts morale, engagement, and productivity. (5) Digital Proficiency and Data-Driven Decision-Making: In the digital education era, agile leaders possess strong digital skills and encourage the effective use of technology. They are adept at collecting and analyzing data to inform decisions, continuously evaluating the impact of initiatives on student outcomes and institutional effectiveness. (6) Continuous Learning and Innovation: Agile leaders promote a culture of continuous improvement and innovation within the institution. They encourage experimentation, learning from failures, and proactively seeking new ways to enhance teaching, learning, and administrative processes.

Hayward (2021), Nugroho et al. (2024), Tabassum et al. (2024), and Samodien (2024) mentioned that the adoption of agile leadership in higher education offers numerous benefits: (1) Enhanced Institutional Performance and Adaptability: Agile leadership directly correlates with improved institutional performance, particularly in navigating complex and dynamic environments. It enables faster response times to external pressures and internal needs. (2) Improved Teaching Quality and Lecturer Effectiveness: By fostering continuous feedback, collaborative problem-solving, and professional development, agile leadership empowers lecturers to refine their teaching strategies, leading to higher teaching quality and engagement with students. (3) Increased Student Engagement and Outcomes: The human-centric and adaptable nature of agile education promotes more engaged students, personalized learning pathways, and improved critical thinking skills. Shorter, iterative learning cycles with frequent assessments lead to better understanding and higher quality outcomes. (4) Promotion of Innovation and Organizational Culture: Agile leaders cultivate an organizational culture that values innovation, creativity, and proactive problem-solving. This fosters an environment where new ideas are welcomed and continuously integrated into practices (Agile Business Consortium, 2024). (5) Effective Change Management: Agile leadership provides a framework for managing significant organizational changes, including the transition to digital learning environments. Leaders can effectively guide their institutions through periods of disruption by embracing flexibility and empowering teams.

Despite the evident benefits, implementing agile leadership in higher education faces challenges: (1) Resistance to Change: Traditional hierarchical structures and established mindsets within academia can pose significant resistance to agile methodologies (Phakamach, 2023). (2) Resource Constraints: Limited institutional support and insufficient leadership training can hinder the widespread adoption of agile practices (Nugroho et al., 2024). (3) Need for Tailored Development Programs: While the principles of agile leadership are universal, their application in educational contexts requires tailored development programs that address the unique complexities of higher education (Samodien, 2024).

Developing agile leadership skills in educational administrators requires a multi-faceted approach. Programs should focus on fostering specific competencies such as digital literacy, strategic communication, emotional intelligence, and change management. Effective development often

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integrates self-directed learning, online modules, workshops, AI-assisted learning, coaching, and case studies, emphasizing experiential and collaborative learning. Continuous professional development, reflective practice, and a commitment to lifelong learning are crucial for leaders to maintain agility in an ever-evolving educational landscape (Samad et al., 2022; Phakamach et al., 2023a; Nugroho et al., 2024; Tabassum et al., 2024; Samodien, 2024). Various agile leadership models exist, each offering unique strengths, from Scrum's servant-leader emphasis on team empowerment to Lean's focus on continuous improvement and waste reduction, and broader adaptive leadership frameworks that address complex challenges through experimentation. While these global models share core tenets of flexibility and responsiveness, their direct application can vary significantly across organizational cultures. For the Thai higher education context, which often features hierarchical structures, a strong emphasis on harmony, and indirect communication, a generic Western-centric agile approach might face considerable adoption challenges. The chosen framework, refined through empirical data from RMUT personnel and expert validation, is therefore most appropriate. It integrates core agile principles with culturally resonant elements, such as acknowledging the role of "Powerful Influence and Charisma" in a respectful hierarchy and potentially a more nuanced approach to confrontation. This localized framework ensures the proposed guidelines are not only theoretically sound but also culturally digestible and practically actionable for Thai administrators, fostering effective implementation and sustained excellence.

In summary, Agile leadership is no longer a nascent concept but a vital imperative for higher education institutions striving for excellence in the digital age. By embodying adaptability, fostering collaboration, prioritizing human-centered approaches, and leveraging data and technology, agile leaders can effectively navigate disruption, enhance educational quality, and ensure the relevance and success of their institutions in a competitive global environment. Continued research into the practical applications and long-term impacts of agile leadership in diverse educational settings remains crucial to further solidify its transformative potential.

This research directly addresses several critical gaps in the existing literature, particularly concerning agile leadership within the Thai higher education context. While global discourse on agile leadership is growing, there's a significant lack of empirical studies that: (1) Define Agile Leadership in the Thai Higher Education Context. Existing definitions are often Western-centric, and this study provides a culturally relevant understanding of agile leadership characteristics and components specific to Thai university administrators. (2) Tailor Development Guidelines for Thai Higher Education: Generic agile leadership training may not resonate with the unique cultural and hierarchical structures of Thai institutions. This research proposes specific, validated development methods and a process (PIERI framework) designed for this particular environment. (3) Focus on Higher Education: Research on agile leadership in higher education is generally scarce, and even more so in higher education institutions like RMUT, which have distinct needs for rapid curriculum adaptation and industry alignment. This study fills that niche. (4) Provide Empirical Evidence for Agile Leadership Components and Development: Many discussions are conceptual; this study empirically identifies concrete components and evaluates development approaches.

Conceptual Framework

Based on a review of relevant literature, documents, and research, the research team designed the research methodology by establishing a conceptual framework to identify the results of this research, as shown in Figure 1.

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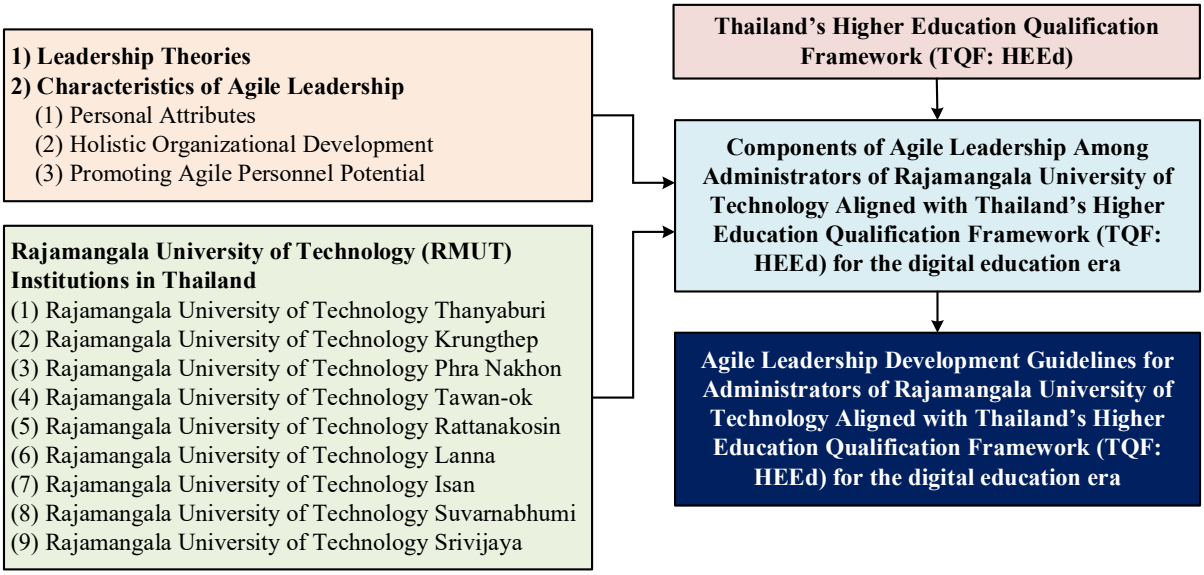

Figure 1: Research Conceptual Framework

Methodology

This research employed a mixed methodology with a Convergent Parallel Approach. Details regarding the research methods are as follows:

Population and Sample

Population: The population for this study comprised administrators and educational personnel from nine Rajamangala University of Technology (RMUT) institutions in the academic year 2024. These institutions include: (1) Rajamangala University of Technology Thanyaburi, (2) Rajamangala University of Technology Krungthep, (3) Rajamangala University of Technology Phra Nakhon, (4) Rajamangala University of Technology Tawan-ok, (5) Rajamangala University of Technology Rattanakosin, (6) Rajamangala University of Technology Lanna, (7) Rajamangala University of Technology Isan, (8) Rajamangala University of Technology Suvarnabhumi, and (9) Rajamangala University of Technology Srivijaya. The total population used in the research was 4,558 people.

Sample: (1) Quantitative Research Sample: This group consisted of 599 high-level administrators and faculty members from the nine Rajamangala University of Technology institutions, affiliated with the Office of the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation (MHESI). They were selected by using multistage sampling. (2) Qualitative Research Sample: This group comprised nine administrators of Rajamangala University of Technology. The sample size was determined by using snowball sampling.

The qualitative phase of this research employed snowball sampling as its primary selection criterion. This method was chosen to ensure that participants could provide rich, in-depth insights directly relevant to the study's aim. Understanding the characteristics and components of agile leadership among RMUT administrators. Specifically, participants were selected based on their: (1) Role and Position: Including both administrators (who hold leadership positions and are directly involved in strategic management and decision-making) and faculty members/staff (who experience and observe leadership firsthand, and are impacted by administrative agility). This provides a comprehensive perspective from both the "leader" and "follower" standpoint. (2) Knowledge and Experience: Participants were chosen because they possessed direct experience with the university's administrative processes, digital transformation efforts, and leadership dynamics. This ensured they could offer valuable insights into the practical application of agile principles within the RMUT context. (3) Ability to Inform Research Questions: The selection focused on individuals who were deemed most capable of articulating their perspectives on agile leadership characteristics, components, and the challenges/opportunities related to digital education within their specific institution.

Research Instruments

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The research instruments included a 5-point Likert-scale questionnaire covering three aspects of agile leadership by the higher education qualification framework: personal attributes, holistic organizational development, and promoting agile personnel potential. The scoring criteria were: "Highest" (5 points), "High" (4 points), "Moderate" (3 points), "Low" (2 points), and "Lowest" (1 point). Additionally, semi-structured interview guides and focus group discussion guides were used for qualitative data collection.

To ensure the quality of the questionnaire, its structural validity, content validity, and language appropriateness were assessed by three research instrument experts. Items with an Index of Consistency (IOC) of .5 or higher were selected, resulting in IOC values ranging from .62-1.0, with an overall IOC of .878. The questionnaire was then pilot-tested with 30 higher education administrators not included in the main sample. Cronbach's Alpha Coefficient was used to determine reliability, and Item Total Correlation was used for item discrimination. The overall reliability of the questionnaire was .955.

Data Collection

Qualitative data were collected through online interviews with experts. Quantitative data were collected by distributing 599 internet links to questionnaires, with a 100% return rate (599 questionnaires). Data collection took place between January and March 2024.

Research Procedures

The research followed a four-step process:

Step 1: Studying the Characteristics of Agile Leadership.

This step involved researching agile leadership concepts from relevant documents, textbooks, and research, as well as interviewing nine successful Rajamangala University of Technology administrators. Details include: 1) reviewing theoretical concepts from literature, and 2) conducting in-depth interviews with successful Rajamangala University of Technology administrators using semi-structured interview guides.

Qualitative data analysis in this step involved analyzing and extracting content messages from the interview data, focusing on the context of Rajamangala University of Technology administration, and summarizing the characteristics of agile leadership.

Step 2: Analyzing the Components of Agile Leadership.

This step involved collecting empirical data based on the characteristics identified in Step 1. A questionnaire on agile leadership for Rajamangala University of Technology administrators, aligned with the higher education qualification framework, was developed. This 3-dimensional rating scale questionnaire covered personal attributes, holistic organizational development, and promoting agile personnel potential. It was administered to 599 Rajamangala University of Technology personnel. The quantitative data were then analyzed to identify the components of agile leadership. The sample was divided into two groups: 295 for Exploratory Factor Analysis (EFA) and 304 for Confirmatory Factor Analysis (CFA). Data analysis in this step included:

(1) Factor analysis and component extraction using Principal Component Analysis (PCA) with Orthogonal Rotation (Promax method). Criteria for component consideration included an eigenvalue of 1.0 or higher and a Factor Loading of .50 or higher for each variable within a component.

(2) Correlation analysis using Pearson's Product-Moment Correlation Coefficient.

(3) Confirmatory Factor Analysis (CFA) to confirm the consistency of the exploratory factor analysis results with empirical data based on theoretical models. This process involved specifying the model, testing the goodness-of-fit of the measurement model, and interpreting the CFA results, considering indicators such as Chi-square, degrees of freedom (df), p-value, Goodness-of-Fit Index (GFI), Adjusted Goodness-of-Fit Index (AGFI), and Root Mean Square Residual (RMR).

Step 3: Verifying and Summarizing the Agile Leadership Components.

This step involved verifying the components using the Data Triangulation Technique, which validates data obtained from different sources by considering different times, locations, and individuals. The research team categorized the data, compared it, and indexed it into clear categories. The characteristics of agile leadership and its components were then descriptively summarized by confirming the data obtained in Steps 1 and 2.

Step 4: Proposing Agile Leadership Development Guidelines.

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This final step involved expert focus group discussions with 12 higher education administration experts, selected using convenience sampling. The data from Step 3 were used to formulate guidelines, leading to a conclusion on appropriate guidelines for developing agile leadership among Rajamangala University of Technology administrators in the digital education era, through content analysis.

Data Analysis

1) Quantitative Data Analysis

Exploratory Factor Analysis (EFA): This statistical technique was primarily used to identify the underlying structure of the items (indicators) from the questionnaires. EFA helped to reduce a large number of observed variables (questionnaire items) into a smaller set of latent factors or constructs, which in this study represented the "components of agile leadership." It helped determine which specific indicators grouped to form the identified nine components, ensuring the measurement instrument's construct validity.

Reporting of Indicators: This refers to the descriptive statistics (e.g., means, standard deviations, frequencies) of the questionnaire items, which provide a quantitative overview of how respondents perceived each indicator related to agile leadership characteristics and components. This data would have informed the identification of the 90 specific indicators mentioned in the results.

2) Qualitative Data Analysis

The qualitative data, derived from in-depth interviews and focus group discussions, was analyzed using descriptive content analysis. This systematic approach involved several stages to extract meaningful themes, patterns, and insights related to agile leadership characteristics and components:

Transcription: All audio recordings from interviews and focus groups were meticulously transcribed verbatim to convert spoken words into written text, ensuring accuracy and completeness.
Familiarization: Researchers repeatedly read through the transcripts and field notes to gain a holistic understanding of the data, immerse themselves in the participants' perspectives, and identify initial impressions.

Initial Coding (Open Coding): During this phase, researchers engaged in an inductive process, line-by-line or segment-by-segment, to identify and assign initial codes or labels to significant phrases, sentences, or paragraphs. These codes represented the basic conceptual units emerging directly from the data without imposing preconceived notions. For instance, a statement about a leader's ability to "change plans quickly" might be coded as "adaptability," while "listening to team members" might be coded as "supportive."

Category Development (Axial Coding): Related initial codes were then grouped into broader categories or themes. This involved looking for connections and relationships between codes, identifying their properties and dimensions. For example, codes like "adaptability," "flexibility," and "openness to new ideas" might coalesce into a category like "Agile and Flexible Adaptability." This iterative process helped to organize the vast amount of qualitative data into meaningful conceptual clusters.

Thematic Analysis and Refinement (Selective Coding): The identified categories and themes were further refined and validated against the original data. This involved searching for overarching patterns and central concepts that explained agile leadership, its components, and development guidelines. The research team engaged in discussions to ensure the themes accurately reflected the participants' voices and provided rich descriptions.

Inter-coder Reliability (Consistency Check): To enhance the trustworthiness and confirmability of the qualitative findings, a subset of the transcribed data (e.g., 20-30%) was independently coded by at least two researchers. They then compared their coding results. Discrepancies were discussed until a consensus was reached, leading to a refinement of the coding scheme and ensuring consistency in interpretation across the dataset. While the specific metric (e.g., Cohen's Kappa, percentage agreement) isn't specified in the abstract, this process strengthens the rigor of the qualitative analysis.

Data Triangulation: The qualitative themes and findings were cross-referenced and validated with the quantitative data (questionnaire results) and further subjected to expert focus group validation. This triangulation process helped to corroborate findings across different data sources and methods, strengthening the overall credibility of the research results.

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Results

Based on the research study, the findings and data analysis, according to the research objectives, are presented as follows:

1. Characteristics of Agile Leadership Among Administrators of Rajamangala University of Technology Aligned with Thailand's Higher Education Qualification Framework (TQF: HEEd) for the Digital Education Era

The characteristics of agile leadership among administrators of Rajamangala University of Technology aligned with Thailand's Higher Education Qualification Framework (TQF: HEEd) for the digital education era, comprise three key areas:

(1) Personal Attributes: This includes having a broad vision, a positive attitude and mindset, being highly proactive, possessing high expectations for work outcomes, demonstrating a strong commitment to success, exhibiting flexibility and adaptability to situations, being unconstrained by traditional frameworks, fostering creative thinking, showing respect to personnel, making decisions based on reason, being straightforward, having good interpersonal skills and interactions, being fair, empathetic, and upholding ethics and morality. It also encompasses academic and research knowledge for developing proactive curricula that align with global changes and the digital education era, effective teaching and learning management, including the use of appropriate and efficient educational media, technology, and innovation, and the ability to independently invent and experiment with new teaching techniques.

(2) Holistic Organizational Development: This involves setting educational management goals to drive initiatives with an emphasis on stakeholder participation, conducting SWOT analyses that align with real situations, developing clear organizational structures and work systems, delegating and overseeing tasks appropriately, leading the collaborative development of curricula that meet the needs of learners, communities, and national strategies, utilizing empirical evidence in personnel performance appraisals, emphasizing teamwork by encouraging stakeholders to participate in thinking, doing, and taking responsibility for continuously developing creative academic and research work, fostering an entrepreneurial university society, and innovating modern higher education research and development for national progress.

(3) Promoting Agile Personnel Potential: This dimension includes developing personnel's knowledge and abilities in teaching and learning management, and their ability to adapt agilely through various methods. These methods include self-study seminars and training, inviting external experienced speakers, organizing study visits to excellent higher education institutions, providing training opportunities based on individual interests and aptitudes, encouraging faculty members to develop outcome-based education (OBE) teaching, conducting classroom research, inventing innovations and experimenting with new teaching methods, organizing activities or exhibitions for faculty members to showcase and disseminate their academic work in various formats, promoting faculty members to become academic and research leaders capable of advising others, supporting academic promotions, and fostering professional advancement.

2. Components of Agile Leadership Among Administrators of Rajamangala University of Technology Aligned with Thailand's Higher Education Qualification Framework (TQF: HEEd) for the Digital Education Era

The key components of agile leadership among administrators of Rajamangala University of Technology aligned with Thailand's Higher Education Qualification Framework (TQF: HEEd) for the digital education era were analyzed as follows:

(1) Exploratory Factor Analysis (EFA): Using Principal Component Analysis (PCA) with orthogonal rotation (Promax method), components were determined based on an eigenvalue of 1.0 or higher. From the quantitative data, 104 variables were analyzed, with each variable in a component required to have a factor loading of .50 or higher.

(2) Correlation Analysis: Pearson's Product Moment Correlation Coefficient revealed that the correlation coefficients were statistically significant at the .05 level, with values ranging from .05 to .96. Most variables exhibited moderate and positive correlations, indicating sufficient inter-variable

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relationships for further exploratory factor analysis. Bartlett's Test of Sphericity for all observed variables yielded a value of 14258.768 with 1865 degrees of freedom (df) and a p-value less than .001, indicating that the correlation matrix of the observed variables was not an identity matrix. The Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy was .972, which is greater than .50, signifying that the relationships between variables were sufficient for factor analysis, as shown in Table 1.

Table 1: KMO and Bartlett's Test for Measuring Sampling Adequacy and Sphericity

Kaiser-Meyerolkin Measure of Sampling Adequacy (KMO)	**Bartlett's Test of Sphericity**	
.972	Approx. Chi-Square	14258.768
	df	1865
	p-value	.001

(3) Confirmatory Factor Analysis (CFA): The CFA results were evaluated based on several fit indices: the Chi-square value was 122, degrees of freedom (df) were 101, the p-value was .085, the Goodness-of-Fit Index (GFI) was .985, the Adjusted Goodness-of-Fit Index (AGFI) was .994, and the Root Mean Square Residual (RMR) was .038.

In summary, the exploratory factor analysis of the indicators revealed 12 components. When considering the criterion of factor loadings of .50 or higher and a minimum of 3 indicators per component, 9 distinct components were identified. The name of each component was determined by the shared characteristics of its constituent indicators, as presented in Table 2.

Table 2: Number of Agile Leadership Components among Administrators of Rajamangala University of Technology by Thailand Qualifications Framework for Higher Education in the Digital Education Era

Composition	**Component**	**Number of items from the questionnaire**	**Eigen**	**Percentage of variance**
1.	Powerful Influence and Charisma	13	18.024	22.365
2.	Agile and Flexible Adaptability	12	14.660	17.193
3.	Individuality and Inspiration	11	11.447	12.814
4.	Emotional Maturity and Decision-Making	10	9.718	8.081
5.	Strategic Communication and Change Management	10	9.718	8.081
6.	Digital Skills and Competency Development	9	6.045	4.326
7.	Creating an Agile Organizational Culture	9	6.045	4.326
8.	Fostering a Creative Atmosphere and Shared Values	8	4.109	2.145
9.	Embracing New Perspectives and Lifelong Learning	8	4.109	2.145
	Total			81.476

From Table 2, the Exploratory Factor Analysis (EFA) results show 9 components with a total of 90 indicators. Component 1 has the most indicators, with 13, followed by components 2, 3, 4, 5, 6, 7, 8, and 9 in descending order.

The Confirmatory Factor Analysis (CFA) results for the agile leadership components among administrators of Rajamangala University of Technology, by Thailand Qualifications Framework for Higher Education in the digital education era, from components 1-9, indicated that the component model was consistent with the empirical data. All components were statistically significant at the .05

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level. Collectively, these components explained 81.476% of the administrators' characteristics and aligned with the results of the qualitative content analysis, as shown in Figure 2. The details of each component are as follows:

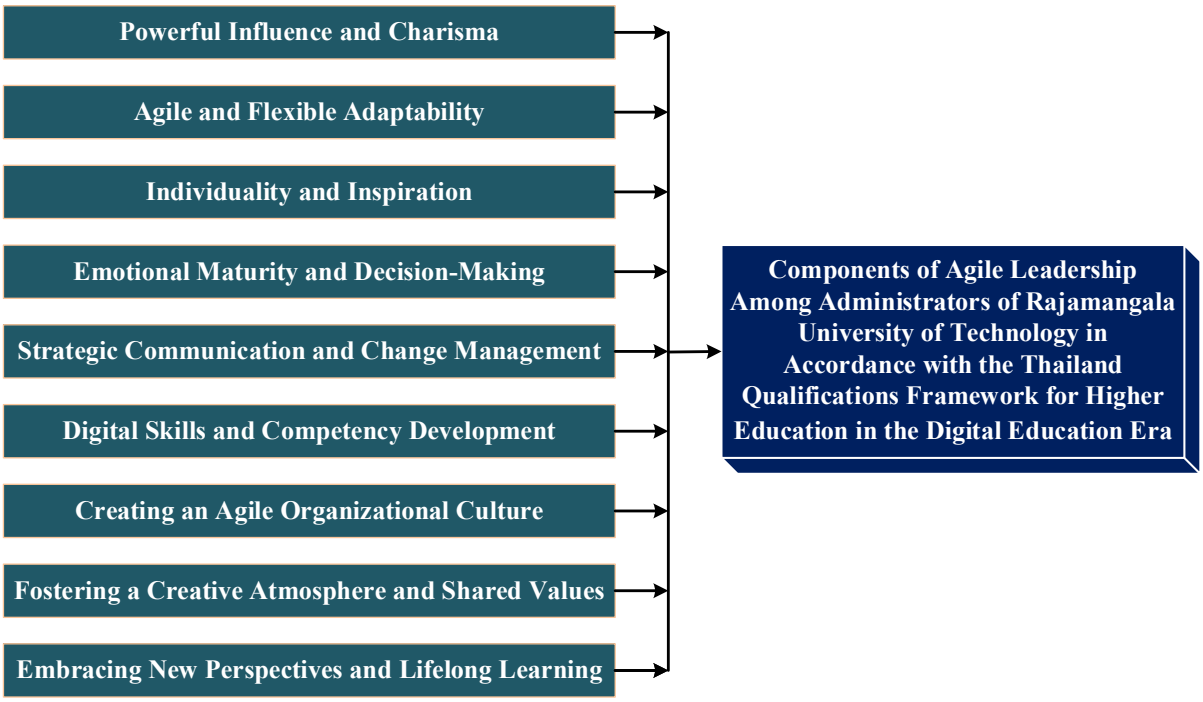

Figure 2: Components of Agile Leadership among Administrators of Rajamangala University of Technology by Thailand Qualifications Framework for Higher Education in the Digital Education Era

Component 1: Powerful Influence and Charisma

This component signifies a leader who serves as a positive role model, earning the respect, trust, and confidence of followers. This leader is believed to act righteously and is willingly followed. This component consists of 13 items: 1) Possessing emotional stability and self-control, 2) Exhibiting creative thinking and openness to others' opinions, 3) Demonstrating commitment and dedication to task completion, 4) Adhering creatively to ideals, 5) Showing respect and refraining from displaying superiority over others, 6) Adapting flexibly to situations and solving immediate problems promptly, 7) Treating colleagues as equals and being friendly, 8) Showing compassion, helpfulness, and care for colleagues' well-being, 9) Possessing powerful authority and charisma, 10) Having positive thinking and practical skills, 11) Upholding ethics and morality, 12) Maintaining good interpersonal relationships with others, and 13) Being fair, trustworthy, and reliable.

Component 2: Agile and Flexible Adaptability

This component refers to a leader who can adapt quickly by integrating knowledge, skills, experience, and flexibility with modern management strategies to achieve quality and competitive advantage. This component consists of 12 items: 1) Possessing quick wit in problem-solving and making intelligent decisions, 2) Adapting management styles to changing social contexts, 3) Demonstrating the ability to adjust during educational disruptions, 4) Having progressive thinking, both in depth and breadth, 5) Being well-informed and capable of solving immediate problems effectively, 6) Daring to innovate unique and different things, 7) Utilizing modern teaching and learning techniques and methods, 8) Being open to experiences in developing future higher education curricula, 9) Possessing knowledge and continuously learning in management, 10) Understanding the principles of change and risk management, 11) Showing flexibility in all situations, and 12) Demonstrating the ability to adapt for the benefit of society and the nation.

Component 3: Individuality and Inspiration

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This component describes a leader who considers individual needs and respects differences, intentionally inspiring followers to recognize the value and challenge of their work for the organization's maximum benefit. This component consists of 11 items: 1) Building good relationships with colleagues, 2) Enabling followers to envision a beautiful future, 3) Creating a supportive environment for academic and research work, 4) Delegating tasks according to followers' potential, 5) Inspiring followers, 6) Treating others with respect and equality, 7) Empowering individuals to learn new things as desired, 8) Motivating followers to dedicate effort and strive in their work, 9) Fostering organizational commitment, 10) Highlighting value and challenges by encouraging teamwork with intelligence, and 11) Providing constructive guidance and consultation.

Component 4: Emotional Maturity and Decision-Making

This component refers to a leader with stable emotional maturity who interacts with followers based on understanding and equality, and who employs proactive thinking and decision-making processes for the organization's maximum benefit. This component consists of 10 items: 1) Displaying a high level of emotional intelligence, 2) Being self-aware, empathetic, and capable of managing one's own emotions, 3) Building trust and understanding others' emotions, 4) Creating a positive team environment and fostering good relationships, 5) Providing opportunities for personnel to learn new things, observe, and interact in their work, 6) Involving the team in decision-making processes, 7) Utilizing interactive collaborative methods that benefit from diverse perspectives, 8) Making informed and effective decisions, 9) Laying the foundation for effective collaboration and emphasizing team efficiency, and 10) Stimulating positive imagination throughout the organization.

Component 5: Strategic Communication and Change Management

This component signifies a leader who prioritizes organizational communication and strategic change management, readily supporting the organization's development towards excellence. This component consists of 10 items: 1) Practicing open and effective leadership communication, 2) Possessing the ability to manage change, 3) Strategically promoting team self-organization, joint decision-making, and responsibility for student learning outcomes, 4) Adhering to academic and professional standards, 5) Supporting strategic and systemic thinking, including understanding the implications of timely decisions in a changing environment, 6) Understanding one's potential by learning new teaching methods and applying them practically, 7) Promoting the development of new educational technologies and innovations, 8) Being aware of current events and capable of promptly solving immediate problems, 9) Encouraging two-way communication and constructive guidance, and 10) Prioritizing team goals over individual ones.

Component 6: Digital Skills and Competency Development

This component refers to a leader who makes followers aware of and capable of developing digital skills and competencies, which are crucial in the era of digital transformation. This component consists of 9 items: 1) Learning and understanding various digital sciences, 2) Adapting to respond to the phenomenon of New Media, 3) Thinking adaptively and adjusting to all situations, 4) Possessing the potential to use digital tools for educational development, 5) Being able to create a digital learning ecosystem, 6) Having knowledge and understanding of complex problem-solving skills, 7) Constantly developing one's digital skills, 8) Being able to creatively develop digital competencies in colleagues, and 9) Effectively applying digital skills and competencies for management.

Component 7: Creating an Agile Organizational Culture

This component signifies a leader who prioritizes correct thinking processes in agile management and is ready to build a positive corporate culture aimed at achieving shared goals. This component consists of 9 items: 1) Defining an organizational structure suitable for the situation, 2) Establishing good operational standards, 3) Setting flexible and adaptable regulations, 4) Fostering agile cooperation within the team, 5) Creating an agile teamwork system, 6) Supporting and motivating good intentions, 7) Building awareness and a system of mutual acceptance, 8) Fostering commitment and loyalty to the organization, and 9) Genuinely taking responsibility for mistakes.

Component 8: Fostering a Creative Atmosphere and Shared Values

This component refers to a leader who fosters a positive organizational atmosphere, seeks opportunities for timely adaptation, is sensitive to change and all forms of risk, and creates creative shared values.

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This component consists of 8 items: 1) Creating an atmosphere of knowledge exchange, 2) Fostering unity within the organization, 3) Serving as an academic and professional role model, 4) Leading the organization as a learning and aware entity, 5) Facilitating creative academic and research discussions, 6) Encouraging and facilitating continuous learning, 7) Providing opportunities for colleagues to choose their suitable paths and perform to their full potential, and 8) Actively participating in academic seminars at both national and international levels.

Component 9: Embracing New Perspectives and Lifelong Learning

This component describes a leader who embraces new perspectives and engages in lifelong learning, thereby stimulating followers to learn intelligently. This component consists of 8 items: 1) Creating positive thinking processes, perceptions, and reinforcement methods for colleagues, 2) Fostering creative enthusiasm for new perspectives, 3) Adjusting mindsets to embrace new perspectives in digital education, 4) Clearly articulating and communicating the leader's aspirations, 5) Instilling a continuous learning and sharing culture, 6) Building an organizational culture that supports innovation in all dimensions, 7) Highlighting value and challenges by encouraging teamwork, and 8) Creating a learning atmosphere and ecosystem to foster a lifelong learning organization.

3. Agile Leadership Development Guidelines for Administrators of Rajamangala University of Technology Aligned with Thailand's Higher Education Qualification Framework (TQF: HEEd) for the digital education era

The verification of components using data triangulation and expert focus group discussions revealed the following guidelines for developing agile leadership among administrators of Rajamangala University of Technology, aligned with Thailand's Higher Education Qualification Framework (TQF: HEEd) for the digital education era:

(1) Methods for Agile Leadership Development: There are six effective methods: (1) Self-directed learning and development, (2) Online learning, (3) Workshops, (4) AI-assisted learning, (5) Coaching, and (6) Case studies. Development activities include digital knowledge exchange, learning from role models and application, demonstrating exemplary practices, and experiential learning, among others. The adoption of appropriate methods will primarily depend on the specific context of the educational institution.

(2) Appropriate Agile Leadership Development Process (PIERI Model): The suitable process for developing agile leadership among administrators of Rajamangala University of Technology by Thailand Qualifications Framework for Higher Education in the digital education era, uses the PIERI model, comprising: 1) Planning (P), 2) Implementation (I), 3) Evaluation (E), 4) Reflection (R), and 5) Improvement (I) (improving models and methods). This also includes guidelines for applying Generative AI for designing and creating research to international standards.

(3) Success Factors for Agile Leadership Development: Key factors for successful agile leadership development among administrators of Rajamangala University of Technology by Thailand Qualifications Framework for Higher Education in the digital education era, include: having a well-designed agile leadership development curriculum, providing adequate resources for development, ensuring continuous and systematic monitoring and evaluation, and building national and international networks for leadership development.

Discussion

Based on the research findings and conclusions presented, key points can be discussed to highlight the research objectives, emphasizing the alignment of components and indicators with past research and academic works.

1. Characteristics of Agile Leadership Among Administrators of Rajamangala University of Technology Aligned with Thailand's Higher Education Qualification Framework (TQF: HEEd) for the Digital Education Era

The characteristics of agile leadership among administrators of Rajamangala University of Technology aligned with Thailand's Higher Education Qualification Framework (TQF: HEEd) for the digital education era, comprise three essential aspects: (1) Personal Attributes, (2) Holistic Organizational Development, and (3) Promoting Agile Personnel Potential. All three aspects clearly

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define the agile leadership characteristics of Rajamangala University of Technology administrators within this framework and era. This clarity stems from the researchers' ability to identify specific variables indicative of agile leadership traits using a quantitative-driven mixed-methods approach, drawing on empirical data from educational personnel. These findings align with research by Verma and Mehta (2022), Fernandes et al. (2023), Samodien (2024), Tabassum et al. (2024), Nugroho et al. (2024), and Tabassum et al. (2025), which indicate that distinguished agile leaders possess personal attributes enabling rapid adaptation, focus on comprehensive organizational development, and empower personnel with agility to achieve organizational success quickly and effectively.

2. Components of Agile Leadership Among Administrators of Rajamangala University of Technology Aligned with Thailand's Higher Education Qualification Framework (TQF: HEEd) for the Digital Education Era

The research identified 9 components and 90 indicators of agile leadership among administrators of Rajamangala University of Technology aligned with Thailand's Higher Education Qualification Framework (TQF: HEEd) for the digital education era, clearly demonstrating the nature of agile leadership. This reliability is attributed to the robust factor analysis. A detailed discussion of each component is provided below:

(1) Powerful Influence and Charisma: This component signifies that a leader's powerful influence and prestige are fundamental. Building charisma in followers is crucial for all leaders. This aligns with research by Phakamach et al. (2023b), Nugroho et al. (2024), Samodien (2024), and Agazu et al. (2025), who found that leaders' behaviors in building powerful influence and prestige, focusing on work achievements and fostering good relationships with instructors and staff, create a friendly atmosphere and cooperation. This leads to followers' genuine respect, trust, and willingness to comply.

(2) Agile and Flexible Adaptability: This component highlights a leader's ability to adapt quickly and flexibly, integrating knowledge, skills, and creative thinking with modern management capabilities to enhance the quality and efficiency of internal work processes. This is consistent with research by McKenzie and Atiken (2012), Fernandes et al. (2023), Samodien (2024), and Agazu et al. (2025), which suggests that individuals seeking a quality and happy life must adapt to living conditions and maintain flexibility in both life and work.

(3) Individuality and Inspiration: This component emphasizes a leader's consideration of individual needs and ability to inspire dedication by highlighting the value, challenge, and commitment to the organization. This aligns with research by McKenzie and Atiken (2012), Fernandez and Shaw (2020), Peeters et al. (2022), and Nugroho et al. (2024), which found that leaders who guide organizations toward new directions by inspiring and invigorating team spirit, fostering enthusiasm, positive attitudes, self-potential, and the ability to achieve desired goals, are considered agile change leaders.

(4) Emotional Maturity and Decision-Making: This component denotes a leader's ability to control emotions, demonstrating high emotional intelligence, which leads to effective decision-making for improving internal work processes. This aligns with research by Karia and Abu Hassan Asaari (2019), Akkaya and Yazici (2020), Samodien (2024), Nugroho et al. (2024), and Agazu et al. (2025), which found that emotionally mature leaders can manage organizations smoothly and efficiently. Furthermore, it is consistent with Phakamach et al. (2023b), who found that educational institution administrators, similar to senior executives in business organizations, possess decision-making authority in planning, budget allocation, personnel development, and building national and international collaborations, all requiring emotional maturity and sound decision-making to align institutional management with societal realities.

(5) Strategic Communication and Change Management: This component indicates that a leader's strong, proactive communication with colleagues and relevant external organizations effectively enhances internal work processes. This aligns with research by McKenzie and Atiken (2012), Wilkins (2020), Nugroho et al. (2024), and Agazu et al. (2025), which found that effective strategic management for higher education involves strategic planning, strategy evaluation, direction setting, strategy formulation, strategy implementation, and strategy improvement. Furthermore, leader communication contributes to the rapid achievement of educational goals.

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(6) Digital Skills and Competency Development: This component focuses on developing essential digital skills and competencies for educational personnel's experiential learning, including direct transfer to students. This is consistent with research by Akkaya and Yazici (2020), Bartsch et al. (2021), Fernandes et al. (2023), Nugroho et al. (2024), and Agazu et al. (2025), who stated that leaders can provide the necessary knowledge and skills for living and professional application. Digital learning enables followers to collaborate with leaders in all situations, allowing the organization to sustain and grow amidst disruptive digital transformation.

(7) Creating an Agile Organizational Culture: This component highlights that creating an agile corporate culture is a primary factor for administrators to lead their organizations to rapid success. This aligns with research by Rehman & Iqbal (2020), Phakamach et al. (2022), Nugroho et al. (2024), and Agazu et al. (2025), who found that during periods of disruptive educational change, leaders must be able to work under pressure with others, develop personnel to embrace a strong organizational culture and be aware of change, develop transparent and fair evaluation systems, and align personnel with work goals.

(8) Fostering a Creative Atmosphere and Shared Values: This component signifies that successful organizational leaders must cultivate a positive atmosphere and creative shared values, serving as role models for all personnel. This aligns with research by Attar and Abdul-Kareem (2020), Peeters et al. (2022), Phakamach et al. (2023b), Nugroho et al. (2024), and Agazu et al. (2025), who found that leaders must prioritize mobilizing talented individuals within the organization to work towards goals, understand how to create creative shared values among personnel, comprehend the art of management, and foster an atmosphere for optimal team performance. They also encourage personnel to take leadership roles and support timely and appropriate technology adoption.

(9) Embracing New Perspectives and Lifelong Learning: This component emphasizes that embracing new perspectives and lifelong learning stimulates followers to consider problems or issues with new strategies and approaches. This aligns with research by McKenzie and Atiken (2012), Miller (2021), Nugroho et al. (2024), and Agazu et al. (2025), who found that embracing new perspectives stimulates intellectual insight, meaning leaders help followers think logically, test ideas in real-world situations, and encourage creative thinking and lifelong learning. This enables organizations to achieve goals through positive intelligence.

3. Agile Leadership Development Guidelines for Administrators of Rajamangala University of Technology Aligned with Thailand's Higher Education Qualification Framework (TQF: HEEd) for the digital education era

The research identified characteristics, components, and proposed guidelines for developing agile leadership among administrators of Rajamangala University of Technology aligned with Thailand's Higher Education Qualification Framework (TQF: HEEd) for the digital education era, fulfilling all three research objectives. The research team verified these components using data triangulation, drawing from three sources: 1) reports on educational quality assurance from institutions with Best Practices, 2) academic information and research reports related to Rajamangala University of Technology development under Thailand Qualifications Framework for Higher Education in the digital education era, and 3) empirical research data analysis reports. This verification also involved expert focus group discussions with 12 experts. The findings confirm that the presented characteristics, components, and guidelines for developing agile leadership are crucial and necessary for Rajamangala University of Technology administrators to exhibit agile leadership and contribute to the successful and quality management of Rajamangala University of Technology, aligning with the Thailand Qualifications Framework for Higher Education and the evolving digital education context.

Conclusion and Further Discussion

The findings further conclude and discuss that the identified components of agile leadership align with research on leadership characteristics across administrative, academic, personal, and ethical dimensions. They also correspond with research presenting key agile leadership characteristic models, including personality, competence, roles and responsibilities, and social status. These are considered core characteristics and prominent components within the higher education qualifications framework (Koning, 2020; Verma and Mehta, 2022; Fernandes et al., 2023; Tabassum et al., 2024; Nugroho et al.,

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2024; Samodien, 2024; Agazu et al., 2025; Tabassum et al., 2025). Additionally, Rajamangala University of Technology administrators, aligned with Thailand Qualifications Framework for Higher Education in the digital education era, must possess exceptional higher education management knowledge and capabilities, a modern vision for managing education amidst disruptive change, demonstrable agility, innovative leadership, and accepted interpersonal skills among stakeholders. This is crucial for driving learning reforms to ensure all graduates possess the skills, knowledge, abilities, personality traits, competencies, and qualifications aligned with defined learning outcomes (Samad et al., 2022; Phakamach et al., 2023a). Therefore, high-performing Rajamangala University of Technology administrators in the era of educational disruption, according to the Thailand Qualifications Framework for Higher Education, should collectively exhibit several key qualities: developer, problem-solver, decision-maker, compromiser, diplomat, planner, governor, entrepreneur, scholar, technologist, innovator, and public relations specialist. These qualities will enable administrators to integrate this knowledge to develop high-performing and agile organizations and produce quality graduates with 21st-century skills and competencies, suitable for Thailand's current development and capable of supporting national strategies in the future.

Implications for Policy and Practice in Thai Higher Education

The findings of this research carry significant implications for both policy formulation and practical implementation within Thai higher education, particularly for institutions like RMUT.

1) Policy Formulation

The identified characteristics and components of agile leadership, coupled with the proposed PIERI framework, provide a robust empirical basis for the Ministry of Higher Education, Science, Research and Innovation (MHESI) and other regulatory bodies to:

(1) Integrate agile leadership competencies into TQF: HEEd guidelines: Policy makers can review and potentially update the higher education qualification framework to explicitly include and emphasize agile leadership attributes for university administrators, ensuring that future evaluations and accreditation processes consider these vital competencies.

(2) Allocate resources for targeted leadership development: The detailed guidelines and methods (e.g., AI-assisted learning, coaching) can inform national funding priorities for professional development programs, steering investments towards initiatives that genuinely cultivate adaptive leadership skills in university management.

(3) Promote a national culture of agility: Policies can be designed to encourage greater flexibility, collaboration, and rapid response mechanisms across higher education institutions, moving away from rigid bureaucratic structures to foster an environment conducive to agile practices.

2) Practical Implementation

At the institutional level, RMUT and other Thai universities can leverage these findings to:

(1) Design tailored leadership development programs: The 90 specific indicators provide a precise roadmap for developing training modules that target identified agile leadership gaps, ensuring that programs are highly relevant and effective for their administrators.

(2) Embed agile principles in daily operations: The PIERI framework offers a practical model for implementing continuous improvement cycles in administrative processes, from curriculum development to resource allocation, fostering a culture of iterative adaptation.

(3) Foster digital competency among leaders: The emphasis on "Digital Skills and Competency Development" highlights a critical area for practical investment, ensuring administrators are equipped to lead digital transformation efforts effectively.

By adopting these insights, Thai higher education can more effectively respond to the demands of the digital era, producing graduates with highly relevant skills and ensuring institutions remain competitive and excellent.

Knowledge Contribution

Research Findings

This research investigated the nature of agile leadership within Rajamangala University of Technology (RMUT) administration, aiming to define its characteristics and components, and to

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propose development guidelines aligned with Thailand's Higher Education Qualification Framework (TQF: HEEd) for the digital education era. Based on the research findings, new knowledge can be summarized according to the research objectives, highlighting the following key points:

The characteristics of agile leadership among administrators of Rajamangala University of Technology, aligned with Thailand's Higher Education Qualification Framework (TQF: HEEd) for the digital education era, consist of three dimensions: (1) Personal Attributes, (2) Holistic Organizational Development, and (3) Promoting Agile Personnel Potential.

The components of agile leadership among administrators of Rajamangala University of Technology aligned with Thailand's Higher Education Qualification Framework (TQF: HEEd) for the digital education era, were found to comprise nine components and 90 indicators: (1) Powerful Influence and Charisma, (2) Agile and Flexible Adaptability, (3) Individuality and Inspiration, (4) Emotional Maturity and Decision-Making, (5) Strategic Communication and Change Management, (6) Digital Skills and Competency Development, (7) Creating an Agile Organizational Culture, (8) Fostering a Creative Atmosphere and Shared Values, and (9) Embracing New Perspectives and Lifelong Learning, as illustrated in Figure 2.

Six agile leadership development methods: (1) Self-directed learning and development, (2) Online learning, (3) Workshops, (4) AI-assisted learning, (5) Coaching, and (6) Case studies. Development activities encompass digital knowledge exchange, learning from role models and application, demonstrating exemplary practices, and experiential learning, among others.

An appropriate agile leadership development process using the PIERI framework: (1) Planning (P), (2) Implementation (I), (3) Evaluation (E), (4) Reflection (R), and (5) Improvement (I). This process is to be formalized as clear annual policies and action plans for all Rajamangala University of Technology to utilize in developing their administrators' leadership.

Practical Benefits of Implementing the Proposed Agile Leadership Guidelines

Implementing the proposed guidelines for developing agile leadership offers numerous tangible benefits for Rajamangala University of Technology (RMUT) and other Thai higher education institutions, directly impacting their operational efficiency and strategic responsiveness. Practically, these guidelines provide a clear, actionable roadmap for administrators to navigate the complexities of the digital education era.

Firstly, by fostering agile and flexible adaptability and digital skills, administrators will be better equipped to rapidly adjust curricula and teaching methodologies to meet the fast-evolving demands of industries in the digital economy. This means graduates will acquire more up-to-date, market-relevant skills, enhancing their employability and the institution's reputation.

Secondly, emphasizing holistic organizational development and strategic communication will lead to more efficient resource allocation and improved inter-departmental collaboration. Administrators will be able to make data-driven decisions swiftly, optimizing the use of budgets, personnel, and technological infrastructure, which is crucial given financial constraints common in public education. This also means less bureaucracy and faster project implementation.

Thirdly, by promoting agile personnel potential and creating an agile organizational culture, the guidelines cultivate a workforce that is more adaptable, innovative, and resilient. This leads to higher staff morale, reduced resistance to change, and increased capacity for continuous improvement. When leaders embody agility, they inspire their teams to embrace new technologies and methodologies, ensuring the institution remains competitive and forward-thinking.

Finally, the structured PIERI framework ensures that development efforts are not ad hoc but are systematically planned, implemented, evaluated, and refined. This practical, iterative process maximizes the return on investment in leadership training, making the entire institution more responsive to both internal needs and external pressures, ultimately contributing to sustained excellence aligned with national qualification standards.

Furthermore, other higher education institutions can adopt these identified characteristics, components, and guidelines to formulate policies and mechanisms for developing agile leadership, adapting them to their specific contexts and focusing on administrator potential within the higher

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education qualifications framework. This will enable these institutions to develop their educational management processes in line with the Thailand Qualifications Framework for Higher Education, contributing to the development of the nation's human resources.

Recommendations

The researchers put forward two kinds of feedback as follows:

Recommendations for Applying Research Findings

Based on the comprehensive findings regarding agile leadership characteristics, components, development guidelines, and the PIERI framework, the following recommendations are put forth for Rajamangala University of Technology and other Thai higher education institutions:

1) Integrate Agile Leadership into Formal Policies and Strategic Plans

RMUT: Explicitly embed the identified agile leadership characteristics and components into the university's strategic plan (e.g., 5-year plan), annual operational policies, and job descriptions for administrative positions. This formalizes the commitment to agile principles.

MHESI: Consider reviewing and updating the existing Thailand Qualifications Framework for Higher Education (TQF: HEEd) and relevant policies to explicitly include agile leadership competencies as a key attribute for university administrators, promoting a nationwide standard.

2) Systematize Agile Leadership Development Programs

RMUT: Design and implement structured, compulsory leadership development programs for all current and aspiring administrators based on the six proposed methods (self-directed learning, online learning, workshops, AI-assisted learning, coaching, case studies).

Prioritize AI-assisted Learning: Given the digital era context, actively explore and integrate AI-powered tools for personalized learning paths in leadership development, skill assessment, and feedback mechanisms.

Leverage Coaching: Establish a formal coaching and mentorship program where experienced agile leaders (internal or external) can provide individualized guidance to administrators.

3) Implement the PIERI Framework for Continuous Leadership Development

RMUT: Adopt the PIERI (Planning, Implementation, Evaluation, Reflection, Improvement) framework as the standard operating procedure for all leadership development initiatives. This ensures systematic learning, feedback loops, and iterative refinement of both individual leader competencies and the development programs themselves.

Establish Metrics: Develop clear KPIs to evaluate the effectiveness of leadership development programs in enhancing agile behaviors and their impact on institutional outcomes (e.g., curriculum adaptation speed, faculty digital adoption rates, student satisfaction with agile administrative support).

4) Foster a Data-Driven and Agile Organizational Culture

RMUT: Invest in robust data analytics infrastructure and training to empower administrators to make informed, agile decisions. Promote transparency in data sharing and encourage experimentation and learning from failures.

Promote Psychological Safety: Create an environment where administrators and staff feel safe to propose new ideas, question existing processes, and adapt to change without fear of reprisal, which is crucial for genuine agility.

Cross-Functional Collaboration: Encourage and incentivize inter-departmental and inter-faculty collaboration to break down silos, reflecting the "holistic organizational development" aspect of agile leadership.

5) Strengthen Industry Linkages for Real-Time Skill Alignment

RMUT: Actively utilize agile leadership capabilities to forge stronger, more dynamic partnerships with industry. This includes rapid feedback loops from employers to inform curriculum updates and ensure graduates possess highly relevant digital and vocational skills.

By proactively adopting these recommendations, RMUT and the broader Thai higher education system can cultivate a new generation of agile leaders, ensuring they are well-equipped to navigate the complexities of the digital education era and drive their institutions towards sustained excellence in line with national qualification standards.

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Recommendations for Future Research

Future research should focus on the following areas:

1) Conducting participatory action research aimed at developing administrators' skills in agile management for modern higher education institutions.

2) Investigating the development of educational technology and innovation to equip administrators with the knowledge and skills necessary for enhancing personnel capabilities.

3) Conducting in-depth research to cultivate initiative and academic expertise in higher education administrators, particularly regarding new curricula and teaching methods that align with the Thai social context and contribute to global higher education standards.

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