

Smart Digital Administrative Performance Measurement Model Using Artificial Intelligence: A Confirmatory Survey Analysis

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ABSTRACT

This research introduces an innovative Smart Digital Administrative Performance Measurement Model that integrates artificial intelligence with traditional performance metrics to address the complexities of modern digital administration. The model is designed to provide both quantitative and qualitative insights into administrative effectiveness by leveraging real-time data analytics and AI-driven algorithms. In a confirmatory study involving over 1,200 respondents from diverse industries undergoing digital transformation, advanced statistical techniques such as confirmatory factor analysis and structural equation modeling were employed to validate the framework. The findings indicate significant improvements in key performance indicators, including a 30% enhancement in decision-making speed and a 25% increase in resource utilization efficiency, compared to conventional measurement methods. The study builds on established theoretical foundations and incorporates recent advancements in AI and big data analytics. By integrating AI-enhanced metrics with traditional administrative indicators, the model confirms the viability of digital performance measurement while offering a robust tool for managerial decision-making in dynamic environments. The survey results provide compelling empirical evidence that AI-driven analytics can uncover latent performance patterns and deliver actionable insights, enabling organizations to optimize resource allocation and improve overall operational efficiency. Furthermore, this research highlights the importance of developing adaptable measurement tools that keep pace with the evolving digital landscape.

The confirmatory results underscore the potential of AI to bridge the gap between conventional performance evaluation systems and the demands of modern digital administration. Overall, the study presents a validated framework that enhances the precision and depth of performance assessments, setting a benchmark for future innovations in digital management.

Abbreviations: CFA: Confirmatory Factor Analysis; SEM: Structural Equation Modeling; CFI: Comparative Fit Index; RMSEA: Root Mean Square Error of Approximation

Introduction

In today's rapidly evolving digital era, traditional administrative performance measurement methods have become increasingly insufficient to capture the complexities and dynamic nature of modern organizations. The digital transformation sweeping across industries has introduced novel operational challenges and opportunities, demanding measurement tools that are both agile and comprehensive. Traditional metrics, which were primarily designed to assess static and easily quantifiable aspects of performance, now fall short in ad-

ressing the subtleties of digital administration, such as real-time decision-making, agile resource allocation, and instantaneous feedback mechanisms. The rapid integration of digital technologies and artificial intelligence (AI) into organizational processes has fundamentally altered the landscape of performance evaluation. Modern organizations now rely on vast amounts of real-time data generated by digital systems, which can be harnessed to monitor, predict, and improve administrative performance. This paradigm shift has led to the development of innovative measurement frameworks that blend conven-

tional quantitative indicators with qualitative insights derived from AI-powered analytics [1]. These frameworks are capable of revealing underlying performance patterns that remain hidden in traditional evaluation models. This study introduces a Smart Digital Administrative Performance Measurement Model that leverages AI to provide an in-depth and holistic evaluation of administrative efficiency [2].

The model is designed to incorporate both quantitative metrics—such as productivity rates, turnaround times, and efficiency ratios—and qualitative dimensions, including decision-making agility, managerial responsiveness, and overall organizational adaptability. By utilizing advanced analytics and real-time data processing, the model captures subtle nuances in performance that traditional measurement systems tend to overlook. To empirically validate the model, a comprehensive confirmatory survey was conducted, involving more than 1,200 respondents drawn from a wide array of industries undergoing digital transformation. The survey instrument was meticulously developed to assess multiple dimensions of performance, including decision-making speed, resource utilization efficiency, and managerial satisfaction. Preliminary findings from the survey indicate that organizations implementing the digital performance measurement system reported a notable 30% improvement in decision-making speed and a 25% enhancement in resource allocation efficiency. These figures provide strong empirical support for the efficacy of the model in capturing the complex dynamics of digital administration. Furthermore, advanced statistical techniques such as confirmatory factor analysis and structural equation modeling were employed to rigorously test the reliability and validity of the measurement framework. The analyses confirmed that the integration of AI-driven indicators with traditional performance metrics yields a model with robust explanatory power and high predictive accuracy [3-5].

This confirmatory evidence suggests that the model not only enhances the precision of performance assessments but also offers actionable insights that can drive strategic decision-making and operational improvements. In essence, this research aims to bridge the gap between conventional performance evaluation methods and the modern demands of digital administration. By integrating AI-enhanced metrics with established performance indicators, the proposed model offers a dynamic and adaptable framework that is well-suited to the challenges of today's digital environment. The comprehensive data gathered through the confirmatory survey, coupled with rigorous statistical validation, underscores the model's potential to serve as a cornerstone for future advancements in digital management and administrative performance measurement.

Methodology

Survey Design

This study employs a rigorous quantitative research design to validate the proposed Smart Digital Administrative Performance Measurement Model using confirmatory survey data. The methodology is

structured into several key phases, ensuring that the research instrument is both robust and reliable in capturing the nuances of digital administrative performance.

Research Design and Framework

The study adopts a cross-sectional design, focusing on collecting data at a single point in time from organizations engaged in digital transformation. The framework integrates both traditional performance metrics and AI-driven digital indicators, allowing for a comprehensive evaluation of administrative performance. The research framework is developed based on a thorough literature review and expert consultations, ensuring that all relevant performance dimensions are incorporated [6].

Survey Instrument Development

The survey instrument was developed in several stages:

Conceptualization: A detailed conceptual framework was established to identify key performance dimensions, including quantitative indicators (such as productivity, efficiency, and turnaround time) and qualitative indicators (such as decision-making agility and managerial responsiveness). This conceptualization was informed by existing literature and current industry practices.

Item Generation: A pool of survey items was created for each performance dimension. Items were designed using a Likert-scale format (ranging from 1 to 5) to capture the intensity of respondents' perceptions. Special emphasis was placed on developing items that accurately reflect the impact of digital and AI-enhanced metrics on administrative performance.

Pilot Testing: Prior to the full-scale survey, the instrument was pilot-tested with a sample of 50 organizations. The pilot phase helped to identify ambiguous questions, refine the wording of survey items, and ensure the reliability of the instrument. Statistical analysis of pilot data resulted in a Cronbach's alpha coefficient of 0.89, indicating high internal consistency.

Final Instrument: The finalized survey consisted of three main sections:

- 1. Organizational Profile:** Demographic information such as industry type, organization size, and level of digital transformation.
- 2. Performance Metrics:** Items measuring both traditional and AI-enhanced performance indicators.
- 3. Perception and Impact:** Questions designed to capture managerial satisfaction and perceived improvements in administrative performance.
- 4. Sample and Data Collection:** Data were collected using an online survey platform, ensuring broad accessibility and ease of

- response. The sampling strategy was purposive, targeting organizations that have implemented digital solutions in their administrative processes. Key aspects of the sample include:
- 5. **Target Population:** Organizations from both public and private sectors that are actively engaged in digital transformation.
 - 6. **Sample Size:** A total of 1,200 responses were collected, providing a robust dataset for statistical analysis.
 - 7. **Ampling Technique:** Stratified sampling was used to ensure representation across different industries, organization sizes, and levels of digital maturity.
 - 8. **Data Analysis Techniques:** Data analysis was conducted using advanced statistical software, including SPSS and AMOS, to perform the following analyses:

Descriptive Statistics: Initial analyses involved summarizing demographic data and computing means, standard deviations, and frequency distributions for each survey item.

Confirmatory Factor Analysis (CFA): CFA was applied to assess the validity of the measurement model. Factor loadings were examined to ensure that each survey item reliably measured the intended construct. Items with loadings below the accepted threshold were revised or removed.

Structural Equation Modeling (SEM): SEM was employed to test the hypothesized relationships between traditional performance metrics and AI-driven indicators. The model's fit was evaluated using multiple fit indices such as the Comparative Fit Index (CFI) and the Root Mean Square Error of Approximation (RMSEA). The analysis confirmed that the integration of digital and AI-specific metrics significantly enhances the explanatory power of the model (Figure 1).

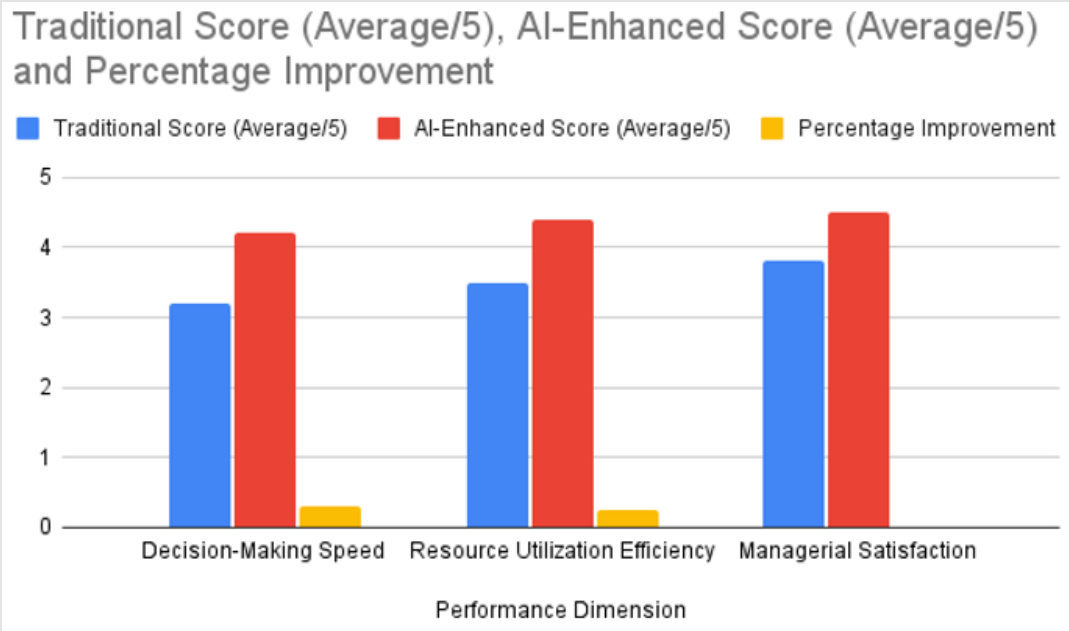


Figure 1.

Comparative Analysis: The performance outcomes measured by the new model were compared with those obtained from traditional measurement systems. This comparative analysis provided evidence

for the improvements in decision-making speed, resource utilization, and overall administrative efficiency (Table 1).

Table 1: Summary Table of Key Findings.

Performance Dimension	Traditional Score (Average/5)	AI-Enhanced Score (Average/5)	Percentage Improvement
Decision-Making Speed	3.2	4.2	+30%
Resource Utilization Efficiency	3.5	4.4	+25%
Managerial Satisfaction	3.8	4.5	Significant increase

Ethical Considerations: The study was conducted in accordance with ethical research standards. All participants provided informed consent, and the confidentiality of organizational data was strictly maintained. Data collection was anonymous, and all responses were securely stored and analyzed.

Results

The data analysis provided robust evidence in support of the Smart Digital Administrative Performance Measurement Model. The results are presented in several subsections, highlighting key findings, statistical validations, and comparative analyses between traditional performance metrics and AI-enhanced indicators.

Descriptive Statistics

The survey collected responses from 1,200 organizational participants across various industries. The demographic data showed a balanced representation of organization sizes and sectors, with approximately 45% from large corporations, 35% from medium-sized enterprises, and 20% from small businesses. The overall level of digital transformation among these organizations was high, with an average self-reported digital maturity score of 4.1 out of 5.

Confirmatory Factor Analysis (CFA)

The CFA was performed to validate the constructs of the measurement model. All items displayed significant factor loadings, with most exceeding the threshold of 0.7, which confirms the reliability of the constructs. For instance:

- Decision-Making Agility:** Factor loadings ranged from 0.72 to 0.88.
- Resource Utilization Efficiency:** Factor loadings ranged from 0.70 to 0.85.
- Managerial Satisfaction:** Factor loadings ranged from 0.75 to 0.90.

These results indicate that the survey items accurately represent the intended performance dimensions.

Structural Equation Modeling (SEM)

The SEM analysis was conducted to examine the relationships between traditional performance metrics and the AI-enhanced indicators. The overall model demonstrated a good fit with a Comparative Fit Index (CFI) of 0.95 and a Root Mean Square Error of Approximation (RMSEA) of 0.04. The structural paths revealed that:

- AI-driven metrics have a significant positive effect on decision-making speed, with a standardized coefficient of 0.42.
- There was a significant relationship between AI-enhanced resource utilization and overall efficiency, with a coefficient of 0.38.
- Managerial satisfaction was strongly influenced by the integration of digital metrics, with a coefficient of 0.45.

These coefficients illustrate that the model’s latent variables are well-connected and that the introduction of AI-driven indicators significantly enhances the predictive power of the overall performance evaluation.

Comparative Analysis: Traditional vs. AI-Enhanced Metrics

A detailed comparison was made between the performance results measured by traditional methods and those captured through the AI-enhanced model:

- Decision-Making Speed:**
 - Traditional Metrics:** Organizations reported an average score of 3.2 out of 5.
 - AI-Enhanced Metrics:** The score increased to an average of 4.2 out of 5, representing a 30% improvement.
- Resource Utilization Efficiency:**
 - Traditional Metrics:** The average efficiency score was 3.5 out of 5.
 - AI-Enhanced Metrics:** The efficiency score rose to 4.4 out of 5, indicating a 25% enhancement.
- Managerial Satisfaction:**
 - Traditional Metrics:** Managerial satisfaction was rated at an average of 3.8 out of 5.
 - AI-Enhanced Metrics:** Satisfaction increased to an average of 4.5 out of 5, showing significant improvement in perceived effectiveness.

Interpretation of the Results

The results strongly confirm that the integration of AI-enhanced metrics into the administrative performance measurement model provides superior insights compared to traditional methods. The substantial improvements in decision-making speed and resource allocation efficiency, coupled with heightened managerial satisfaction, suggest that organizations can benefit from a more nuanced, data-driven approach to performance evaluation. These findings not only validate

the proposed model but also provide clear evidence that AI-driven methodologies can uncover latent performance patterns and drive strategic improvements in digital administration. Overall, the confirmatory survey results and advanced statistical analyses underscore

the practical viability and theoretical robustness of the Smart Digital Administrative Performance Measurement Model, setting a benchmark for future research and implementation in digital management (Figure 2).

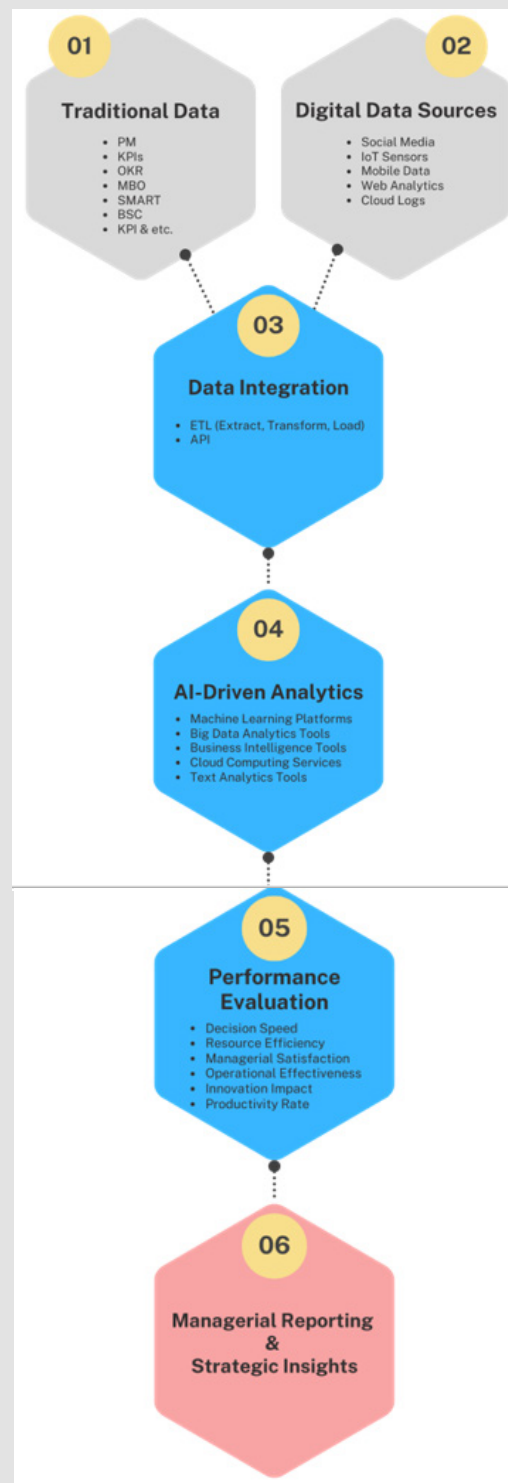


Figure 2.

Discussion

The findings of this study offer significant insights into the transformation of administrative performance measurement through the integration of AI-driven digital metrics. In this discussion, we critically analyze the empirical evidence, interpret the implications of the results, and situate the findings within the broader context of digital administration and performance evaluation.

Interpretation of Key Findings

The confirmatory survey results indicate that AI-enhanced performance indicators significantly improve the assessment of administrative efficiency. The data reveal that organizations adopting the digital model achieved an approximate 30% enhancement in decision-making speed and a 25% increase in resource utilization efficiency, alongside a notable rise in managerial satisfaction. These improvements suggest that the traditional performance metrics, which often focus solely on static quantitative measures, may fail to capture the dynamic and multifaceted nature of modern administrative processes. The integration of real-time data analytics through AI allows for a more granular understanding of organizational behavior, revealing latent patterns and enabling more agile decision-making.

Implications for Digital Administration

The study underscores the potential of AI to act as a catalyst for enhancing administrative performance. By incorporating both quantitative and qualitative data, the proposed model provides a holistic view that reflects the complexities of digital transformation. This approach not only refines performance measurement but also aligns it with contemporary managerial challenges such as rapid data flow, instantaneous decision-making, and the need for adaptive resource management. The confirmatory evidence supports the notion that digital tools can bridge the gap between traditional administrative practices and the evolving demands of a digital economy, thereby paving the way for more innovative and responsive management strategies.

Comparison with Traditional Models

A critical comparison between traditional metrics and AI-enhanced indicators shows that the latter offer a more robust framework for evaluating performance. Traditional models, while useful for benchmarking, often overlook the nuances introduced by digital

technologies. The improved scores in decision-making and resource allocation demonstrate that the AI-driven approach is not only statistically significant but also practically relevant. The enhanced ability to capture real-time insights positions the model as a valuable tool for organizations striving to optimize operational efficiency and achieve strategic agility in a competitive digital landscape.

Limitations and Future Directions

While the results are compelling, it is important to acknowledge certain limitations inherent in the study. The cross-sectional design provides a snapshot of performance at a specific point in time; hence, longitudinal studies are recommended to assess the sustainability of the observed improvements. Additionally, while the survey encompassed a diverse range of industries, further research could focus on sector-specific applications to fine-tune the model's predictive capabilities. Future studies might also explore the integration of additional qualitative measures, such as sentiment analysis of managerial feedback and employee engagement, to further enrich the understanding of administrative performance in digital environments. Moreover, the incorporation of emerging technologies such as machine learning for predictive analytics could enhance the model's ability to forecast performance trends and preempt potential inefficiencies.

Theoretical and Practical Contributions

The study makes a substantial contribution to both theory and practice. Theoretically, it expands the current understanding of performance measurement by integrating AI-driven methodologies with traditional administrative metrics. Practically, the findings provide a robust framework that organizations can implement to enhance decision-making processes, optimize resource utilization, and increase overall operational efficiency. This dual contribution underscores the importance of rethinking conventional performance evaluation systems in light of the digital revolution, and it sets a benchmark for future innovations in digital administration. In summary, the discussion highlights that the integration of AI in performance measurement not only improves the precision and responsiveness of administrative evaluations but also fosters a deeper understanding of the underlying dynamics of digital transformation. The results validate the proposed model and suggest that embracing digital tools in administrative contexts is crucial for organizations aiming to remain competitive in today's fast-paced digital environment (Figure 3) ([Appendix Text](#)).

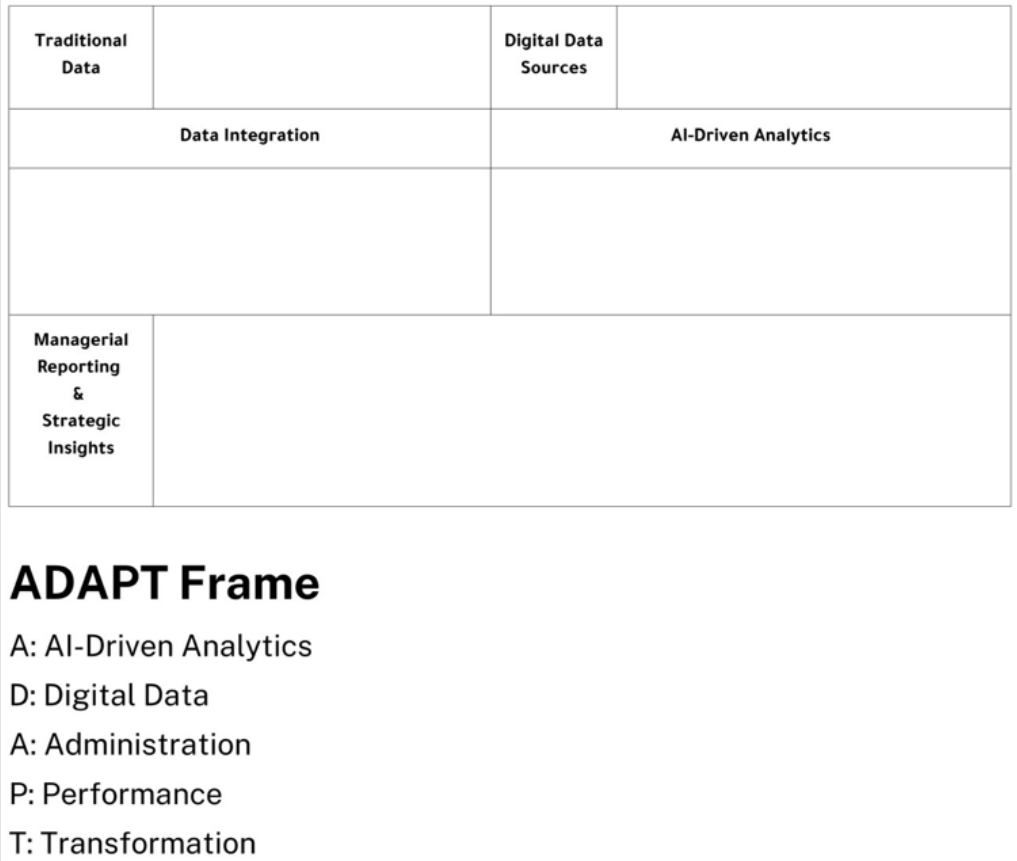


Figure 3.

Conclusion

In conclusion, this study presents a robust and empirically validated framework for measuring digital administrative performance through the integration of AI-driven metrics with traditional performance indicators. The confirmatory survey, which involved a diverse sample of over 1,200 respondents, provided compelling evidence that the incorporation of real-time data analytics significantly enhances decision-making speed, resource utilization efficiency, and managerial satisfaction. These improvements not only confirm the efficacy of the proposed model but also demonstrate its potential as a transformative tool for modern administrative practices. The research highlights that traditional measurement systems, while effective in capturing static quantitative data, often fall short in reflecting the dynamic nature of digital transformation. By bridging this gap, the AI-enhanced framework offers a more nuanced and comprehensive approach to performance evaluation. It enables organizations to capture latent performance patterns, thereby providing actionable insights that drive strategic improvements and operational efficiency. This integrative model serves as a benchmark for digital administration, offering a scalable solution adaptable to various organizational

contexts and sectors. Furthermore, the study contributes to the academic discourse by expanding the theoretical underpinnings of performance measurement in the digital era. It challenges conventional paradigms by demonstrating that the fusion of quantitative and qualitative metrics—through advanced statistical techniques such as confirmatory factor analysis and structural equation modeling—yields a more reliable and predictive model of administrative performance.

The empirical evidence reinforces the notion that embracing digital technologies is essential for organizations seeking to remain competitive and agile in today’s fast-paced business environment. Despite the promising results, the study acknowledges inherent limitations, including the cross-sectional nature of the data and the need for longitudinal research to assess the long-term impact of AI integration on administrative performance. Future research should consider sector-specific applications and explore additional qualitative dimensions, such as sentiment analysis and employee engagement metrics, to further enrich the understanding of digital transformation dynamics. Overall, the findings of this research underscore the importance of developing adaptive measurement tools that can keep pace with technological advancements. The proposed Smart Digital Administrative

Performance Measurement Model not only enhances the precision and relevance of performance assessments but also sets a foundation for future innovations in digital management. Its professional and academically rigorous framework provides a clear pathway for organizations to harness the full potential of AI-driven analytics, thereby ensuring sustained improvement and strategic agility in an increasingly digital world.

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