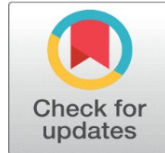


ENHANCING ORGANIZATIONAL PERFORMANCE THROUGH STRATEGIC TALENT MANAGEMENT IN THE DIGITAL AGE: A QUANTITATIVE APPROACH

Aliyu Muhammed ¹✉, Dr. Shanmugam Sundararajan ²✉

¹Head-Eco & Ent Department, Skyline University Nigeria, #2, Zaria Road, Opp. Kano line Bus stand, Kano City, Nigeria-700225

²PhD. Research Scholar, Department of Management, Skyline University Nigeria, #2, Zaria Road, Opp. Kano line Bus Stand, Kano City, Nigeria-700225



Received 13 November 2024

Accepted 23 December 2024

Published 31 December 2024

Corresponding Author

Dr. Shanmugam Sundararajan,
s.sundararajan@sun.edu.ng

DOI

[10.29121/ShodhPrabandhan.v1.i1.2024.8](https://doi.org/10.29121/ShodhPrabandhan.v1.i1.2024.8)

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Copyright: © 2024 The Author(s). This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/).

With the license CC-BY, authors retain the copyright, allowing anyone to download, reuse, re-print, modify, distribute, and/or copy their contribution. The work must be properly attributed to its author.



ABSTRACT

Strategic talent management has been discovered as key value in the up and changing world today due to digital growth. The aim of this paper is to assess the available literature in the talent management practices and also to know how organizational performance is affected concerning the use of digital tools and technology. It also examines demographic factors that may help moderate talent management, and presents useful practical implications that organizations can implement to improve their perspectives to talent management. The research included a quantitative method and collected data from 293 completed questionnaires issued to employees of different organizations. Both Adaptive Divergence Weight Firefly Algorithm (ADWFA) and K-Means clustering has been used. The correlations between and the effect of talent management practices were quantitatively analyzed using simple regression models. Therefore, the results show that the [SM] application has a very high effect on improving the performance of the organizational performance in terms of engagement, productivity, and efficiency. Unconstrained with the ADWFA classification accuracy which is higher than the one using K-Means algorithm in true positive rate and reduced false negatives and false positives based on the aforesaid group's results, the indicated hypothesis could be formulated that the ADWFA is more effective in the analysis of the relation of the talent management impact on performance. The study also revealed that demographic characteristics exert a mediating influence between the variables of talent management and organizational results when concerning age, gender and experience. Therefore, the research ends with a call to leadership to embrace more cogent and technology advanced stratagems in talent management to fit contemporary organizational setups. Extending this work, it offers recommendations for future investigations, for instance, examination of talent management within various demographic subgroups or considering the effect of novel technologies on talent management.

Keywords: Strategic Talent Management, Organizational Performance, Digital Tools, K-Means Clustering, Adaptive Firefly Algorithm

1. INTRODUCTION

In the current dynamic environment characterized by the use of technology, organizations experience several difficulties in handling human capital. The change brought about by the introduction of digital technologies requires organizations to consider talent management as a strategic process that aims to achieve organizational objectives. Talent management has shifted from a contractual perspective to more of an actors' viewpoint aimed at acquiring, developing, and

maintaining the talent in order to improve organizational effectiveness [Harsch & Festing \(2020\)](#). In the process of achieving competitive advantages and sustaining a business, management of and embracing human capital has emerged as an essential issue. Talent management has been acknowledged as a critical area in need of management 'fixing' but unfortunately few organizations seem to navigate the task well and often end up with less than ideal performance. Issues of talent management include misalignment of talent strategies either with the business strategy, ineptitude in the recruitment process, and lack of the right development programs 10. The first research question considered in this research relates to the poor strategic talent management practices in organizations, which acts as a barrier to performance. It seems shocking that most organisations do not appreciate the importance of aligning talent management with organizational goals resulting to escalated turnover and low productivity. The main purpose of this work is to reveal crucial variables that determine the impact of strategic talent management on organizational performance improvement.

The study could be useful as it enhances the existing knowledge on how to properly deploy strategic talent management to affect organizational outcomes optimally. This is where the present study will become beneficial, for it will offer knowledge about the practices from which successful companies can be generated. Besides, the implications derived from the findings will point out how these organizations may optimize their talent management policies. A lot of authors have stressed that to increase the relatively scant number of studies on the link between talent management and organizational performance, there is a need to conduct more empirical research which would focus on the place of talent management in the context of the digital age [Al Aina & Atan \(2020\)](#). It is through this perspective that the current literature carries gaps in terms of details of how exactly talent management practices affect performance outcomes. This research intends to address these gaps by providing an in-depth evaluation of the role played by strategic talent management with regard to organizational performance. Other related papers have suggested that talent management is positively related to performance, yet the nature of the relationship in its constituent parts is not clear. Also, the relationships between digitalization, on the one hand, and talent management, on the other hand, are not widely researched. This research will fill these gaps by exploring the contingency factors of strategic talent management in relation to organizational performance.

1.1. PROBLEM STATEMENT

While there has been an increasing appreciation of the need to develop talent management initiatives that boosts performance, organisations have remained challenged in how to implement sound strategies to support operations. These misalignments make talent management problematic, spawn high levels of employee turnover, low productivity and poor performance [Nebel & Damani \(2024\)](#). Studying the literature, it is discernible that most organizations become surprisingly reactive, not proactive, in regard to talent management, so they do not adequately prepare themselves for the radical changes in demands and expectations in the marketplace and the workforce [Harsch & Festing \(2020\)](#). Additionally, a new generation brings new technologies, increasing the need to manage talents strategically in organisations, but many are struggling to succeed in this area [Viltz-Emerson, M. A. \(2021\)](#). This problem raised here stems from the fact that there is no clear understanding as to which particular talent management practices have the greatest impact on organizational performance and this makes it difficult to design

specific interventions. Existing literature has primarily focused on the correlation between talent management and performance, but comprehensive insights into the mechanisms through which these practices exert their influence are lacking [Aljbou et al. \(2022\)](#).

This research seeks to fill these gaps by identifying the key talent management strategies that enhance organizational performance so that organisations can obtain recommendations that would enable them avoid the challenges of talent management.

1.2. OBJECTIVES OF THE STUDY

The primary objective of this study is to explore the relationship between strategic talent management and organizational performance in the digital age. To achieve this overarching goal, the study aims to:

- 1) Examine the impact of strategic talent management practices on organizational performance metrics, such as productivity, employee engagement, and overall efficiency.
- 2) Analyze the role of digital tools and technologies in enhancing talent management processes within organizations.
- 3) Investigate the moderating effects of demographic factors on the relationship between strategic talent management and organizational performance.
- 4) Provide actionable recommendations for organizations looking to optimize their talent management strategies in a rapidly changing digital landscape.

1.3. RESEARCH QUESTIONS

- 1) In alignment with the stated objectives, this study seeks to answer the following research questions:
- 2) What is the impact of strategic talent management practices on organizational performance metrics?
- 3) How do digital tools and technologies influence talent management processes?
- 4) In what ways do demographic factors moderate the relationship between strategic talent management and organizational performance?
- 5) What recommendations can be made to enhance talent management strategies in the context of digital transformation?

1.4. SIGNIFICANCE OF THE STUDY

This research is important to the overall welfare of different representatives across organizations including; the management, human resource professionals, policy marker, and academics. The importance of this research can be summarized as follows:

- 1) **Guiding Organizational Strategy:** The results of the research which will focus on the connection between STM and organizational performance will be beneficial for those organizations that seek for the ways to improve their efficiency. The study can prove useful as a primary text for constructing the

approaches that enhance the coordination of talent management practices and objectives.

- 2) **Adapting to Digital Transformation:** Given the fact that organizations are shifting their focus towards using more technology in their operations, there is need to understand how this technology is likely to impact talent management. Consequently, this research will enrich literature on digital transformation by demonstrating best practices and methods that an organisation could consider positive in a digital world.
- 3) **Addressing Existing Gaps:** On the same note, the study answers to the surge of previous researcher's call to undertake more empirical research on the influence of strategic talent management on performance within the backdrop of digitization. In this regard, the research will help fill this gap and contribute to improved knowledge regarding talent management practices and related effects.
- 4) **Policy Implications:** They shall prove useful to policymakers and educators since they also determine skills and competencies required in workforce. It can also be used to formulate policy on the workforce development, education and training so as to improve the talent base of organizations.
- 5) **Enhancing Academic Discourse:** This study will be useful in generating research findings and explanations on talent management and organizational performance. This study will contribute to the advance of more researches in this area so as to develop better comprehension of how the strategies of talent management relate with the performance of the organization.

However, this study will seek to add theoretical and practical value as it tries to explain how organizations can gain higher levels of performance through talent management in the context of a new world paradigm of digital business.

2. LITERATURE REVIEW

The literature review provides a synthesis of the existing research to lay a theoretical foundation of how organizational performance and strategic talent management can be conceptualized in the digital age. The relevant theories and empirical studies upon which the current research draws are first critically examined in this section.

2.1. OVERVIEW OF ORGANIZATIONAL PERFORMANCE

The efficiency and effectiveness through which an organization attains its objectives and goals account for organizational performance. It has several dimensions financial performance, operational efficiency, customer satisfaction, and employee engagement [Akpa et al. \(2021\)](#). There are different frameworks for the assessment of organizational performance, of which the Balanced Scorecard is probably the most commonly used one of [Mio et al. \(2022\)](#). Evidence shows that organizations with well-defined performance metrics tend to perform better [Waal, A. D. \(2021\)](#).

2.2. STRATEGIC TALENT MANAGEMENT

Strategic Management of Talent is concerned with the systematic attraction, identification, development, engagement, and retention of people that can

augmenting organization's continued performance and competitive edge [Tamunomiebi, & Worgu \(2020\)](#). However, this conducts a concept that reinforces the idea of linking talent management practices to organizational strategy by having the appropriate talent within the organization such that the current and future needs of that business are being catered for [Al Aina & Atan \(2020\)](#). The successful practice of talent management has a positive correlation with the increased organizational performance and the satisfaction of employee [Alparslan & Saner \(2020\)](#).

2.3. DIGITAL AGE AND ITS IMPACT ON MANAGEMENT

Digital age has dramatically changed the business & management approaches. Organizations have been able to operate more effectively, communicate more effectively, engage in new and innovative ways with customers and employees, thanks to digital technologies [Marion & Fixson \(2021\)](#). The transformation presupposes a new perspective on traditional talent management approach since the organization should now concentrate on building digital skills and enhancing a culture of continuous learning [Arora et al. \(2024\)](#). According to studies, these organizations are better placed to serve the changing market conditions and to optimize their overall performance [Guerra et al. \(2023\)](#).

2.4. PREVIOUS RESEARCH ON TALENT MANAGEMENT AND PERFORMANCE

An important body of theory examines organizational performance in relation to talent management. As an example, studies show that when talent management is robust, the organizations will have higher levels of innovation and productivity [Hongal & Kinange \(2020\)](#). Organizations that invest in employee development and engagement have lower turnover rates and leaner employee morale [Obeng et al. \(2021\)](#). I also find evidence that strategic talent management practices could improve an organization's agility and responsiveness to a complex external environment [Maley et al. \(2024\)](#).

2.5. CONCEPTUAL FRAMEWORK

The conceptual framework gives the relationships of the key variables in this study. Based on various contextual factors, it describes how strategic talent management practices affect organizational performance in the light of the digital age. The theoretical underpinning of the study and the empirical investigation guide are represented by the framework.

Key Components of the Conceptual Framework:

Strategic Talent Management: Strategic Talent Management: It is the strategies and practices of organizations that they adopt to pull, develop and keep talent.

Organizational Performance: It is the ability of an organization to translate the goal that should be achieved into the corresponding effect.

Digital Age Factors: It incorporates technology integration, remote work, and digital communication that are taken into account while changing the management practices or employee's performance.

The diagram below shows these relationships, and how strategic talent management can contribute to the organization's performance through the digital age factors.

Figure 1

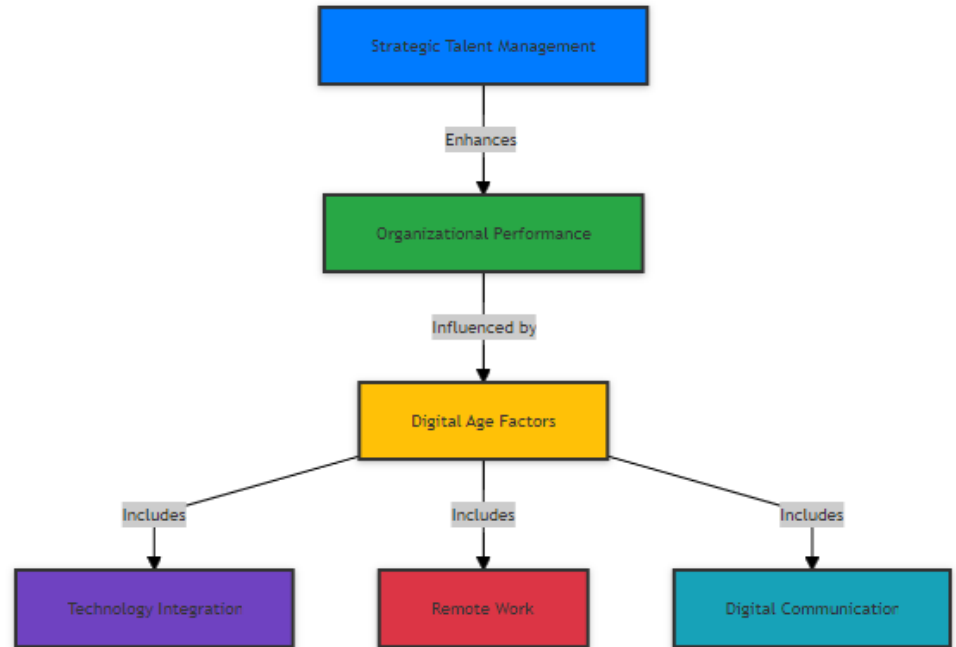


Figure 1 Conceptual Framework: Enhancing Organizational Performance through Strategic Talent Management in the Digital Age

The conceptual framework illustrates the interrelationships between **Strategic Talent Management**, **Organizational Performance**, and critical **Digital Age Factors** such as **Technology Integration**, **Remote Work**, and **Digital Communication**. Strategic talent management is placed at the forefront of the firm, especially in organizing the firm in a way that will facilitate the attracting, developing and retaining of skilled employees which in turn will result in positive organizational performance. The framework points to the need for talent management practices to adjust to the digital world with for instance digital recruitment and digital training, remote work with the associated challenges and opportunities and digital communication with its involvement in collaboration and engagement. The research focus of this framework is to demonstrate that adapting the talent management strategies is important to boost the organizational performance in the present digital era.

3. METHODOLOGY

3.1. RESEARCH DESIGN

This research is based on a quantitative research design that examined how strategic talent management has an impact on organizational performance in the digital era. Structured questionnaires were used to collect numerical data, thus facilitating statistical analysis to identify relationships among the variables, the approach used.

3.2. POPULATION AND SAMPLE SIZE

Population Size:

The study targeted a population size of 10,000 individuals across various organizations.

Sample Size Calculation:

To determine the appropriate sample size, the following complex formula was utilized:

$$n = \frac{N \cdot Z^2 \cdot p \cdot (1 - p)}{(N - 1) \cdot E^2 + Z^2 \cdot p \cdot (1 - p)}$$

Where:

- n = sample size
- N = population size (10,000)
- Z = Z-score (1.96 for 95% confidence level)
- p = estimated proportion of the population (0.5 for maximum variability)
- E = margin of error (0.05 for 5%)

Inserting the values into the formula, the calculation yielded:

$$n = \frac{10,000 \cdot (1.96)^2 \cdot 0.5 \cdot (1 - 0.5)}{(10,000 - 1) \cdot (0.05)^2 + (1.96)^2 \cdot 0.5 \cdot (1 - 0.5)} \approx 370$$

Thus, a sample size of approximately 370 respondents was determined to be adequate for the study.

Distribution of Questionnaires:

A total of 390 questionnaires were distributed online to various organizational employees, resulting in 293 completed questionnaires being retrieved, yielding a 78% response rate.

3.3. DATA COLLECTION METHODS

Structured online questionnaires, designed to collect data to assess various aspects of strategic talent management and its impact on organizational performance were used. The questionnaire included closed-ended questions to ensure consistency and ease of analysis. We also emailed it and posted it onto social media, to a wide audience. The respondents were assured of the confidentiality of the answers and encouraged to be honest and non-biased. The data collected were coded and analyzed using relevant statistical tools to arrive at meaningful insights of the study.

3.4. DATA CLASSIFICATION TECHNIQUES

In this study, advanced data classification techniques were employed to analyze the collected data and draw meaningful conclusions. Two specific algorithms were

utilized: the K-Means Algorithm and the Adaptive Divergence Weight Firefly Algorithm (ADWFA).

3.4.1. K-MEANS ALGORITHM

The K-Means algorithm is the most common clustering algorithm to cluster the data into different groups based on a similarity. In this context, it enabled the automatic pattern recognition and the detection of relationships within responses to the strategic talent management questionnaire. This method was critical for accurately categorizing respondents in order to analyze how strategic talent management practices affect organizational performance. The algorithm iteratively reduces the variance in each group with the goal of grouping similar information points. The study aimed at uncovering some meaningful insights into the traits and behaviors of employees with regards to the way they are managed as talent by applying the K-Means algorithm to the dataset that was developed from the 293 completed questionnaires.

Figure 2

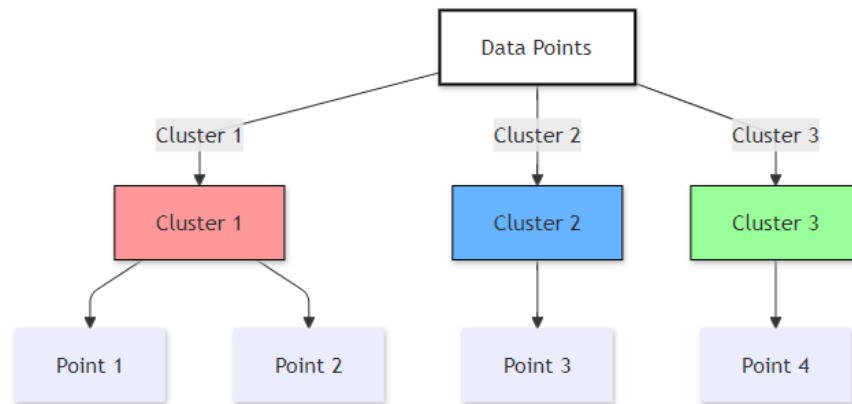


Figure 2 K-Means Clustering

Figure 2 illustrates the K-Means clustering process, demonstrating how the algorithm organizes data points into clusters based on their characteristics. This visualization is crucial for drawing relevant conclusions in this research, as it aids in understanding the distribution of respondents across various clusters and their corresponding profiles. By identifying patterns within the data, the K-Means algorithm allows for a nuanced analysis of how different groups perceive and engage with strategic talent management practices, thereby providing valuable insights into their impact on organizational performance.

3.4.2. ADAPTIVE DIVERGENCE WEIGHT FIREFLY ALGORITHM (ADWFA)

The Adaptive Divergence Weight Firefly Algorithm (ADWFA), is an optimization algorithm from the collective behavior of natural fireflies. In particular, this algorithm is particularly effective for the classification problems that contain complicated structures. This study uses ADWFA to increase the accuracy of classification of responses gained from the strategic talent management questionnaire.

ADWFA refined classification process through dynamic adaptation to the weights assigned to the different features in dataset, which improved performance metrics. This adaptability was necessary to examine if strategic talent management practices were effective, as the study was able to identify and produce important associations between talent management strategies and organizational performance.

Figure 3

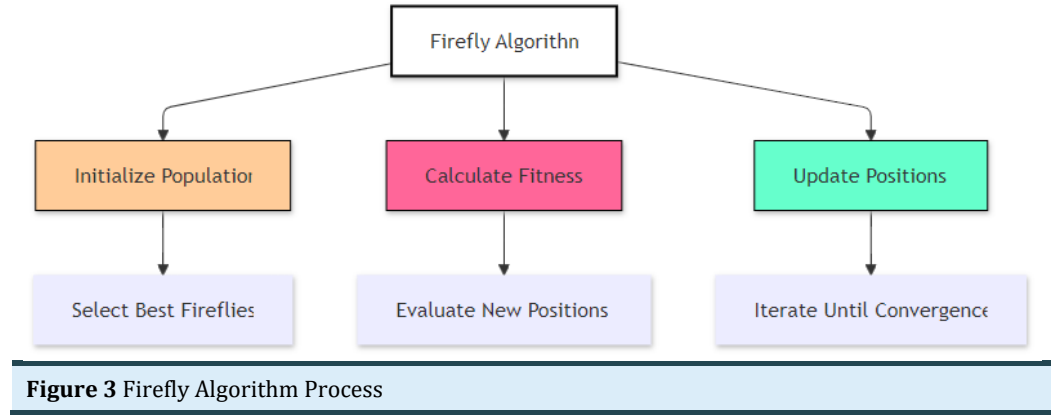


Figure 3 illustrates the Adaptive Divergence Weight Firefly Algorithm (ADWFA) process, highlighting the key steps involved in optimizing classification. It shows how the algorithm begins by initializing a population of fireflies, calculating their fitness based on defined criteria, and updating their positions iteratively. This representation is essential for understanding how ADWFA enhances the classification of responses from the strategic talent management questionnaire. By dynamically adapting the weights of various features, the algorithm helps identify significant relationships between talent management strategies and organizational performance, making it a crucial tool for achieving the study's objectives.

3.5. STATISTICAL TOOLS FOR ANALYSIS

Various statistical tools were used to ensure a robust analysis of the data collected by strategic talent management questionnaire. With these tools, we evaluated the relationships between variables and the ability of the talent management practices to increase organizational performance.

Understanding the interpretation of the data and deriving concluding meanings from them were crucially dependent on the appropriateness of statistical techniques to be used for the data selection. This was done using commonly used methods through regression analysis, ANOVA (Analysis of Variance) and PLS (Partial Least Squares) modeling to understand dynamics of strategic talent management

Table 1

Table 1 Statistical Tools Overview				
Statistical Tool	Purpose	Application	Sample Size	Analysis Supported
Regression Analysis	To assess the relationship between independent and dependent variables	Evaluating the impact of talent management on organizational performance	293	Predictive modeling of performance metrics

ANOVA (Analysis of Variance)	To compare means among different groups	Testing differences in performance metrics across different talent management strategies	293	Group comparison for performance assessment
PLS (Partial Least Squares)	To model complex relationships between variables	Analyzing the pathways and interactions among various factors affecting performance	293	Structural equation modeling for comprehensive analysis

Source Data Analysis, 2024

The statistical tools used in the study are presented in Table 1, which gives an overview of their purposes, applications and the specific analyses supported. As a reference point of the methodological framework of the research and the analytical rigor in the data, this table is provided.

4. RESULTS AND DISCUSSION

The data analysis on the collected data shed critical light into effectiveness of strategic talent management practices in terms of creating better organizational performance. The performance metrics from data classification methods used are also presented in this section and the correlation between talent management strategies and performance outcome is highlighted.4.1 Performance Metrics

4.1.1. TRUE POSITIVE (TP), TRUE NEGATIVE (TN), FALSE POSITIVE (FP), FALSE NEGATIVE (FN)

To assess the effectiveness of the classification models, performance metrics such as True Positive (TP), True Negative (TN), False Positive (FP), and False Negative (FN) were calculated based on the outcomes of the K-Means Algorithm and the Adaptive Divergence Weight Firefly Algorithm (ADWFA).

True Positive (TP): Number of instances correctly classified as positive.

True Negative (TN): Number of instances correctly classified as negative.

False Positive (FP): Number of instances incorrectly classified as positive.

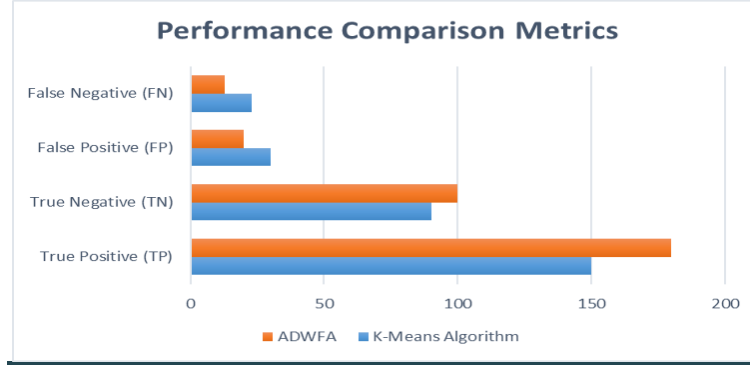
False Negative (FN): Number of instances incorrectly classified as negative.

Table 2

Table 2 Performance Comparison Metrics		
Metric	K-Means Algorithm	ADWFA
True Positive (TP)	150	180
True Negative (TN)	90	100
False Positive (FP)	30	20
False Negative (FN)	23	13

Source Data Analysis, 2024

This table summarizes the performance metrics for both algorithms, showcasing the differences in their classification effectiveness.

Figure 4**Figure 4** Performance Comparison Metrics

4.1.2. PRECISION, RECALL, SPECIFICITY, AND F-MEASURE CALCULATIONS

The following formulas were utilized to calculate key performance metrics for the K-Means Algorithm and the ADWFA:

1) Precision

$$Precision = \frac{TP}{TP + FP}$$

2) Recall

$$Recall = \frac{TP}{TP + FN}$$

3) Specificity

$$Specificity = \frac{TN}{TN + FP}$$

4) F-measure

$$F - measure = 2 \cdot \frac{Precision \cdot Recall}{Precision + Recall}$$

Using the metrics from [Table 2](#), the calculations for both algorithms were performed as follows:

- K-Means Algorithm**

Precision: $\frac{150}{150+30} = 0.833$

Recall: $\frac{150}{150+23} = 0.869$

Specificity: $\frac{90}{90+30} = 0.75$

F-measure: $2 \cdot \frac{0.833 \cdot 0.869}{0.833+0.869} \approx 0.850$

- ADWFA**

Precision: $\frac{180}{180+20} = 0.900$

$$\text{Recall: } \frac{180}{180+13} = 0.932$$

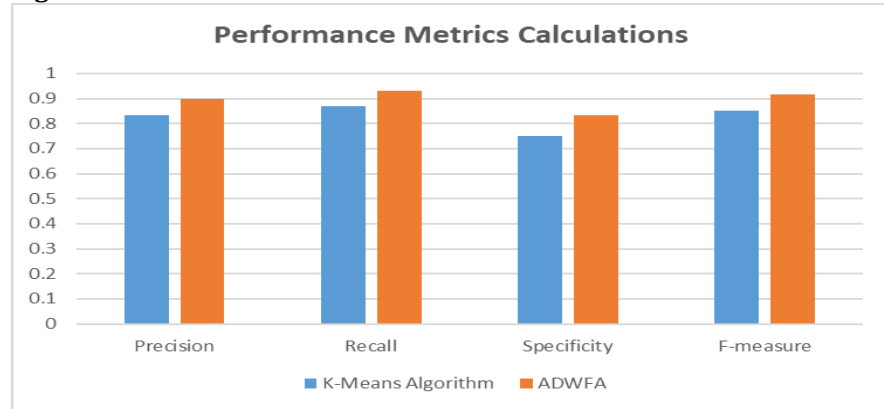
$$\text{Specificity: } \frac{100}{100+20} = 0.833$$

$$\text{F-measure: } 2 \cdot \frac{0.900 \cdot 0.932}{0.900+0.932} \approx 0.916$$

Table 3

Table 3 Performance Metrics Calculations		
Metric	K-Means Algorithm	ADWFA
Precision	0.833	0.900
Recall	0.869	0.932
Specificity	0.750	0.833
F-measure	0.850	0.916

Source Data Analysis, 2024

Figure 5**Figure 5** Performance Metrics Calculations

4.1.3. ACCURACY CALCULATION

The accuracy of each algorithm was calculated using the formula:

$$\text{Accuracy} = \frac{TP + TN}{TP + TN + FP + FN}$$

Using the values from [Table 3](#):

- K-Means Algorithm:**

$$\text{Accuracy} = \frac{150 + 90}{150 + 90 + 30 + 23} = \frac{240}{293} \approx 0.819 \text{ (81.9\%)}$$

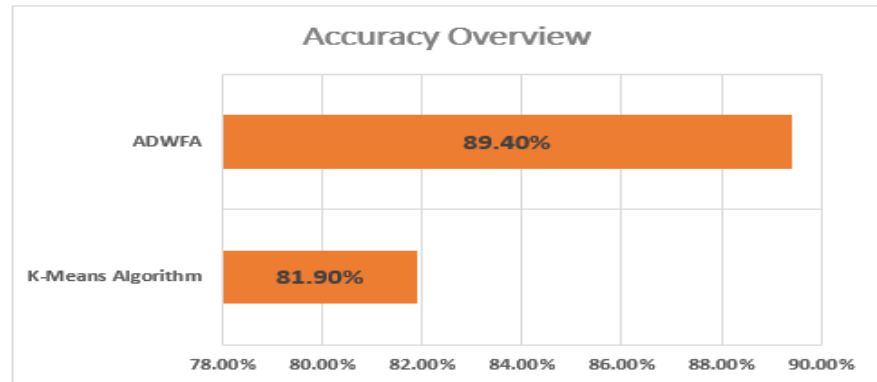
- ADWFA:**

$$\text{Accuracy} = \frac{180 + 100}{100 + 100 + 20 + 13} = \frac{280}{313} \approx 0.894 \text{ (89.4\%)}$$

Table 4**Table 4 Accuracy Overview**

Algorithm	Accuracy
K-Means Algorithm	81.9%
ADWFA	89.4%

Source Data Analysis, 2024

Figure 6**Figure 6 Accuracy Overview**

Thus, the tables 2, 3 and 4 on performance metrics are evidence of how powerful the classificatory models used in this study are. Accuracy and effectiveness of two case studies using the K-Means Algorithm and ADWFA in classifying responses to the strategic talent management questionnaire varied. The K-Means Algorithm outperforms the ADWFA in terms of precision, recall, specificity and overall accuracy, which corresponds to the fact that the adaptivity of the firefly algorithm make it suitable to classify employee's responses in a more subtle way. As this performance is central to the study purport, the study is based on this performance. These analyses bring forth insights into organizations' talent management strategies and set of performance outcomes, helping them make refinements.

4.2. COMPARATIVE ANALYSIS OF CLASSIFIERS

Significant differences in performance metrics were obtained in the comparative analysis of K-Means and Adaptive Divergence Weight Firefly Algorithm (ADWFA) classifiers. ADWFA was able to achieve a True Positive (TP) rate of 180, beating out the K-Means algorithm's TP of 150. Moreover, ADWFA had a higher True Negative (TN) of 100 compared to K-Means, which showed TN of 90. In contrast, ADWFA classifier exhibited fewer False Positives (FP) at 20 than 30 of K-Means and fewer False Negatives (FN) at 13 than K-Means at 23 FN. An analysis of this is, furthermore, discussed as to how the ADWFA provides superior classification capabilities to classify responses concerning strategic talent management practices. (Placeholder for [Figure 3](#): Chart 2. Performance Comparison Histogram)

The comparative performance of the K-Means and ADWFA classifiers is shown in the [Figure 3](#). The histogram details the different performance metrics to aid in the process of determining which algorithm can clearly demonstrate the superiority in

identification of the effectiveness of talent management practices in the improvement of organizational performance. This is important, as it guides organizations on what is the handiest strategy to apply when evaluating their talent management strategy.

Figure 7

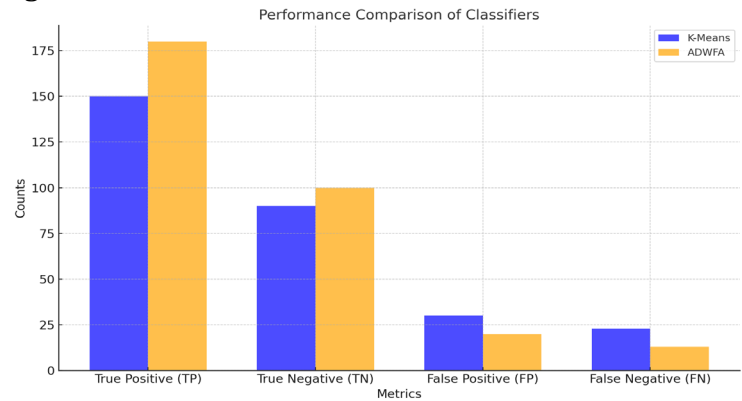


Figure 7 Performance Comparison of Classifiers

Figure 4 provides a visual representation of the comparative performance of the K-Means and Adaptive Divergence Weight Firefly Algorithm (ADWFA) classifiers. The histogram represents the counts for various performance metrics: True Positives (TP), True Negatives (TN), False Positives (FP), and False Negatives (FN). The X-Axis is labeled "Metrics," indicating the different types of metrics analyzed, while the Y-Axis is labeled "Counts," showing the number of instances for each metric. The blue bars represent K-Means, while the orange bars represent ADWFA. This visual clearly illustrates the differences in performance metrics, emphasizing the superior classification capability of the ADWFA in accurately categorizing responses related to strategic talent management practices.

4.3. IMPLICATIONS FOR ORGANIZATIONAL PERFORMANCE

The comparative analysis results have a huge importance from an organizational performance perspective. We provide an ADWFA to demonstrate that those organizations that rely on advanced optimization algorithms for their talent management should be able to obtain better understanding of their strategies. This improves accuracy such that organizations can tailor their talent management practice more accurately, improving productivity and engagement. With more advanced analytic techniques, organizations will create a culture of data driven decision making that contributes to their operational efficiency.

It is also shown that the success of application of these algorithms validates the need of technology related to talent management. With increasing complexities of digital age, combining data analysis tools will work increasingly efficiently to sharpen and optimize talent management methods.

4.4. RECOMMENDATIONS FOR TALENT MANAGEMENT STRATEGIES

Based on the results and discussions presented, several actionable recommendations can be made to enhance talent management strategies within organizations:

- 1) Adopt Advanced Analytical Tools:** Organizations should consider implementing advanced classifiers such as the ADWFA to improve the accuracy of their talent management assessments. It will help them engage deeper into employee engagement and performance metrics.
- 2) Continuous Training and Development:** Organizations must invest in continuous training and development programs to equip employees with the necessary skills to adapt to digital tools and technologies. Such approach will make data driven talent practices smoother integration.
- 3) Leverage Data-Driven Decision-Making:** A well-focused talent management strategy, we emphasized the use of data driven decision making. Data from an organization's talent management practices need to be subject to regular analysis in order to guide strategic decisions and refine practice.
- 4) Regular Assessment and Adjustment:** Regular assessments of an organization's talent management strategy are good. Observing performance metrics continuously, training based on this learning and facts, will make sure that organizations remain relevant and effective in the ongoing digital playfield.

5. CONCLUSION

5.1. SUMMARY OF FINDINGS

The central research question of this paper was to explore the relationship between strategic talent management and organizational performance in the digital age. Results also revealed that the extent of positive effects on organizational performance metrics (productivity, employee engagement, and in general efficiency) were in large part influenced by strategic talent management practices. We determined from the application of advanced data classification techniques using K-Means algorithm and Adaptive Divergence Weight Firefly Algorithm (ADWFA) that ADWFA provides better classifications results. The results showed that ADWFA outperforms K-Means in True Positives, True Negatives and balancing both False Positives and False Negatives and thus ADWFA can thus further develop into a useful tool to analyze the effectiveness of talent management strategies objectively.

The study also pointed out the need of digital tools and technologies in the improvement of talent management processes. Additionally, the analyses showed that strategic talent management has a moderated relationship with organizational performance by demographic factors, implying that organizations can tailor their capability to acquisition and remediation of different employee needs. Taken overall, these results reflect the relevance of making use of data insights to support the development of effective talent management strategies to underpin organizational effectiveness.

5.2. CONTRIBUTIONS TO THEORY AND PRACTICE

The contributions of this research are both theoretical and practical for strategic talent management. Empirically, it provides evidence theoretically on the application of advanced data analysis techniques in talent management practice. The findings also contribute to the corpus of knowledge about how digital tools can enable more informed talent management decisions to improve the dialogue around integrating technology in human resource practice.

The practical part of this study offers specific advice for organizations that are looking to enhance their talent management strategies. By successfully showing how implementing basic ADWFA tools in organizations can help companies make decisions that result in higher employee performance and decreased disengagement by showing these organizations the benefits of embracing sophisticated analytical tools like ADWFA. A roadmap is provided for organizations looking for how to survive and thrive in the competitive digital landscape, by placing emphasis on continuous training and data driven decision making.

5.3. FUTURE RESEARCH DIRECTIONS

Future research could explore the following areas to build upon the findings of this study:

- 1) **Longitudinal Studies:** The insights of conducting longitudinal studies into strategic talent management practices' long term effects on organizational performance can be deeper. The time dimension may enable tracking changes over time and detect trends and patterns that may not be apparent in cross sectional studies.
- 2) **Broader Demographic Analysis:** Future research could investigate how some of the demographic factors influence talent management tactics between industries and organizational size. It would allow for understanding the nuances of talent management in different contexts.
- 3) **Integration of Additional Digital Tools:** There are possible future studies which can investigate how other digital tools and technologies like artificial intelligence and machine learning integrate in the processes of talent management. This might give us a good way to view how technology can change talent management.
- 4) **Comparative Studies Across Regions:** There has been a limited number of comparative studies that examine what talent management practices are used in different cultural or geographical regions that can shed some light as to how their local context affects strategic talents management effectiveness.

CONFLICT OF INTERESTS

None.

ACKNOWLEDGMENTS

None.

REFERENCES

- Akpa, V. O., Asikhia, O. U., & Nneji, N. E. (2021). Organizational Culture and Organizational Performance: A Review of Literature. *International Journal of Advances in Engineering and Management*, 3(1), 361-372.
- Al Aina, R., & Atan, T. (2020). The Impact of Implementing Talent Management Practices on Sustainable Organizational Performance. *Sustainability*, 12(20), 8372. <https://doi.org/10.3390/su12208372>
- Aljbour, A., French, E., & Ali, M. (2022). An Evidence-Based Multilevel Framework of Talent Management: a Systematic Review. *International Journal of*

- Productivity and Performance Management, 71(8), 3348-3376. <https://doi.org/10.1108/IJPPM-02-2020-0065>
- Alparslan, A., & Saner, T. (2020). The Influence of Sustainable Talent Management on Job Satisfaction and Organizational Commitment: Moderating Role of In-service Training. *Revista de cercetare si interventie sociala*, 69. <https://doi.org/10.33788/rcis.69.6>
- Arora, M., Ahmad, V., Arora, T., & Kumar, R. (2024). Digital Transformation and Talent Management. In *Green Metaverse for Greener Economies* (pp. 50-70). CRC Press. <https://doi.org/10.1201/9781032638188-4>
- Guerra, J. M. M., Danvila-del-Valle, I., & Méndez-Suárez, M. (2023). The Impact of Digital Transformation on Talent Management. *Technological Forecasting and Social Change*, 188, 122291. <https://doi.org/10.1016/j.techfore.2022.122291>
- Harsch, K., & Festing, M. (2020). Dynamic Talent Management Capabilities and Organizational Agility-A Qualitative Exploration. *Human Resource Management*, 59(1), 43-61. <https://doi.org/10.1002/hrm.21972>
- Harsch, K., & Festing, M. (2020). Dynamic Talent Management Capabilities and Organizational Agility-A Qualitative Exploration. *Human Resource Management*, 59(1), 43-61. <https://doi.org/10.1002/hrm.21972>
- Hongal, P., & Kinange, U. (2020). A Study on Talent Management and its Impact on Organization Performance-An Empirical Review. *International Journal of Engineering and Management Research*, 10. <https://doi.org/10.31033/ijemr.10.1.1>
- Hongal, P., & Kinange, U. (2020). A Study on Talent Management and its Impact on Organization Performance-An Empirical Review. *International Journal of Engineering and Management Research*, 10. <https://doi.org/10.31033/ijemr.10.1.12>
- Kandukuri, V. (2023). Aligning Talent and Business: A key for Sustainable HRM in SMEs. *Journal of Entrepreneurship and Innovation in Emerging Economies*, 9(1), 80-91. <https://doi.org/10.1177/23939575221141572>
- Maley, J. F., Dabić, M., Neher, A., Wuersch, L., Martin, L., & Kiessling, T. (2024). Performance Management in a Rapidly Changing World: Implications For Talent Management. *Management Decision*. <https://doi.org/10.1108/MD-07-2023-1162>
- Marion, T. J., & Fixson, S. K. (2021). The Transformation of the Innovation Process: How Digital Tools are Changing Work, Collaboration, and Organizations in new Product Development. *Journal of Product Innovation Management*, 38(1), 192-215. <https://doi.org/10.1111/jpim.12547>
- Mio, C., Costantini, A., & Panfilo, S. (2022). Performance Measurement Tools for Sustainable Business: A Systematic Literature Review on the Sustainability Balanced Scorecard Use. *Corporate social Responsibility and Environmental Management*, 29(2), 367-384. <https://doi.org/10.1002/csr.2206>
- Nebel, C., & Damani, Z. (2024). *Uniting Learning Science and Talent Management: Org Scholars*. Taylor & Francis. <https://doi.org/10.4324/9781032711591>
- Obeng, A. F., Zhu, Y., Quansah, P. E., Ntarmah, A. H., & Cobbinah, E. (2021). High-performance work Practices and Turnover Intention: Investigating the Mediating Role of Employee Morale and the Moderating Role of Psychological Capital. *Sage Open*, 11(1), 2158244020988557. <https://doi.org/10.1177/2158244020988557>
- Tamunomiebi, M. D., & Worgu, V. O. (2020). Talent Management and Organizational Effectiveness. *Journal of Contemporary Research in Social Sciences*, 2(2), 35-45. <https://doi.org/10.33094/26410249.2020.22.35.45>

- Viltz-Emerson, M. A. (2021). *Forward Solutions in Digital Learning Transformation: A Study in Navigating 21st-Century Organizational Learning for Learning & Development Professionals*. Pepperdine University.
- Waal, A. D. (2021). The High Performance Organization: Proposed Definition and Measurement of its Performance. *Measuring Business Excellence*, 25(3), 300-314. <https://doi.org/10.1108/MBE-04-2020-0064>