

ROLE OF HUMAN RESOURCE MANAGEMENT IN MEDIUM AND SMALL SCALE ENTERPRISES IN NIGERIA

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Abstract: *It is impossible to overstate how important employees are to a small business' survival and how well they are managed. This is especially true because, smaller businesses depend more on the individual contributions of the employees to the overall success of the business. Small and medium-sized businesses (SMEs) are significantly more prevalent than large corporations worldwide and employ a greater proportion of the labor force. In many economic sectors, SMEs are credited with fostering competition and innovation. While SMEs in Nigeria produce more jobs than large companies do, they also face difficulties that call for the assistance of experts from a variety of fields, including human resources managers. Therefore, this study uses a basic literature review and desk research approach to investigate the potential role of human resource management in SMEs in Nigeria. The main issues with SMEs' prior to the COVID-19 pandemic are identified as being insufficient skills and training, as well as depression and high labor turnover during the pandemic in Nigeria. In order to increase their effectiveness and efficiency in Nigeria, efforts are made to encourage SMEs to implement human resource management philosophies. As a result of the fact that no organization, no matter how big or small, can function without people, the study comes to the conclusion that human resource management is crucial. The study therefore recommends, among other things, that in order for Nigeria to experience sustainable post-COVID-19 business growth, SMEs must immediately implement human resource management strategies.*

Keywords: *Human resource management, small and medium enterprises*

Introduction

Human resource management focuses on how human resource managers manage people in accordance with organizational policies, procedures, and strategies in order to bring out the best in them in support of those goals and objectives. Human resource managers are referred to using various nomenclatures in various Organizations. They may also be known as personnel administrators, personnel managers, labor and staff administrators, or custodians of corporate conscience. Many of the first human resource

managers were lawyers, sociologists, and business administrators; however, in more recent years, people with a variety of degrees and licenses have entered the field. These individuals participated in carefully planned training, education, and professional development programs in specialized departments of tertiary and professional institutions both inside and outside of Nigeria. The human resource managers work in a delicate area of human resources, which is frequently referred to as the "cost center," "heartbeat," "unit that determines success or failure," and/or "people center" of an organization. Human resource management (HRM) used to cover a wide range of welfare and functional tasks, including hiring, job analysis, job evaluation, payroll management, performance reviews, labor law compliance, training administration, and other related duties. At the moment, it also encompasses all of these activities in addition to organizational development activities like leadership, motivation, creating organizational culture, and sharing shared values. The majority of HRM work in Nigeria has historically and currently been done in big organizations. Since SMEs have long been viewed by HRM researchers as second-class citizens, their attention to SMEs has been very limited (Tansky & Heneman, 2003; Zakaria, 2013). The results of HRM research in large organizations, however, cannot be universally generalized to SMEs because they are not a scaled-down version of large firms, have their own distinctive characteristics, and face different challenges (Nguyen & Bryant, 2004; Kwang, Songan & Kian, 2008; Barret & Mason, 2007). Given the limited understanding of the important roles of HRM in small and medium firms, there is a need to shift the focus from HRM in large Organizations to HRM practices in SMEs (Cardon & Steven, 2004; Ojokuku, 2012). SMEs are far more prevalent and employ a greater number of people than large corporations in the majority of nations around the world. For instance, SMEs in Australia account for 98% of all businesses, generate one-third of the nation's GDP, and employ 4.7 million people. SMEs make up a larger portion of the economy in developing nations than in developed ones. About 28% of all non-farm employment in Tunisia is held by self-employed individuals, and 62% of all employment is held by companies with fewer than 100 employees. 98.5% of businesses in Chile are categorized as SMEs. SMEs are credited with fostering innovation and competition across a wide range of economic sectors. Small and medium-sized enterprises (SMEs) make up more than 80% of businesses in Nigeria and about 10% of all new jobs created there (Standard Bank- BRIU, 2018). Despite the fact that SMEs in Nigeria generate more business opportunities than large corporations, they still face difficulties that call for the assistance of experts from a variety of fields, including human resource managers.

Apulu and Lutham (2009) claim that a number of variables influence how well Nigerian SMEs perform and these variables also increase the likelihood of SMEs failure. Furthermore, as noted by Costello and Sloane (2003) and Apulu and Lutham (2009), one of the factors influencing the industry is the adoption of new technologies by SMEs. According to Ongori and Migiro (2008), some of the difficulties faced by small businesses include a lack of infrastructure, poor governance, issues with a market that is too small, organizational and legal restrictions, insufficient credit availability, and insufficient regional amalgamation. Other studies, including Ihua (2009), Adenikinju (2005), and Akpan-Obong (2007), contribute to the factors that affect Nigerian SMEs. These factors, which include inadequate infrastructure, corruption, a lack of funding, the cost of implementation, inadequate skills and training, cultural considerations, electricity restrictions, a lack of institutional framework and owner-manager awareness, are quite

similar to those of Ongori and Migiro (2008). Due to the aforementioned, two important problems with human resource management in SMEs include: a lack of skills and training prior to the COVID-19 pandemic; and depression and high labor turnover during the COVID-19 pandemic in Nigeria. Although SMEs may have fewer options for resources than their larger counterparts to boost performance, human resources are a resource that all organizations, regardless of size, can benefit from, and this topic is increasingly at the center of conceptual, theoretical, and empirical debates in SMEs (Sheehan, 2013). Thus, using a basic literature review and desk research approach, this study contribute to the debate by critically examining, in line with HRM philosophies, the potential role of human resource management in Nigerian SMEs .

Review of Related Literature

The paradigm of human resource management was created as a result of the ongoing dynamics of a globalizing business environment, including changes to sociocultural and political-economic systems, technologies, consumer preferences, demand patterns, and competitive tendencies (HRM). HRM is a branch of management that is concerned with how people interact at work and within organizations. Its main goal is to unite people and help them grow into a successful organization made up of both men and women. To do this, it cares about the needs of each employee and the working groups to which they belong, ensuring that everyone gives it their all to make the organization successful. The effectiveness of their human resources has been the primary factor in the rise and fall of both large and small organizations (HR). This has caused a number of academics to pay more attention to HRM issues as a factor that can support industrial development throughout the world. The government of these nations has taken various measures to raise the standard of living of its citizens as a result of the global economy's downward trends and the high unemployment rate in third-world nations. The promotion of self-employment through the creation of small and medium-sized businesses stands out among these (Ariyo, 2001:2). Different people and organizations have different definitions of SMEs, so an enterprise that is viewed as small in one location may be seen differently in another. The definition evolves over time, even within a single nation. Total assets, the amount of labor employed, the values of annual turn-over and capital investment, etc. are some common indicators used in the various definitions.

Small businesses were defined as having capital (investments in land, buildings, machinery, and equipment, as well as working capital) of up to N60,000 and employing no more than 50 people by the Federal Ministry of Industries' small scale industries unit as early as 1979. However, small-scale industries were defined in the Central Bank's monetary and credit guidelines as businesses with an annual turnover of less than N6 million and a maximum capital investment of N10 million. In other words, a small business has a low market share, few employees, and is independently owned and managed. Most of what it covers is direct and private assistance. Barbershop, computer business, honey production, water packaging, poultry, detergent/soap production, etc. are all potential small-scale investment opportunities. Organization for Economic Cooperation and Development (2005) defines SMEs as independent businesses with fewer than a specified number of employees. However, SMEs are categorized according to their size and financial resources. Medium-sized businesses are those with up to 250 employees, while small businesses are

those with up to 50 employees and micro businesses are those with fewer than 10, respectively. Small scale businesses are those with a workforce of between 11 and 100 employees and a total cost of less than N50 million, including working capital but excluding cost of land, according to the Central Bank of Nigeria report from 2003. Medium scale businesses were defined as those with a workforce of between 101 and 300 employees and a total cost of more than N50 million but not less than N200 million, including working capital but excluding cost of land.

According to the Small and Medium Industries and Equity Investment Scheme (SMIEIs), SMEs are businesses with a maximum asset base of 200 million naira, excluding land and working capital, and with a workforce of between 10 and 300 employees (Akabueze, 2002). Small scale firms are referred to by the terms small scale business, small scale industries, and small scale entrepreneurship. A small scale business is one that employs fewer than ten people or whose machinery and equipment cost less than N600,000, according to the Third National Development Plan of Nigeria (1975–1980). A small business in Nigeria is defined by the Federal Government Small Scale Industry Development Plan of 1980 as any manufacturing process or service industry with a capital not exceeding N150, 000 in manufacturing and equipment alone. Small businesses make up a large portion of businesses in Nigeria, the majority of which are in the commercial sector. However, SMEs have fewer options for resources than their larger counterparts to boost performance. However, human resources are a resource that is available to all organizations, regardless of size, and this is receiving more conceptual, theoretical, empirical, and practical attention in SMEs (Sheehan, 2013). The management of an organization's most valuable asset its employees who individually and collectively contribute to the accomplishment of the business's goals is referred to as human resource management (HRM) by Armstrong (2012). People's mental and physical efforts are required to achieve organizational performance, which only happens when the proper HRM policies and practices are implemented (Guest, 1997).

According to Singh and Vohra (2005), small-scale businesses will operate more efficiently when their HRM system is successfully integrated with their vision and organizational objectives. Delery and Doty (1996) acknowledge that small businesses adopting effective HRM practices will result in employees not only learning new skills and knowledge but also changing their attitudes, which will enhance their performance. In the era following COVID-19, HRM practices are crucial for businesses all over the world, but especially for SMEs. Businesses are human organizations, so people are crucial to their existence and success. Therefore, it is not surprising that management is constantly worried about the organization's efficient human resources. Osalor (2010) claims that Nigeria's informal economy has developed to the point where it contributes over 65% of the nation's GNP and creates more than 70% of all new jobs. Nigeria as a country has recently made clear how highly the government, educational institutions, and corporate bodies regard SMEs. The growth of SMEs is now acknowledged as a real tool for promoting poverty eradication, job creation, rural development, and sustainable livelihood for the populace (Iwere, 2013). According to Odunayo (2021), someone must be responsible for the welfare and productivity of those who work for the organization. Human resource management refers to the process by which an individual or group of individuals oversees programs and establishes policies that affect everyone connected to the company.

Small and medium-sized businesses are widely recognized as the foundation and industrial center for development in nation-building (Stokes & Wilson; 2010). Over time, SMEs have been a means of empowering Nigerians and generating jobs, accounting for about 50% of all jobs in Nigeria (Akeem, Obaje & Salisu, 2015). Additionally, Mba and Izunwanne (2014) argued that the expansion of non-oil export is facilitated by SMEs, which also guarantee even distribution of industrial development and reduce poverty. Ofobruku, Nwakoby, Omale, and Okoye (2019) contend that a country won't be able to develop anything else if it can't develop the knowledge and skills necessary for its economy. In their discussion of the high-performance work system (HPWS), Zhang, Fan, and Zhu (2014) proposed the notion of HPWS as a set of practices which enhance employees' skills, commitment, and efficacy in order to gain a competitive advantage. Perhaps if the staff receives the required training to advance their knowledge and skills, this will in some way result in an increase in production, which would improve business performance and result in higher wages for the workers. As a result, the country's GDP will rise, improving living conditions in particular. An increase in output may also increase the country's trade with other nations on the global stage.

Roles of SMEs in Nigeria

It is impossible to overstate the importance of SMEs to the Nigerian economy. They include:

Creating jobs for young people who are unemployed;

Increasing the number of indigenous industrialists, which results in true economic independence?

Facilitating the efficient mobilization of local resources and expertise. When located in rural areas, they serve as a deterrent to rural-urban migration;

They promote local raw material sourcing and utilization;

Some small and medium business organizations produce parts and components for large-scale enterprises;

They provide good avenues for few entrants into the business world and an excellent training ground for young entrepreneurs;

They serve as rivals, adversaries, and subsidiaries to the big businesses.

Given the (1) function of SMEs described above, human resource managers place a high priority on creating jobs for young people. Therefore, it is imperative to consider the roles of human resource management and how they can assist in addressing the challenges of inadequate skills and training faced by SMEs in Nigeria.

Role of Human Resource Management in Addressing the Inadequate Skills and Training Challenges of SMEs in Nigeria

Employee involvement or participation in work organization, as well as higher productivity and quality, are the goals of human resource management (HRM). It is important to remember that human resource management is the department within an organization that is responsible for hiring and selecting employees, managing them effectively, and giving them guidance. The organizational function known as human resource management deals with matters pertaining to people, including pay, hiring,

performance management, organization development, safety, wellness, benefits, employee motivation, communication, administration, and training (Okolie, Irabor & Udom, 2017). Human capital management, corporate social responsibility, and other factors that are expected of any Organization that requires the practice of human resource management as well as the professionalism of human resource managers are the main philosophies at the center of human resource management (Okolie & Ayewumi, 2020). In large organizations, the human resource management philosophies are frequently emphasized, but in Nigeria's small and medium-sized businesses, they are rarely or never strictly emphasized. As was already mentioned, SMEs may have fewer options for resources than their larger counterparts to boost performance, but human resources are a resource that all Organizations, regardless of size, share. Effective HRM philosophies are therefore necessary to address the issues with inadequate skill and training in Nigerian SMEs.

Small and medium-sized businesses (SMEs) should have a clear organizational structure or design, as well as clear human resource strategies, policies, procedures, practices, and programs. Employees should be placed in job positions based on their competencies, and recruitment and selection processes should be objective and based on job design and analysis. Talented workers should be properly managed, and workers' overall health, safety, and well-being should be prioritized. Performance management should be based on job evaluation, with an emphasis on learning, training, and development. Employees' voices should be heard, and grade and pay structures should be emphasized, and top-down and bottom-up communication should be encouraged for performance-related reasons.

Furthermore, in light of the COVID-19 pandemic, HRM in SMEs is crucial. In Nigeria, many SMEs are going out of business. Due to the CBN cashless policy, many organizations, including those in the hotel, tourism, cosmetics, and other industries as well as SMEs around the world are currently losing the majority of their customers, and countless organizations are dismissing their staff as a result of financial difficulties. As a result, some workers are depressed, and others have made the decision to take time off or quit their jobs (Adams & Walls, 2020). Therefore, human resource managers' efforts are essential to guaranteeing SMEs' survival in this challenging time. In addition to the inadequate skills and training that are SMEs' biggest problems from an HRM perspective, depression and turnover have also become major problems during COVID-19 and must be urgently addressed using the aforementioned HRM philosophies. Government relief measures are essential for business survival in this difficult period, but organizations must also implement HRM philosophies effectively if they are to survive the aftermath of the COVID-19 pandemic. As a result, SMEs in Nigeria are expected to adopt HRM philosophies in order to be more effective and efficient in service delivery through proper utilization or management of their employees in order to achieve organizational goals.

Theoretical Framework

The evolutionary theory of firm growth proposed by Nelson and Winter (1982) is the foundation of this study. According to the scholars, a company's ability to use factors that support the growth of SMEs, particularly people (staff or employees) to speed up the production process, which will result in a significantly larger company, is what determines the size of the firm. Future outcomes are anticipated from effective capacity-building

techniques that have improved over time. According to the evolutionary theory of firm growth, organizations' critical assets must be used to their full potential in order for them to perform better. The theory further asserted that in order to increase productivity and organizational performance, the human resource (employees) of the firms must go through strategic capacity development. The theory states that human resource management is essential for enhancing employees' productivity and performance in all sizes of organizations, not just SMEs. According to Dessler (2011), effective HRM is essential for small businesses to remain competitive because they face unique risks and must therefore take advantage of every advantage available. For small businesses to attract and retain large clients, the implementation of specific HR policies is another crucial requirement. This is due to the fact that major clients look for evidence of compliance with global quality standards, which may include specific HR practices like training and performance management initiatives. However, small business HR management differs from large business HR management.

Conclusion and Recommendations

Today, SMEs in Nigeria are receiving more attention as a way to combat the rising scourge of unemployment, especially among graduates and school dropouts. Practices in human resource management are a key factor in any business organization's success. Although there are many factors that affect an organization's success, it is difficult for an organization to succeed without effectively managing its human resources (HR). The situation is even more dire for small businesses because these organizations rely more on the contributions of specific employees than do their larger counterparts. In the majority of SMEs in Nigeria, human resource management philosophies are absent. Many of them don't even have quick memos outlining employee conduct, dress code, work hours, etc. for managers and staff. When faced with a legal issue or when trying to address its human resource challenges, an organization will spend less time developing HR policies and procedures than it will spend litigating human resource management-related issues, particularly in light of the CBN cashless policy. Therefore, SMEs must adopt the HRM philosophies in order to carry out their duties effectively and efficiently, attract and retain personnel with the necessary skills, knowledge, and abilities, or address the issues of insufficient skills, training, cum depression, and labor turnover that exist among workers. The study comes to the conclusion that human resource development is crucial for all organizations, no matter how big or small, because it is well known that no business can function without people. Businesses are human organizations, so people are crucial to their existence and success. Making opportunities for employees to carry out various managerial tasks available through job enrichment and job rotation to broaden staff experience is one tactic for promoting HRM among employees. According to the study's conclusion, the following suggestions are made:

To achieve sustained business growth in Nigeria after COVID-19, SMEs must immediately implement human resource management strategies. While conducting the recruitment and selection process, job specifications should be created and strictly followed.

To broaden their knowledge and boost organizational performance, managers of small and medium-sized businesses in Nigeria should take advantage of various training programs and workshops on human resource management techniques.

There should be consistency in training activities, and SMEs should have clearly defined recruitment and selection policies that are compliant with the law. The owners of SMEs should ensure that training provided to employees is pertinent to their needs. For this reason, the proper machinery should be installed to conduct routine skills gap analyses to determine their employees' training needs.

References

1. Adams, J. G., & Walls, R. M. (2020). Supporting the healthcare workforce during the covid-19 global epidemic. *Journal of American Medical Association*, 34, 57 – 79.
2. Adenikinju, A. (2005). *Analysis of the cost of infrastructure failures in a developing economy: The case of the electricity sector in Nigeria*. Ibadan: University Press.
3. Akabueze, B. (2002). *Prospectus on Nigeria SMEs under the small and medium industries investment scheme (SMIEIS)*. Retrieved from www.nigeriabusinessinfor.com/nigerian-smes2000.htm on February 2nd 2023.
4. Akeem, T. N., Obaje, F. O., & Salisu, Y. (2015). Imperatives of strategy in human resource training of small and medium scale enterprise in Nigeria. *Economic and Organization*, 2(3), 225 - 239.
5. Akpan-Obong, R (2007). *Information and Communication Technologies in development: contextuality and promise*. Brazil: Sao Paulo Publications.
6. Apulu, I., & Latham, A. (2009). Information and communication technology adoption: Challenges for Nigerian SMEs. *TMC Academic Journal*, 4(2). 64 - 80.
7. Ariyo, A. M. (2001). Empowering women for national development. *African Journal of Cross Cultural Psychology and Sports Facilitation*, 3, 70 - 72.
8. Armstrong, M. (2012). *Armstrong's handbook of human resource management practice*. London: Kogan Page.
9. Armstrong, M., & Taylor, S. (2014). *Human resource management practice*. London: Kogan Page.
10. Barrett, R., & Mayson, S. (2007). Human resource management in growing small firms. *Journal of Small Business and Enterprise Development*, 14(2), 307 - 320. <https://doi.org/10.1108/14626000710746727>
11. Cardon, M. S., & Steven, C. E. (2004). Managing human resources in small organizations: What do we know? *Human Resource Management Review*, 14, 295 - 323. <https://doi.org/10.1016/j.hrmr.2004.06.001>
12. Central Bank of Nigeria (2003). *Small and medium industries equity investments scheme*. Lagos: CBN Training Centre.
13. Costello, R., & Sloane, A. (2003). *Friendly advice? - How SMEs gain knowledge of ICT*. Warwick: University Press.
14. Delery, J. E., & Doty, D. H. (1996). Modes of theorizing in strategic human resource management: Tests of universalistic, contingency and configurational performance predictors. *Academy of Management Journal*, 4(39), 802 - 835. <https://doi.org/10.5465/256713>
15. Guest, D. (1997). Human resource management: When research confronts theory. *International Journal of Human Resource Management*, 12(7), 1092 - 1106. <https://doi.org/10.1080/09585190110067837>
16. Ihua, U. B. (2009). SMEs key failure-factors: A comparison between the United Kingdom and Nigeria. *Journal of Social Sciences*, 18(3), 199 - 207. <https://doi.org/10.1080/09718923.2009.11892682>
17. Iwere, T. (2013). *SMEs: Tool for development and economic prosperity*. New York: Harper.
18. Kwang, S. N., Songan, R., & Kian, S. H. (2008). Organizational learning capability of Malaysian SMEs: Examining the effects of entrepreneurial orientation and human capital development practices. *Journal of Information & Knowledge Management*, 7(4), 219 - 230. <https://doi.org/10.1142/S0219649208002123>
19. Mba, O. A., & Izunwanne, C. E. (2014). Issues challenges and prospects of SMEs in Port-Harcourt City, Nigeria. *European Journal of Sustainable Development*, 3(1), 101 -114.

20. Nelson, R. R., & Winter, S. G. (1982). *An evolutionary theory of economic change*. New York: Belknap Press.
21. Nguyen, T. V., & Bryant S. E. (2004), A study of the formality of human resource management practices in small and medium-size enterprises in Vietnam. *International Small Business Journal*, 22(6), 595 - 618. <https://doi.org/10.1177/0266242604047412>
22. Odunayo, H. A. (2021). Human resource management practices and small and medium scale business in Nigeria. *International Journal of Business and Management Review*, 9(2), 63 – 76. <https://ssrn.com/abstract=3880061>
23. Ofobruku, S. A., Nwakoby, N. P., Omale, M. I., & Okoye, N. J. (2019). Effects of investment climate on entrepreneurial growth in Abuja, Nigeria. *International Journal of Economics, Business and Management Studies*, 6(1), 77 - 86. <https://doi.org/10.20448/802.61.77.86>
24. Ojokuku, R. M (2012). Human resource management demands and challenges in small and medium scale enterprises. *International Journal of Economic Development Research and Investment*, 3(3), 1-10.
25. Okolie, U. C., & Ayewumi, T. E. (2020). Communication and human resource management in Edo State Broadcasting Service (EBS), Benin City, Nigeria. *Styles of Communication*, 12(1), 121-131.
26. Okolie, U. C., Irabor, I. E., & Udom, I. D. (2017). A comparative study of human resource management and personnel management. *International Journal of Research in Arts and Social Sciences*, 10(1), 151 – 164.
27. Ongori, H., & Migiro, S. (2010). Information and communication technologies adoption in SMEs: Literature review. *Journal of Chinese Entrepreneurship*, 2(1), 93 - 104. <https://doi.org/10.1108/17561391011019041>
28. Osalor, P. (2010). *Entrepreneurial development in Nigeria*. Retrieved from <http://ezinearticles.com/?EntrepreneurialDevelopmentinNigeria> on February 2nd 2023.
29. Sheehan, M. (2013). Human resource management and performance: Evidence from small and medium- sized firms. *International Small Business Journal*, 10(1), 1 - 26. <https://doi.org/10.1177/0266242612465454>
30. Singh, M., & Vohra, N. (2005). Strategic human resource management in small enterprises. *Journal of Entrepreneurship*, 14(1), 59 -70. <https://doi.org/10.1002/hrm.10096>
31. Standard Bank, BRIU (2018). *Report on SMEs contribution to employment percentage*. Abuja: Standard Bank Publications.
32. Stokes D., & Wilson N., (2010). Entrepreneurship and marketing education: time for the road less travelled? *International Journal Entrepreneurship and Innovation Management*, 11(1), 1 -14. <https://doi.org/10.1504/IJEIM.2010.02977>
33. Tansky, J. W., & Heneman, R. (2003). Guest editor's note: Introduction to the special issue on human resource management in SMEs. *Human Resource Management*, 42(4), 299 - 302.
34. Zakaria, N. (2013). Enhancing organizational performance of Malaysian SMEs through human resource management practices and organizational innovative capability: A proposed framework. *International Conference on Management Proceeding*, 326 - 351.
35. Zhang, M., Fan, D., & Zhu, C. (2014). High-performance work systems, corporate social performance and employee outcomes: Exploring the missing links. *Journal of Business Ethics*, 120(3), 423 - 435. <https://doi.org/10.1007/s10551-013-1672-8>



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