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WORK SCHEDULING PRACTICES AND EMPLOYEE PRODUCTIVITY: MODERATING ROLE OF TECHNOLOGY ADOPTION IN MANUFACTURING FIRM

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Abstract

This study examined the influence of work scheduling practices, including shift scheduling, workload distribution, and flexible work arrangements, on employee productivity in a manufacturing firm, while assessing the role of technology adoption in the relationship. A descriptive survey research design was adopted, and data were collected from 347 employees using a structured questionnaire. The reliability of the research instrument was established using Cronbach's alpha coefficient of 0.78, indicating satisfactory internal consistency. The collected data were analyzed using Structural Equation Modeling (SEM) to determine the relationships among the study variables. The findings revealed that work scheduling practices significantly influence employee productivity, although the strength and direction of the relationships depend on effective implementation and technological support. Shift scheduling demonstrated a significant effect on employee productivity, accounting for 53.4% of the variation in productivity outcomes. Workload distribution emerged as a strong predictor of employee productivity, explaining 69.1% of the observed variations, while flexible work arrangements accounted for 48.7% of productivity changes. Furthermore, technology adoption played a critical role in explaining the relationship between work scheduling practices and employee productivity, with the model demonstrating a combined explanatory power of 78.6%. The study concludes that effective work scheduling practices supported by appropriate technological systems are essential for improving employee productivity and organizational efficiency. The findings emphasize that manufacturing firms should prioritize strategic scheduling approaches, balanced workload allocation, flexible work policies, and the adoption of user-friendly technological solutions to enhance workforce performance and achieve sustainable organizational outcomes.

Keywords: Work scheduling, Employee productivity, Shift scheduling, Flexible work arrangements, Structural Equation Model

1.0 INTRODUCTION

The productivity of employees is generally considered one of the main determinants of organizational success, and the analysis of the factors impacting it is crucial to enhance the performance in the workplace (Shaikh et al., 2023). Productivity is the level of efficiency and effectiveness at which employees will carry out the duties they are assigned and help achieve the organizational goals. It shows the extent to which the employees can convert the inputs of time, skills, knowledge, and effort in meaningful and valuable products. In the case of high productivity, organizations are likely to have increased profitability, increased competitiveness and enhanced operational performance. Moreover, high productivity is linked to favorable employee performance which may comprise of elevated job satisfaction, reduced turnover, enhanced morale and greater organizational commitment. Nevertheless, the productivity does not depend only on the competence of the employees or the availability of the resources. It is also greatly determined by structural and managerial issues, especially work scheduling practices. The negative impact of poor scheduling arrangements including irregular work schedules, too much overtime, lack of enough rest time, and unclear assignment of tasks may result in fatigue, lack of motivation, increased absenteeism, and overall low productivity of the employees. Conversely, scheduled and designed time management systems can encourage the welfare of the employees, foster motivation, minimize work-related stress, and eventually boost individual and organizational performance.

In the modern dynamic business world that is characterized by technological development, organizational complexity, and growing competitive pressures, the management of employee working time has never been more crucial than it is now. Organizations are ever finding solutions that would help them optimize productivity and still ensure the well-being of employees and efficiency in their operations. Consequently, work scheduling practices are receiving more interest as an instrument of strategic management. The current interest in the work scheduling practices and the productivity of employees is preconditioned by the necessity to comprehend the impact of various scheduling arrangements on the performance of employees, their motivation, and engagement. The objectives of the modern

organization are to measure the degree of influence of work schedules on productivity results, their influence on employee motivation and job satisfaction, and whether there are any difficulties or constraints with the existent type of scheduling. The knowledge of these dynamics helps organizations to develop scheduling plans that meet operational needs and employee performance and well-being.

Work scheduling practices are a complex issue in relation to employee productivity that includes numerous organizational, technological, and human factors (Reddy, 2025). The relationship is especially important within large multinational manufacturing companies in Nigeria where operations are characterized by complex production processes, coordinated supply chain operations, and the ability to respond effectively to market forces. Within these settings, efficient scheduling is vital in order to achieve maximum use of human resources, continuity of the workflow, and avoid any disruption of operations. In addition, the development of digital technologies has changed the way organizations control work schedules and performance of employees. Automated scheduling systems, enterprise resource planning (ERP) systems, and digital communication tools are becoming more popular in many organizations to improve coordination, lessen administrative burden, and improve operational efficiency. These technological applications can help organizations to distribute tasks more efficiently, track the performance of employees, and react swiftly to evolving operational needs.

The manufacturing industry in Nigeria is increasingly implementing digital technologies to deal with the inefficiency of the operations, meet the increasing competition, and address the structural issues, thus, opening the opportunity to improve the overall performance of the sector (Olakpa & Adebusuyi, 2025). Introduction of technological tools in the work scheduling processes can enhance accuracy of the scheduling process, reduce human errors, improve communication between the management and the employees and allow real-time monitoring of employee performance and operational activities. Therefore, the application of technology is significant in enhancing the integrity of work scheduling practices. It can also serve as a moderating variable in the association between work scheduling practices and employee productivity by improving scheduling systems efficiency, reliability, and responsiveness. By adopting the modern technological solutions, organizations are able to streamline the workforce management, enhance the productivity performance and ensure a competitive edge in a highly dynamic business world.

1.1 Statement of Problem

Employee productivity is one of the issues that organizations can be concerned with in order to attain operational efficiency, competitiveness, and sustainable growth (Avery & Zabel, 2018). When employees are highly productive, it helps organizations to use resources effectively, lower operational expenses, and enhance quality of goods and services, and boost the competitive advantage (Hill et al., 2014). It further leads to enhanced employee performance like job satisfaction, performance recognition and job security (Jerono & Bula, 2025). In spite of these advantages, most organizations, especially those in the manufacturing industry, are still facing problems in attaining optimal productivity, which means that organizational factors that affect employee performance require to be studied.

Work scheduling is one of the critical organizational factors that affect the productivity of employees. Good work scheduling measures, such as shift scheduling, appropriate workload allocation, and flexibility of work arrangements are imperative in ensuring efficiency and performance of the employees. Nevertheless, some of the challenges that employees in manufacturing companies like Nestle Nigeria Plc regularly face include fatigue caused by shifts, work overload, conflicts in schedule, and rigid working conditions that may adversely impact their productivity and performance. Research has demonstrated that the scheduling of workforce has a tremendous impact on the efficiency and productivity of the employees (Hossain, 2023; Holovchenko, 2024; Barongo, 2025; Reddy, 2025). Likewise, Jerono and Bula (2025) established that work scheduling practice (especially compressed work schedules) is highly influencing employee productivity. Although these results were obtained, the question of productivity remains open, and it is proposed that the efficacy of certain scheduling strategies like shift scheduling, workload assignment, and flexible work schedules needs additional empirical research, particularly in the Nigerian manufacturing industry.

Moreover, the current trend of using technological resources, including automated scheduling systems, digital communication platforms, and enterprise resource planning systems, has opened novel possibilities in terms of enhancing workforce scheduling and employee productivity. The adoption of technology will help to improve the accuracy of scheduling, enhance communication, and facilitate better workload management, thus increasing employee productivity. Nevertheless, there is limited empirical evidence on whether technology adoption enhances or moderates the correlation between work scheduling practices and employee productivity. The lack of this gap brings in some uncertainty as to the role of technological tools in enhancing the efficacy of scheduling practices in enhancing employee productivity.

1.2 Objective of the Study

The specific objectives of this study are to:

i. assess the effect of shift scheduling on employee productivity in manufacturing firms;
ii. examine the impact of workload distribution on employee productivity;
iii. determine the influence of flexible work arrangements on employee productivity; and
iv. examine the moderating role of technology adoption in the relationship between work scheduling practices and employee productivity.

1.3 Research Questions

This study was guided by the following research questions:

i. What is the effect of shift scheduling on employee productivity in manufacturing firms?
ii. How does workload distribution influence employee productivity?
iii. To what extent do flexible work arrangements affect employee productivity?
iv. How does technology adoption moderate the relationship between work scheduling practices and employee productivity?

1.4 Article Structure

This article is organized into six sections. The first section presents the introduction, which provides the background to the study, problem of the study, research objectives, and research questions. The second section focused on literature review which includes; the concepts of work scheduling practices, employee productivity, technology adoption, hypotheses, conceptual framework, the theoretical and empirical review of the study. The third section describes the methodology, outlining the research design, population, sampling technique, data collection instrument, and analytical methods used in the study. The fourth section presents the results and findings obtained from the data analysis. The fifth section discusses the implications of the findings in relation to existing literature. Finally, the last section provides the conclusion, recommendations, limitations of the study, and directions for future research.

■ 2.0 LITERATURE REVIEW

2.1 Work Schedulling Practices

A work schedule refers to the organisation of an employee's working hours, including the specific times of day they work, the duration of their shifts, and the regularity or consistency of those hours. According to Reddy (2025), a work schedule is a structured plan outlining the hours and days an employee is expected to follow. Regular or fixed schedules typically involve daytime work with consistent start and end times, often determined by the employer and set for a specified number of hours and days each week. An employee's work schedule therefore specifies when they are expected to be present at work, including both the days and times assigned.

Depending on the organisation and job role, work schedules may follow a traditional 40-hour, Monday-to-Friday pattern or may vary daily, weekly, or seasonally. Reddy (2025) further explained that employers usually determine the schedule when filling a vacant position, and many organisations assign fixed schedules with predetermined hours so employees know their weekly working times in advance. However, some organisations adopt flexible scheduling policies, allowing employees to adjust their arrival and departure times or, in some cases, select their workdays. Kandie and Chepkilot (2022) identified several types of work schedules, including the full-time work schedule, which typically requires a commitment of 37–40 hours per week. Because of the longer hours, full-time employees are often eligible for benefits such as health insurance, paid leave, and retirement plans. Full-time schedules are usually consistent each day, although in some sectors, such as retail, shifts may vary while still maintaining the required total weekly hours.

2.2 Employee Productivity

Employee productivity can be defined as the degree to which an employee produces in relation to the time, effort, and other resources used in a specific time span (Gomathy, et al. 2022). It is an indication of the efficiency and effectiveness with which the employees execute their respective duties and help in the accomplishment of organisational goals. High productivity implies that a worker or a group of workers can be able to generate more output with a limited amount of resources and this is an indication of efficiency. The concept is vital to organisations as it impacts their competitiveness, financial performance, and long-term sustainability (Okechukwu, 2021).

The productivity of the employees is influenced by a lot of factors such as organisational structure, management practices, workplace culture, work schedules and individual competencies. It usually indicates the motivation of employees, the sufficiency of the training provided, and the extent of organisational support (Okolocha, 2025). Moreover, the external influence of the work environment, the presence of tools and resources, and the effectiveness of leaders are also important. Productivity, therefore, is not merely the amount of work done but the quality and general contribution of that work to organisational objectives (Gomathy, et al., 2022). Additionally, employee productivity transcends to doing the job assigned, but also the capability to prioritize the job, be consistent, and high quality of output (Dunmade, et al. 2024).

2.3 Technology adoption

Technology adoption is a process where organisations discover, obtain, incorporate, and capitalise new technologies to increase operational effectiveness, reinforce competitive edge, as well as generate innovation (Beaman et al., 2021). Technology adoption is a subject of study that has been done in various fields proving its importance in organisational performance and innovation. As an illustration, adoption has been investigated in the context of the electronic payment system, which simplifies financial transactions and allows better service delivery, and in the context of sustainable agricultural practices, which increase productivity and have less impact on the environment (Takahashi et al., 2020). These applications highlight the revolutionary nature of technology when it is adopted and managed well.

There are several theoretical frameworks that have been established to learn and lead the adoption process. Mhlanga and Ndhlovu (2023) examined several models of technology adoption that have proven to be relevant even in industries like agriculture and digital technology. These models provide systematic methods of examining the adoption process, such as the drivers of successful integration, and the factors that might serve as impediments. To add to this, Pamidimukkala et al. (2023) offered a detailed overview of the theoretical positions and practical use cases, highlighting the key factors that determine successful adoption and the challenges that organisations tend to encounter, including the lack of resources, organisational resistance, and technological complexity.

There are important determinants that have been found using the empirical studies that determine technology adoption at both the individual and organisational level. Berkowsky et al. (2017) emphasized that technology is likely to improve performance; ease of use, which is the amount of effort needed to use and adopt the technology; and social influence, which involves peer, managerial, and societal pressure to adopt. The adoption of technology is not just a matter of how to obtain new tools but a plan and a methodology of how to incorporate technology in organisational processes. Implementation must be well planned, contextual factors must be considered, change management practices must be implemented and continuous evaluation must be undertaken to ensure that technology is added to organisational goals, that it creates innovation and that it makes deliverable and quantifiable efficiency and performance improvements.

2.4 Shift Scheduling and Employee Productivity

Management of shift work has become a key element of the contemporary manufacturing process, and its development has changed considerably in the last ten years. According to Martinez and Collins (2023), the concept of shift work entails an organisational arrangement of scheduling that enables organisations to work beyond the usual working hours by hiring a number of groups of workers. Building on this, Wilson et al. (2024) emphasised shift work as a holistic method of workforce scheduling including the aspects of operational efficiency, human factors, and organisational sustainability.

Ramirez et al. (2022) followed the development of shift work models with traditional structures to more adaptive ones, with three main systems, including the 2-shift system, which is used in 40% of organisations around the world, the 3-shift system, which explains 35% of the applications, and the 4-shift continental, which covers 25% of applications. Both models have peculiarities and working issues. A study by Rodriguez et al. (2023) also confirmed the role of these systems in industry type, demographics of the working population, and local cultural settings in determining their effectiveness.

One of the trends in manufacturing in the world today is the use of flexible shift scheduling where employee preferences are taken into consideration in the shifts. According to Thompson and Lee (2024), the percentage of manufacturing companies using such flexible approaches has risen to about 65% presently. As Anderson et al. (2023) and Meilinda et al. (2024) note, this has been a strategy that has led to a 28 percent rise in job satisfaction and a 15 percent drop in turnover. Nevertheless, Davidson and Wong (2024) and Widagdo et al. (2022) also conclude that flexibility or standardisation is necessary to ensure that the operations are consistent and safe at the workplace.

The latest developments in shift work management can be seen through the use of digital technologies. According to Mendrofa and Palupiningtyas (2025), AI-based scheduling systems are becoming common in order to streamline shift planning. In their study, Hassan and Chen (2024) found out that 45% of fortune 500 manufacturing companies use AI-based scheduling, with an average of 23% of these companies recording an improvement in operational efficiency. These systems enable organisations to think of many variables at a given time such as the preferences of the employees, production needs, and labour laws leading to more efficient and flexible scheduling. Based on this reviewed, this hypothesis is formulated;

Hypothesis II: Workload distribution has significant effect on employee productivity.

2.5 Workload Distribution and Employee Productivity

Workloads are the tasks, duties, and responsibilities given to employees, and it includes the general scope of their jobs (Srimarut & Mekhum, 2020). Every employee is normally allocated certain duties that he or she is supposed to accomplish within a certain period. There are three types of workloads which are task-level, unit-level and job-level workload. Studies have shown that work overload happens when employees are given duties that they cannot handle usually because they need more productivity and performance (Latip, et al., 2018). Employees in big organizations often have to cope with several tasks at the same time with strict deadlines (Shittu, et al., 2018). The workload and deadlines have been proven to be a significant contributor to job-related stress (Lin, et al., 2015).

Proper workload management is the process of allocating tasks to employees in a strategic way so that the employees can perform optimally and be productive (Sravani, 2018). Balanced workload is crucial in ensuring that organizations are competitive because the management is in a position to make the best out of the workforce. Nevertheless, there are still numerous organizations that struggle to effectively manage the workload of employees. Overwork or workload imbalance leads to a higher vulnerability to stress and burnout by employees and this may ultimately minimize efficiency and productivity of the entire organization. Effective workload management, thus, is a decisive issue in the maintenance of employee welfare and attainment of stable performance results.

Hypothesis II: Workload distribution has significant effect on employee productivity.

2.6 Flexible Work Arrangements

Flexible work arrangements are becoming a common trend among organizations as a strategy to minimize the stress of employees, improve performance, and job retention. Monday to Friday or Saturday flexible schedules are offered as an alternative to the standard fixed work schedule in Nigeria, which is usually 8:00 a.m. to 4:00 or 5:00 p.m., Monday to Friday or Saturday (Idowu, 2020). Such schedules may involve part-time employment, rotation, job sharing, shorter hours, remote work by nursing mothers, leave of passion, and career flexibility among others. Such practices are promoted in order to reduce work-life conflicts, motivate employees and increase productivity

in human resource departments. Flexible working hours are deemed one of the most innovative methods in human resource management that reflects the vision of leaders who recognize the needs of the fast-evolving global business world (Idowu, 2014; Idowu, 2019).

Flexible work schedules enable workers to have more control over their working hours or have the option of their place of work and provide them with more autonomy and control over their work (Holovchenko, 2024). This is known to be a good method of increasing employee satisfaction, alleviating stress as well as maximizing organizational resources. According to McMaster (2005), flexible work arrangements like modified working hours or leave arrangements contribute to aligning the needs of employees with the objectives of the organization. These practices can involve job restructuring, part-time employment, or contract employment among other flexible employment practices. Likewise, Glass and Finley (2002) discovered that when an organization has a flexible schedule, it tends to have a policy that is friendly to the family and hence employees are able to manage work and family commitments. Flexible work arrangements are thus perceived as a viable method of balancing work and life issues (Dex & Smith, 2002).

Employees and employers normally negotiate flexible working arrangements so that they can both be able to benefit (Galea, Houkes & De Rijk, 2013). It leads to better results because employees are not bound by strict schedules, and these practices over time have been seen to benefit both the organization and the employees (Nijp, et al.,). Nevertheless, Wheatley (2016) observed that flexible practices are not always applied to meet the needs of the employee but the organization. Flexible work arrangements are ideally supposed to reduce the conflict between work and the personal life so that the employee can have control over his or her schedule and have work-life balance (Rastogi, et al., 2015). Flexible work arrangements can help increase productivity, positively affect employee well-being, and make organizations successful by allowing employees to better manage their time and responsibilities.

Hypothesis III: Flexible work arrangements have significant effect on employee productivity.

2.7 Technology Adoption as a Moderator

Technology adoption can be described as the process by which people or organizations embrace, adopt and constantly utilize the new technologies in an attempt to enhance efficiency, performance, and productivity. It consists of perceiving the utility of a technological innovation, weighing its advantages, moving it into the current work processes, and maintaining its use in the long term. Technology adoption in an organization facilitates firms to automate their operations, enhance communication, and decision-making processes (Venkatesh & Davis, 2000).

Usman and Yusoff (2026) have studied the role of the adoption of digital technology on employee productivity in real estate companies in North-Central Nigeria. Another aspect that the study examined is how the technological knowledge of the employees moderates the relationship between the use of technology and the productivity. The quantitative research design was chosen and the data were gathered through structured questionnaires to the employees of real estate organizations in various states in Nigeria. Partial Least Squares Structural Equation Modelling (PLS-SEM) was used to analyse the data in the study. The findings showed that access and application of digital technology had a profound effect on enhancing employee productivity. Moreover, the researchers discovered that the working knowledge of digital technologies among the employees positively moderated the connection between the use of technologies and productivity, i.e. the more technologically competent employees, the larger the productivity increase, when the technological tools were used. The researcher concluded that the organization must invest in digital infrastructure and employee training to enhance the adoption of technology effectiveness to improve the productivity.

Necula, Fotache and Rieder (2024) examined how artificial intelligence tools can influence the productivity of employees in different organizations. The quantitative method of the study was based on the survey and the data was analyzed with the help of machine learning models and Bayesian network analysis in order to estimate the connection between the use of AI technology and the productivity of the employees. The results showed that the implementation of artificial intelligence tools enhanced the efficiency and work output of employees greatly, through the automation of their daily tasks, decision-making process, and the collaboration among the organizations. The research also found out that efficacy of work processes, scheduling and coordination of tasks, increased remarkably with the introduction of AI-enabled technologies into the workplace systems. The researchers have found that the adoption of technology could be used to reinforce processes in the organization and improve productivity when well combined with work management systems.

The article by Hamdani (2024) is an empirical study that evaluates the influence of remote work on the productivity of employees with the moderating effect of artificial intelligence tools in the digital marketing industry in Pakistan. The research design adopted a qualitative study that utilized semi-structured interviews on professionals that operate remotely in digital marketing organizations. The results showed that the arrangements of remote work played a significant role in contributing to the productivity of employees, and the use of artificial intelligence, including automation platforms and digital analytics systems, assisted employees in managing their tasks more effectively. Notably, the researchers discovered that AI technologies mediated the association between the remote work practices and the productivity of employees, allowing employees to plan tasks, schedule, and retain a higher level of productivity. The study concluded that the implementation of digital technologies increases the efficiency of the contemporary working practice and boosts the productivity of the employees in the technologically motivated working conditions.

Hypothesis IV: Technology adoption has significant moderating effect on the relationship between work scheduling practices and employee productivity.

2.8 Conceptual Framework

A conceptual framework is a set of elements or ideas that are essential to understanding a certain area of research. Drawing from the existing literature, a conceptual model was formulated to demonstrate how technology adoption served as moderating factor between work scheduling practices and employee productivity.

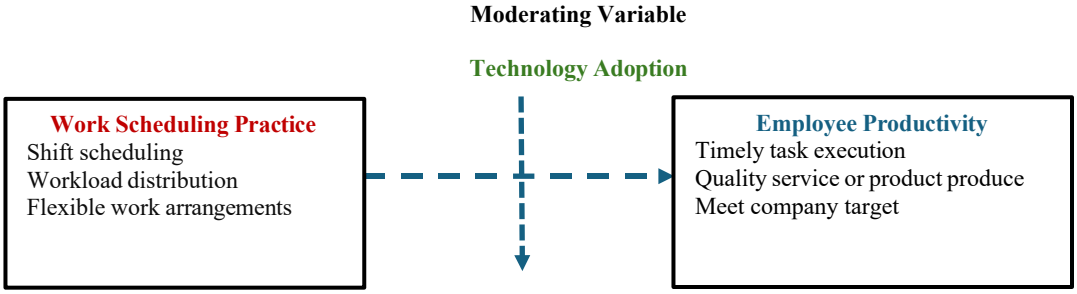

Figure 1 Conceptual Framework

2.9 Theoretical Framework

The study is anchored on both the Spillover Theory and the Technology Acceptance Model (TAM).

Spillover Theory

The Spillover Theory was first introduced by Piotrkowski in 1979 and focuses on the interaction between work and family life. The theory emphasizes that employees' productivity, job satisfaction, and retention are influenced by the balance between work-related and family-related responsibilities. It posits that stress or issues in one domain work or family can spill over into the other, potentially affecting overall well-being and performance (Zhou et al., 2019). Effective management of family-related stress is therefore essential to prevent negative spillover that may impair either work or home life.

Barongo (2025) expanded the theory by highlighting additional factors such as employee attitudes, stress, and emotions, underscoring the importance of managing these elements while maintaining a healthy work-life balance. The theory suggests that social and personal factors significantly influence an employee's efficiency and effectiveness at work. It is particularly relevant to understanding how flexible work arrangements can improve performance, as it supports the idea that employees perform better when they can balance work and family responsibilities.

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), developed by Fred Davis in 1986 and formally published in 1989, is a widely recognized theory for explaining individuals' acceptance and use of technology. The model was derived from the Theory of Reasoned Action (TRA) and posits that technology adoption is primarily influenced by two factors: perceived usefulness and perceived ease of use. Perceived usefulness refers to the extent to which an individual believes that a technology will enhance job performance, while perceived ease of use relates to the degree to which the technology can be used with minimal effort. According to TAM, these perceptions shape users' attitudes toward technology, influence their behavioral intentions, and ultimately determine actual usage. The model assumes that individuals make rational decisions regarding technology adoption by evaluating its usefulness and ease of use. It further assumes that positive attitudes toward technology increase users' intentions to adopt it and that behavioral intention is a strong predictor of actual technology usage. Additionally, external factors such as training, organizational support, and technological infrastructure indirectly influence adoption through their effects on perceived usefulness and perceived ease of use.

TAM has received considerable support from scholars. For instance, Venkatesh and Davis (2000) extended the model through TAM2, while Venkatesh et al. (2003) incorporated TAM into the Unified Theory of Acceptance and Use of Technology (UTAUT). Similarly, King and He (2006) and Marangunić and Granić (2015) confirmed the model's strong predictive ability and continued relevance across various technological contexts. Despite its popularity, TAM has been criticized for oversimplifying technology adoption by focusing mainly on perceived usefulness and perceived ease of use while paying limited attention to organizational, social, and individual factors. Critics also argue that the model is more effective in explaining initial technology adoption than long-term usage behavior. These limitations led to the development of advanced versions such as TAM2, TAM3, and UTAUT. The relevance of TAM to this study lies in its ability to explain how employees' acceptance of technology influences the effectiveness of work scheduling practices and employee productivity in manufacturing firms. Since technology adoption serves as a moderating variable, the model provides a useful framework for understanding how employees' perceptions of scheduling technologies affect their utilization. When employees perceive scheduling technologies as useful and easy to use, they are more likely to adopt them, thereby enhancing coordination, reducing scheduling conflicts, improving operational efficiency, and increasing productivity. Consequently, TAM offers a strong theoretical foundation for explaining the moderating role of technology adoption in the relationship between work scheduling practices and employee productivity.

2.10 Empirical Review

Barongo (2025) explored how flexible work schedules affect employee performance within the public sector with specific reference to universities within the coastal region of Kenya. The research design used was descriptive study and the qualitative data used was taken in the form of structured questionnaires that were distributed to the academic staff. Since the respondents were very few, a census sampling technique was employed. It was found that flexible working hours are appreciated by the employees with most of them identifying them as a key motivator. The researchers concluded that the introduction of flexible work schedules in the universities is the key to improving the performance of employees.

Reddy, (2025) investigated the relationship between work schedules and productivity of employees. Based on the quantitative and qualitative data obtained regarding employees in the IT, healthcare, and manufacturing industries, the study examined the impact of different schedules on output, motivation, job satisfaction and overall well-being. Results showed that, when accompanied by managerial trust and autonomy, flexible working arrangements and remote working are likely to improve productivity. The study arrives at a conclusion that scheduling does not have one-size fits-all approaches.

Jerono and Bula (2025) examined how employee productivity is affected by compressed work schedules and based the study on the Demand Control Model as the theoretical basis of the research. A descriptive research design was taken. Target population comprised 300 personnel who have been pulled across all County Pension Fund Financial Services activities as reported by the Human Resource department. The sampling method used in the study was stratified random sampling in which the population was stratified into homogeneous groups and simple random sampling was applied to select proportional samples in each stratum. The sample size of 171 participants was obtained using the statistical formula by Yamane. The primary data were to be gathered using a standardized questionnaire and analyzed using Statistical Package of Social Sciences (SPSS), version 29. The methods of analysis were descriptive statistics and multiple regression analysis. Frequency tables were used to present the results. The findings revealed the strongest correlation between employee productivity and the use of compressed work schedules and the least correlation between employee production and the use of part time arrangements. It was found that compressed work schedules can produce a great impact on the productivity of employees at the County Pension Fund Financial Services.

Olakpa and Adebusuyi (2025) analyzed how the digital transformation affected the productivity of the manufacturing industry staff in Nigeria It was also found out that digital systems have increased the level of productivity of the staff over the years but their efficiency is dependent upon enabling conditions like power supply that is reliable and internet that is stable. The research was able to conclude that manufacturing companies need to be strategic in their approach to digital transformation in order to improve their performance, gain competitive advantage, and become more sustainable by tackling major initiatives in phases and with priority.

Hossain (2023) has performed the capacity analysis to explore the aspects that influence the scheduling of workforce and employee productivity by considering BurgerFi Glenview. The research questions covered in the study were; the effect of workforce scheduling on employee productivity, the most important factors that influence workforce scheduling and productivity, and how organizations can maximize the workforce scheduling to enhance employee productivity. The study was a mixed-method study encompassing both quantitative and qualitative data of 20 employees by use of surveys and interview. The results offered significant information on how effective workforce scheduling practices can be established and implemented to improve employee productivity.

■ 3.0 METHODOLOGY

The research design adopted in the study was a quantitative research design to study the work scheduling and productivity of employees. Wolman and Kruger (2004) referred to quantitative research design as a method of gathering and interpreting data of the participants in numerical terms. In particular, a descriptive survey design was used in this study. As Leedy and Ormrod (2001) mention, a descriptive survey design is intended to describe and gather detailed information on an existent phenomenon and investigate any meaningful relation between two or more variables.

The study population is the staff of Nestle Nigeria PLC. Nestle Nigeria PLC is a major food and beverage company that has been in operation since the year 1961 and has more than 2,500 employees working directly with the company with the main emphasis on manufacturing, marketing, and distribution of such brands as Maggi, Milo, and Nescafé. The working power was 2,592 employees as of December, 2025, working on three manufacturing facilities, numerous branch offices, and the headquarters is in Lagos (PitchBook, 2026). The target group includes the permanent and contract employees of Nestle Nigeria Plc. Lagos, Nigeria. The instrument that was employed in the collection of primary data in this research was the self-designed questionnaire. All the questions were responded to using a five-pointer scale that went to 5=Strongly agree and 1=Strongly disagree. It was made up of five parts. Section A will entail demographic details of the respondents. Questions on the shift scheduling, workload distribution, flexible work arrangements, technology adoption and employee productivity are in Section B-E.

In calculating a suitable sample size to be used in effective distribution of questionnaires, the Taro Yamane statistical formula was used. This is a systematic way of calculating the sample size considering the entire population, which guarantees reliability and precision of the study.

$$S = \frac{N}{1 + N(e)^2}$$

Where; N = Population
S = Sample Size

e = Error term (0.05)
1 = Constant

$$S = \frac{2592}{1 + 2592\ (0.05)^2}$$

$$S = \frac{2592}{1 + 2592\ (0.0025)}$$

$$S = \frac{2592}{1 + 6.48}$$

$$S = \frac{2592}{7.48}$$

S =346.52 Approximately 347.

This study took cognizance of two types of internal validity: content and construct validity. Content validity was achieved by evaluating the face validity of the instrument through expert opinions and the academic knowledge from two professionals in the field of marketing and Management. The second type of content validity was attained by aligning all the study's constructs and objectives with the research instrument. Construct validity was guaranteed in this study by adapting instruments developed by experts in the field of study. Reliability was evaluated using the Cronbach's Alpha coefficient, which resulted in a value of 0.78, demonstrating that the measurement items have an acceptable level of internal consistency.

This study covered employees with diverse socio-demographic characteristics, including gender, age, educational level, and marital status. The study employed structural equation model (SEM) to examine the relationship between work scheduling practices and employee productivity, and the hypotheses. The model is expressed as follows:

$Y= \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + ẹ$
Where:
Y = Employee Productivity (EP)
α = Constant Term
β = Beta coefficients
X1= Shift Scheduling (SS)
X2 = Workload Distribution (WD)
X3 = Flexible Work Arrangements (FWA)
X4= Technology Adoption (TA)
ẹ = Error Term
Where:

SS =		Shift Scheduling
WD	=	Workload Distribution
FWA	=	Flexible Work Arrangements
TA	=	Technology Adoption (Moderating Variable)
EP	=	Employee Productivity (Dependent Variable)
TEC	=	Technology as a Moderator

■ 4.0 RESULTS

4.1 Hypothesis I: Shift scheduling has significant effect on employee productivity in Nestle Nigeria PLC

Table 1 Significant effect of shift scheduling on employee productivity

Items	Mean	Standard deviation	Test statistic	R-Square	p value
EP 1	4.205	1.157	7.954		0.002
EP 2	4.406	1.190	12.647		0.001
EP 3	4.303	0.638	6.281		0.000
EP 4	3.899	1.040	6.333	0.534	0.000
EP 5	4.398	0.489	11.050		0.004
EP 6	3.199	1.244	1.761		0.003
EP 7	3.997	1.185	5.534		0.000
SS 1	4.501	0.500	10.125		0.000
SS 2	4.403	0.491	10.949		0.002
SS 3	3.602	0.798	4.820		0.001
SS 4	3.902	1.135	4.037		0.001
SS 5	4.196	0.599	7.673		0.000
SS 6	4.193	1.252	8.125		0.003

The table1, presents the descriptive and inferential statistics for items measuring employee productivity (EP) and work scheduling practices (SS). The mean scores for employee productivity range from 3.199 to 4.406, indicating that respondents generally agreed that work scheduling practices influence their productivity. EP2 recorded the highest mean (4.406), while EP6 had the lowest (3.199), suggesting varying levels of agreement among respondents. The standard deviation values show moderate variability in responses. Similarly, the work scheduling items recorded mean values ranging from 3.602 to 4.501, indicating that employees generally perceive scheduling practices in the organization positively. SS1 had the highest mean (4.501), suggesting strong agreement that scheduling practices are well structured. The test statistics values are relatively high and all p-values are below 0.05, indicating that the responses are statistically significant. The R-square value of 0.534 implies that 53.4% of the variation in employee productivity is explained by work scheduling practices, suggesting that effective scheduling significantly improves employee productivity in manufacturing firms.

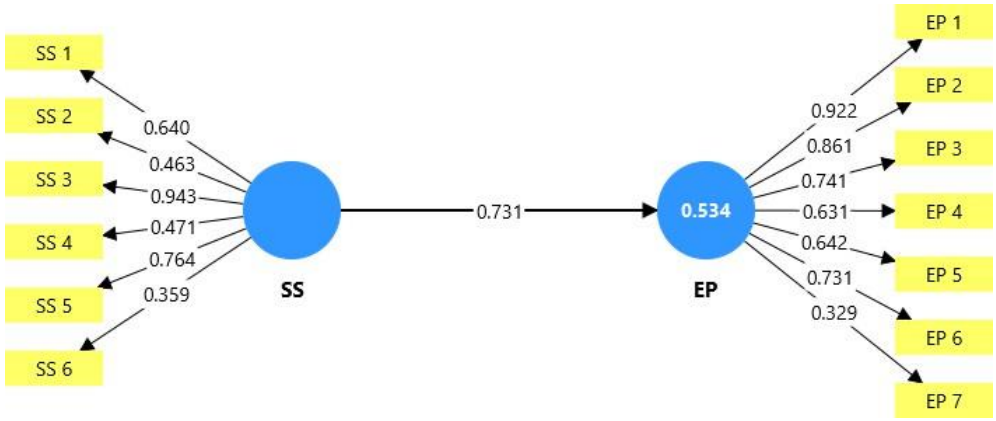

Figure 2 Structural model of Significant effect of shift scheduling on employee productivity

Figure 1 presents the structural model showing the effect of shift scheduling (SS) on employee productivity (EP). The model indicates a strong positive relationship, with a path coefficient of 0.731, implying that improved shift scheduling practices significantly enhance employee productivity. The R-square value of 0.534 shows that 53.4% of the variation in employee productivity is explained by shift scheduling, indicating a moderate explanatory power of the model. The factor loadings for shift scheduling indicators (SS1–SS6) range from 0.359 to 0.943, while those for employee productivity indicators (EP1–EP7) range from 0.329 to 0.922, suggesting that the indicators adequately measure the constructs. Overall, the figure confirms that effective shift scheduling significantly improves employee productivity in manufacturing firms.

4.2 Hypothesis II: Workload distribution has significant effect on employee productivity

Table 2 Significant effect of workload distribution on employee productivity

	Mean	Standard deviation	Test statistic	R-Square	p value
EP 1	4.205	1.157	7.954		0.000
EP 2	4.406	1.190	12.647	0.691	0.002
EP 3	4.303	0.638	6.281		0.003
EP 4	3.899	1.040	6.333		0.003
EP 5	4.398	0.489	11.050		0.001
EP 6	3.199	1.244	1.761		0.000
EP 7	3.997	1.185	5.534		0.000
WD 1	4.403	0.910	8.184		0.000
WD 2	4.199	0.399	17.829		0.003
WD 3	3.795	0.749	10.839		0.004
WD 4	3.594	0.914	3.297		0.000
WD 5	3.697	1.009	5.020		0.000
WD 6	4.303	1.000	7.804		0.002

Table 2 shows the effect of workload distribution (WD) on employee productivity (EP). The mean scores for employee productivity range from 3.199 to 4.406, indicating that respondents generally agreed that workload distribution influences their productivity. EP2 recorded the highest mean (4.406), while EP6 had the lowest (3.199). Similarly, the workload distribution items recorded mean values ranging from 3.594 to 4.403, suggesting that employees perceive workload allocation in the organization to be fairly effective. The R-square value of

0.691 indicates that 69.1% of the variation in employee productivity is explained by workload distribution. Since all p-values are below 0.05, the results are statistically significant, showing that workload distribution has a significant positive effect on employee productivity.

Figure 2 Structural model of significant effect of workload distribution on employee productivity

Figure 2 presents the structural model result showing the relationship between Workload Distribution (WD) and Employee Productivity (EP). The path coefficient from WD to EP is β = -0.831, indicating a strong negative relationship between the two constructs. This implies that changes in workload distribution are associated with substantial changes in employee productivity. Specifically, an increase in uneven or poorly managed workload distribution tends to result in a decrease in employee productivity, while an effective and balanced workload distribution is likely to enhance productivity. The model also shows an R^2 value of 0.691 for Employee Productivity. This indicates that approximately 69.1% of the variation in employee productivity is explained by workload distribution, while the remaining 30.9% is attributable to other factors not included in the model. The R^2 value suggests a substantial explanatory power of the predictor variable.

Regarding the measurement indicators, Workload Distribution is represented by six items (WD1–WD6), while Employee Productivity is measured by seven items (EP1–EP7). Most of the indicator loadings for Employee Productivity are above the recommended threshold of 0.50, with values ranging from 0.499 to 0.957, indicating that the indicators adequately measure the construct. Similarly, some workload distribution indicators show strong loadings, although a few exhibit relatively low or negative loadings, suggesting varying contributions of the indicators to the construct. Based on the magnitude of the path coefficient (β = -0.831) and the substantial proportion of variance explained (R^2 = 0.691), the model suggests that workload distribution exerts a considerable influence on employee productivity. Therefore, if the corresponding bootstrapping results show a statistically significant p-value ($p < 0.05$), the null hypothesis stating that "Workload distribution has no significant effect on employee productivity" would be rejected, and the alternative hypothesis accepted. In the context of the study, effective workload distribution is crucial for enhancing employee productivity. Manufacturing firms that allocate tasks fairly, balance workloads among employees, and prevent work overload are more likely to achieve higher levels of employee productivity. Conversely, poor workload distribution may lead to employee fatigue, stress, reduced efficiency, and lower productivity outcomes.

4.3 Hypothesis III: Flexible work arrangements have significant effect on employee productivity

Table 3 Significant effect of flexible work arrangements on employee productivity

Item	Mean	Standard deviation	Test statistic	R-Square	p value
EP 1	4.205	1.157	7.954		0.000
EP 2	4.406	1.190	12.647	0.487	0.000
EP 3	4.303	0.638	6.281		0.000
EP 4	3.899	1.040	6.333		0.000
EP 5	4.398	0.489	11.050		0.000
EP 6	3.199	1.244	1.761		0.000
EP 7	3.997	1.185	5.534		0.000
FWA 1	3.991	1.096	5.662		0.000
FWA 2	4.297	0.457	13.721		0.000
FWA 3	4.398	0.489	11.050		0.000
FWA 4	3.401	1.357	2.140		0.000
FWA 5	4.098	0.946	4.406		0.000
FWA 6	4.101	1.133	6.520		0.000

Table 3 provides both descriptive and inferential insights into the impact of flexible work arrangements (FWA) on employee productivity (EP). The mean scores for employee productivity range from 3.199 to 4.406, reflecting that respondents generally agree that flexible work arrangements positively influence their productivity. Among the indicators, EP2 recorded the highest mean score of 4.406, whereas EP6 had the lowest at 3.199, suggesting some variation in how employees perceive the effects of flexibility on their work output. Similarly, the measures of flexible work arrangements showed mean values between 3.401 and 4.398, indicating an overall positive perception of these practices among employees. Specifically, FWA3 achieved the highest mean of 4.398, while FWA4 recorded the lowest mean of 3.401, highlighting minor differences in employee views regarding specific aspects of flexibility. The R-square value of 0.487 demonstrates that approximately 48.7% of the variation in employee productivity can be attributed to flexible work arrangements. Furthermore, since all associated p-values are below the 0.05 threshold, the findings are statistically significant. This provides strong evidence that flexible work arrangements have a meaningful and significant effect on employee productivity.

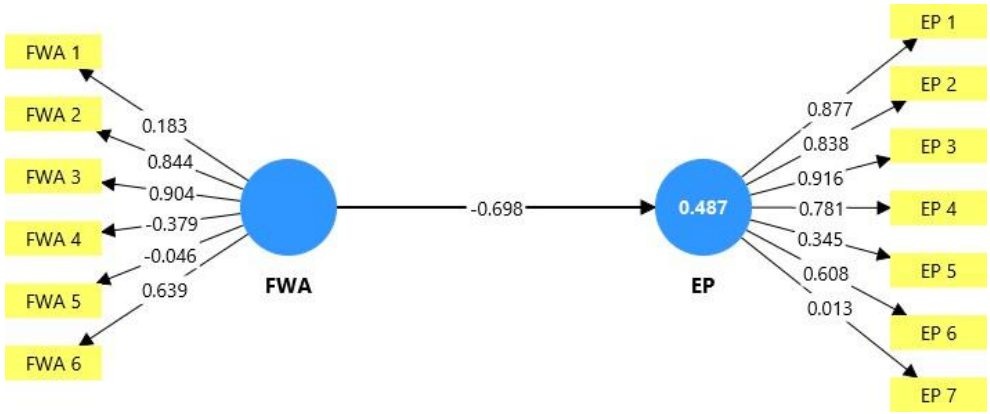

Figure 3 Structural model of Significant effect of flexible work arrangements on employee productivity

Figure 3 presents the structural model illustrating the relationship between Flexible Work Arrangements (FWA) and Employee Productivity (EP). The path coefficient from FWA to EP is β = -0.698, indicating a strong inverse relationship between the two variables. This means that a unit change in flexible work arrangements is associated with a 0.698-unit change in employee productivity in the opposite direction. The negative coefficient suggested that ineffective implementation or poor management of flexible work arrangements could adversely affect employee productivity. The model further shows an R^2 value of 0.487 for Employee Productivity, indicating that 48.7% of the variation in employee productivity is explained by flexible work arrangements, while the remaining 51.3% is accounted for by other factors not included in the model. This suggests that flexible work arrangements have a moderate explanatory power in predicting employee productivity.

The structural path coefficient (β = -0.698) indicates that Flexible Work Arrangements exert a substantial influence on Employee Productivity. Therefore, if the corresponding bootstrapping results reveal a statistically significant p-value ($p < 0.05$), the study would conclude that flexible work arrangements significantly affect employee productivity. In such a case, Hypothesis III would be accepted, while the null hypothesis of no significant effect would be rejected. In the context of the study "Work Scheduling Practices and Employee Productivity: Moderating Role of Technology Adoption in Manufacturing Firms," the result suggests that flexible work arrangements constitute an important component of work scheduling practices and significantly influence employee productivity. Organizations that carefully design and implement flexible work arrangements may improve employee satisfaction, work-life balance, and performance outcomes. However, where flexibility is poorly coordinated or inadequately monitored, it may create challenges that negatively affect productivity. Consequently, manufacturing firms should establish effective policies and technological support systems to maximize the benefits of flexible work arrangements and enhance employee productivity.

4.4 Hypothesis IV: Technology adoption has significant moderating effect on the relationship between work scheduling practices and employee productivity

Table 4 Significant moderating effect of Technology adoption on the relationship between work scheduling practices and employee productivity

	Mean	Standard deviation	Test statistic	R-Square	p value
EP 1	4.205	1.157	7.954	0.786	0.000
EP 2	4.406	1.190	12.647		0.000
EP 3	4.303	0.638	6.281		0.000
EP 4	3.899	1.040	6.333		0.000
EP 5	4.398	0.489	11.050		0.000
EP 6	3.199	1.244	1.761		0.000
EP 7	3.997	1.185	5.534		0.000

SS 1	4.501	0.500	10.125		0.000
SS 2	4.403	0.491	10.949		0.000
SS 3	3.602	0.798	4.820		0.000
SS 4	3.902	1.135	4.037		0.000
SS 5	4.196	0.599	7.673		0.000
SS 6	4.193	1.252	8.125		0.000
TA 1	3.804	1.075	3.932	0.395	0.000
TA 2	4.599	0.490	10.999		0.000
TA 3	4.902	0.297	23.338		0.000
TA 4	4.401	0.490	10.999		0.000
TA 5	4.401	0.799	8.060		0.000
TA 6	4.398	0.489	11.050		0.000
TA 7	4.700	0.458	13.622		0.000

Table 4 presents the descriptive and inferential statistics on the moderating effect of technology adoption (TA) on the relationship between work scheduling practices (SS) and employee productivity (EP). The mean scores for employee productivity items range from 3.199 to 4.406, indicating that employees generally agree that their productivity is influenced by work scheduling practices, especially when technology is adopted. EP2 recorded the highest mean (4.406), while EP6 had the lowest (3.199), reflecting some variation in responses. The R-square value of 0.786 for EP suggests that 78.6% of the variation in employee productivity is explained by the combined effect of work scheduling practices and technology adoption, indicating a strong explanatory power. The work scheduling items (SS1–SS6) have mean scores ranging from 3.602 to 4.501, suggesting that employees perceive scheduling practices positively. Similarly, the technology adoption indicators (TA1–TA7) have high mean scores ranging from 3.804 to 4.902, indicating strong adoption of technology in the organization. TA3 recorded the highest mean (4.902), showing that employees perceive certain technological tools as highly effective in supporting work scheduling.

All p-values are below 0.05, indicating that the effects are statistically significant. The R-square value for TA (0.395) indicates that technology adoption explains 39.5% of its variability. Overall, the table demonstrates that technology adoption significantly strengthens the effect of work scheduling practices on employee productivity, highlighting the important moderating role of technology in enhancing productivity at Nestlé Nigeria PLC.

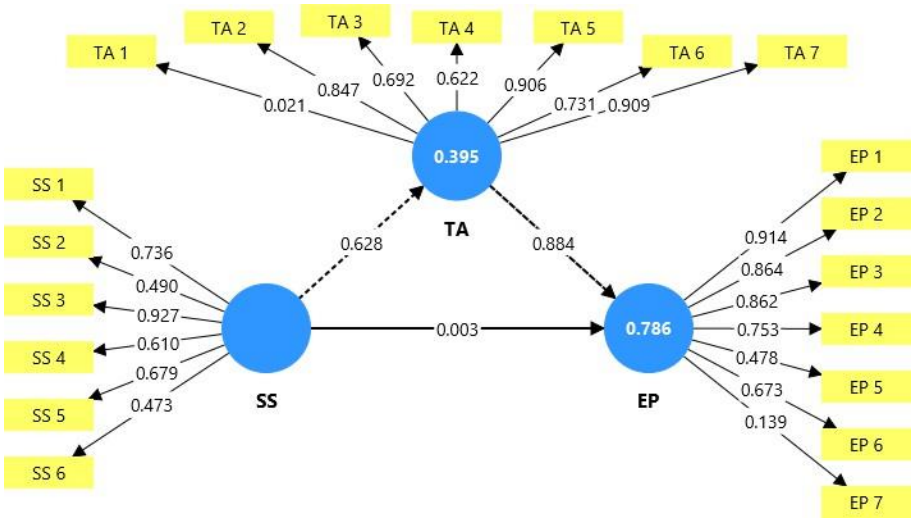

Figure 4 Structural model of significant moderating effect of Technology adoption on the relationship between work scheduling practices and employee productivity

Figure 4 presents the structural model showing the moderating effect of technology adoption on the relationship between work scheduling practices and employee productivity in Nestlé Nigeria Plc. The direct path between work scheduling practices and employee productivity is very weak (β = 0.003), indicating that work scheduling practices alone have little influence on employee productivity. However, work scheduling practices significantly influence technology adoption (β = 0.628), and technology adoption strongly affects employee productivity (β = 0.884). This suggests that technology adoption strengthens the effectiveness of work scheduling practices in improving productivity. The model also shows that work scheduling practices explain 39.5% of the variance in technology adoption (R^2 = 0.395), while the combined effect of work scheduling practices and technology adoption explains 78.6% of the variance in employee productivity (R^2 = 0.786). Overall, the results indicate that technology adoption plays a significant moderating role in enhancing the relationship between work scheduling practices and employee productivity.

■ 5.0 DISCUSSION

This research result suggests that work scheduling, workload distribution, and flexible work arrangements have a significant impact on the productivity of employees in Nestle Nigeria Plc with technology adoption being a critical moderator. Comparative study of the shift schedules (Table 1; Figure 1) indicate that the schedule is highly correlated with employee productivity based on the path coefficient of 0.731 and an R^2 of 0.534. This implies that the shift scheduling practices solely account for more than 53% of the change in productivity. These practices are largely viewed favorably among employees, the mean scores of such items like SS1 and EP2 being higher. These results correlate with the recent studies that state that structured shift system enhances the continuity of operations, fatigue rates, and worker engagement, which leads to increased productivity (Wilson et al., 2024).

The impact of workload distribution on productivity seems to be greater, with an R^2 of 0.691 (Table 2). This indicates that the allocation of tasks can explain almost 70% of the difference in the productivity of employees. Workload allocation is viewed to be reasonably fair since employees rate the mean scores of between 3.594 and 4.403. This advocates the research focusing on the fact that equal and reasonable workload allocation helps to eliminate stress, burnout, and enhance task performance (Lin, et al., 2015).). The productivity is also strongly influenced by the flexible work arrangements (FWAs), but in a moderate degree, and the R2 is 0.487 (Table 3; Figure 3). Mean scores show that employees tend to like flexibility in the working hours, place, and schedules. Flexible work arrangements can help increase productivity, positively affect employee well-being, and make organizations successful by allowing employees to better manage their time and responsibilities (Rastogi, et al., 2015).

Notably, the research points to the mediating effects of technology adoption as contributing to the enhancement of the relationship between the work schedule and productivity (Table 4; Figure 4). Although the direct impact of scheduling on productivity is insignificant, scheduling has a strong impact on technology adoption (2 = 0.628), and this also has a strong impact on productivity (2 = 0.884). The combined R^2 of 0.786 shows that we explain almost 79 percent change in productivity in case of technology adoption. These findings are consistent with the literature that highlights digital tools, including scheduling software, performance monitoring tools, and communication technologies, as improvements to HR practices and efficiency through enhancing coordination, transparency, and control of workflow (Gupta & Singh, 2024). The results show that scheduling, workload distribution, and flexible work arrangements have positive effects on the productivity of the employees but the success of the above-mentioned factors is significantly improved by the adoption of the technology. The purpose of introducing structured scheduling, fair distribution of workload, flexible arrangements, and digital tools should therefore be combined to ensure organizations aim at maximizing productivity.

■ 6.0 CONCLUSION, LIMITATIONS AND FUTURE DIRECTION

This study examined the influence of work scheduling practices, specifically shift scheduling, workload distribution, and flexible work arrangements, on employee productivity in Nestlé Nigeria Plc, while also considering the role of technology adoption in enhancing this relationship. The findings reveal that work scheduling practices significantly influence employee productivity; however, the nature and direction of the relationships depend on the effectiveness of implementation and the organizational context. The results indicate that workload distribution and flexible work arrangements require proper management to ensure that they contribute positively to employee performance, as ineffective allocation of tasks or poorly structured flexibility may negatively affect productivity outcomes. Furthermore, the study highlights the critical role of technology adoption in shaping the effectiveness of work scheduling practices. The findings suggest that technological systems serve as an important mechanism through which scheduling practices influence productivity, as digital tools improve coordination, communication, workforce planning, and operational efficiency. Rather than merely strengthening the relationship, technology adoption provides a pathway through which effective scheduling practices can translate into improved employee productivity. The study concludes that employee productivity in modern manufacturing organizations is determined not only by the design of work scheduling practices but also by the successful integration and acceptance of technology. Therefore, organizations such as Nestlé Nigeria PLC should prioritize efficient scheduling systems, balanced workload allocation, employee-friendly flexible work policies, and investments in user-accepted technological solutions to achieve sustainable workforce efficiency and improved organizational performance.

6.1 Recommendations

In accordance with the results, the following recommendations can be put forward:

i. To improve performance and minimize fatigue, management must make sure that the shift schedules are designed in a way that is fair and dependent on the ability of the employees.
ii. To reduce burnouts and boost productivity in organizations, there should be transparent and balanced task allocation systems.
iii. Employees should be encouraged to work at their own convenience or location because such policies will enhance motivation and job satisfaction.
iv. Digital tools that should be incorporated by firms are scheduling software, workflow management systems, and performance tracking systems.

6.2 Limitations of the Study

There are a few important limitations to this study that need to be considered. One of them is that the research was conducted specifically with employees at Nestlé Nigeria Plc in Lagos, which means the results might not apply to other companies or industries. Another limitation is that the study used a quantitative survey with self-administered questionnaires, which might not fully reflect the true feelings or complex thoughts of the employees. There could also be a response bias, where participants might not answer honestly or in a way that accurately represents their views. Additionally, because this study was cross-sectional, data was collected at one specific time, making it hard to determine if there is a long-term cause-and-effect relationship between work scheduling and employee productivity. Lastly, other important factors that could affect productivity, such as leadership style, company culture, and employee motivation, were not taken into account in this study.

6.3 Future Research Directions

For future research, it would be helpful to look at different organizations in various industries to get a broader understanding of the findings. Researchers could also use a mixed-methods approach, combining both quantitative and qualitative data, to get a richer picture of employees' experiences. Longitudinal studies, which track data over a longer period, could provide better insights into how work scheduling and technology use affect productivity over time. It would also be valuable to include additional factors like leadership style, job satisfaction, and employee engagement in future studies to create a more complete picture of what influences employee productivity.

Acknowledgement

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Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this study. The research was conducted independently and the results were reported objectively without any financial, personal, or institutional influence that could have affected the study's outcomes.

Data availability

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Ethics declaration

Although formal ethical approval was not obtained, the study was conducted in accordance with recognised principles of ethical research and good research practice. Appropriate safeguards were implemented to ensure informed consent, voluntary participation, confidentiality, privacy, and responsible handling of research data.

References

Anderson, K., Thompson, R., & Lee, M. (2023). Global manufacturing trends and employee well-being: A systematic review. *International Journal of Industrial Management*, *45*(4), 10–16.

Avery, C., & Zabel, D. (2001). *The flexible workplace: A sourcebook of information and research*. Quorum Books.

Barongo, Y. S. (2025). Flexible work schedules and employee performance among public universities in Kenya. *Journal of Human Resource and Leadership*, *10*(3), 43–57. https://doi.org/10.47604/jhrl.3579

Beaman, L., BenYishay, A., Magruder, J., & Mobarak, A. M. (2021). Can network theory-based targeting increase technology adoption? *American Economic Review*, *111*(6), 1918–1943. https://doi.org/10.1257/aer.20200295

Berkowsky, R. W., Sharit, J., & Czaja, S. J. (2018). Factors predicting decisions about technology adoption among older adults. *Innovation in Aging*, *1*(3), igy002. https://doi.org/10.1093/geroni/igy002

Davidson, M., & Wong, K. (2024). Employee turnover patterns in shift-based manufacturing industries. *The International Journal of Human Resource Management*, *35*(10), 45–67.

Davis, F. D., & Venkatesh, V. (1996). A critical assessment of potential measurement biases in the technology acceptance model: Three experiments. *International Journal of Human-Computer Studies*, *45*(1), 19–45. https://doi.org/10.1006/ijhc.1996.0040

Dex, S., & Smith, C. (2002). *The nature and pattern of family-friendly employment policies in Britain*. Policy Press.

Dunmade, E. O., Aderibigbe, A. S., Asa, K. J., & Obadare, G. O. (2024). Impact of working environment on the employees' performance in the Nigerian manufacturing industry. *Bahria University Journal of Management & Technology*, *7*(1).

Fu, Y., Kok, R. A. W., Dankbaar, B., Ligthart, P. E. M., & van Riel, A. C. R. (2018). Factors affecting sustainable process technology adoption: A systematic literature review. *Journal of Cleaner Production*, *205*, 226–251. https://doi.org/10.1016/j.jclepro.2018.08.268

Galea, C., Houkes, I., & de Rijk, A. (2014). An insider's point of view: How a system of flexible working hours helps employees to strike a proper balance between work and personal life. *The International Journal of Human Resource Management*, *25*(8), 1090–1111. https://doi.org/10.1080/09585192.2013.816862

Glass, J. L., & Finley, A. (2002). Coverage and effectiveness of family-responsive workplace policies. *Human Resource Management Review*, *12*(3), 313–337. https://doi.org/10.1016/S1053-4822(02)00063-3

Gomathy, C. K., Aparrajit, R., Vishnu, J., & Rangaprasad, S. V. (2022). The effects of stress on employees' productivity in service industry. *International Journal of Scientific Research in Engineering and Management*, *6*(4). https://doi.org/10.55041/IJSREM11786

Gupta, K., & Singh, N. (2026). Greenwashing perception and attitude-intention relationship towards green products purchase: A mediating model. *Environment, Development and Sustainability*, *28*(6), 13765–13788. https://doi.org/10.1007/s10668-024-05486-5

Hamdani, S. A. S. (2024). The impact of remote work on employee productivity with moderating role of AI tools: Insights from the digital marketing sector of Pakistan. *Graduate Journal of Pakistan Review*, *4*(2), 142–168.
Hassan, R., & Chen, K. (2024). Shift work adaptation in Southeast Asian manufacturing: A regional analysis. *Asian Journal of Management*, *15*(10), 19–24.
Hill, C. W. L., Jones, G. R., & Schilling, M. A. (2014). *Strategic management: Theory: An integrated approach*. Cengage Learning.
Holovchenko, S. (2024). The impact of flexible work schedules on employee productivity in the modern business environment. *Economics and Business Management*, *15*(4), 47–64. https://doi.org/10.31548/economics/4.2024.47
Hossain, M. I. (2023). Capacity analysis: Considering factors affecting workforce scheduling and employee productivity. *World Wide Journal of Multidisciplinary Research and Development*, *9*(8), 42–49.
Idowu, S. A. (2014). *Impact of flexible working hours on employee performance, work life conflict and work pressure* [Unpublished master's thesis]. University of Lagos.
Idowu, S. A. (2019). Impact of leadership styles on employees' work performance in some South-Western Nigerian private universities. *Economic Insights – Trends and Challenges*, *8*(71), 27–46.
Idowu, S. A. (2020). Role of flexible working hours' arrangement on employee job performance and retention in manufacturing industries in Agbara, Nigeria. *Economic Insights – Trends and Challenges*, *9*(3), 23–37.
Jerono, C., & Bula, H. (2025). Effect of compressed work schedule on employee productivity in County Pension Fund Financial Services. *The Strategic Journal of Business & Change Management*, *12*(1), 148–156. https://doi.org/10.61426/sjbcm.v12i1.3176
Kandie, D., & Kipkelwon, S. K. (2022). Effect of work planning on employee performance in private hospitals in Uasin-Gishu County, Kenya. *Journal of Policy and Development Studies*, *1*(1), 42–50. https://doi.org/10.51317/jpds.v4i1.252
King, W. R., & He, J. (2006). A meta-analysis of the technology acceptance model. *Information & Management*, *43*(6), 740–755. https://doi.org/10.1016/j.im.2006.05.003
Latip, H. A., Tak, A. H., Rahaman, M. M., & Abdul Kohar, U. H. (2018). Managing work-life-family demands towards job satisfaction among family business entrepreneurs. *International Journal of Academic Research in Business and Social Sciences*, *8*(14), 187–199. https://doi.org/10.6007/IJARBSS/v8-i14/5217
Leedy, P. D., & Ormrod, J. E. (2001). *Practical research: Planning and design* (7th ed.). Merrill Prentice Hall.
Lin, J.-H., Wong, J.-Y., & Ho, C.-H. (2015). The role of work-to-leisure conflict in promoting frontline employees' leisure satisfaction: Examining the job demand-control-support model. *International Journal of Contemporary Hospitality Management*, *27*(7), 1539–1555. https://doi.org/10.1108/IJCHM-03-2014-0155
Marangunić, N., & Granić, A. (2015). Technology acceptance model: A literature review from 1986 to 2013. *Universal Access in the Information Society*, *14*(1), 81–95. https://doi.org/10.1007/s10209-014-0348-1
Martinez, C., & Collins, K. (2023). Defining shift work in the modern manufacturing context: Conceptual evolution and operational implications. *International Journal of Operations Management*, *41*(8), 56–67.
McMaster, F. (2005). How flexible is your workplace? Workplace flexibility—IBM style. *Local Government Manager*, *39*(3), 12–13.
Meilinda, R., Palupiningtyas, D., & Maryani, T. (2024). The influence of the work environment and work stress on employee turnover intention at PT Always Cinta Indonesia Salatiga. *International Journal of Integrated Science and Technology*, *2*(2), 75–86. https://doi.org/10.59890/ijist.v2i2.1426
Mendrofa, I. A., & Palupiningtyas, D. (2025). A study on the effects of shift work management on employee well-being in the manufacturing sector. *Journal of Business Management and Economic Development*, *3*(2), 498–518. https://doi.org/10.59653/jbmed.v3i02.1501
Mhlanga, D., & Ndhlovu, E. (2023). Digital technology adoption in the agriculture sector: Challenges and complexities in Africa. *Human Behavior and Emerging Technologies*, *2023*, 6951879. https://doi.org/10.1155/2023/6951879
Necula, S.-C., Fotache, D., & Rieder, E. (2024). Assessing the impact of artificial intelligence tools on employee productivity: Insights from a comprehensive survey analysis. *Electronics*, *13*(18), 3758. https://doi.org/10.3390/electronics13183758
Nijp, H. H., Beckers, D. G. J., Geurts, S. A. E., Tucker, P., & Kompier, M. A. J. (2012). Systematic review on the association between employee worktime control and work–non-work balance, health and well-being, and job-related outcomes. *Scandinavian Journal of Work, Environment & Health*, *38*(4), 299–313. https://doi.org/10.5271/sjweh.3307
Okechukwu, O. V. (2021). A study of stress management and employee productivity in Nigerian service organizations. *Contemporary Journal of Psychology and Behavioral Science*, *1*(1), 54–67.
Okolocha, C. B. (2025). Stress management and employee productivity in selected manufacturing firms in Awka metropolis. *Noland Research Journal of Economics and Management Studies*, *13*(1), 14–32. https://doi.org/10.5281/zenodo.14931243
Olakpa, E. G., & Adebusuyi, A. T. (2025). Does digital transformation impact staff productivity? Evidence from Nigeria manufacturing sector. *International Journal of Research and Scientific Innovation*, *12*(12), 727–737. https://doi.org/10.51244/IJRSI.2025.12120062
Pamidimukkala, A., Kermanshachi, S., Rosenberger, J. M., & Hladik, G. (2023). Evaluation of barriers to electric vehicle adoption: A study of technological, environmental, financial, and infrastructure factors. *Transportation Research Interdisciplinary Perspectives*, *22*, 100962. https://doi.org/10.1016/j.trip.2023.100962
Ramirez, J., Thompson, K., & Lee, S. (2022). Evolution of shift work models in global manufacturing: A comparative analysis. *Production and Operations Management*, *31*(11), 67–78.
Rastogi, M., Rangnekar, S., & Rastogi, R. (2016). Flexibility as a predictor of work–family enrichment. *Global Journal of Flexible Systems Management*, *17*(1), 5–14. https://doi.org/10.1007/s40171-015-0108-y
Reddy, G. S. (2025). Exploring the link between work schedules and employee productivity. *International Journal of Progressive Research in Engineering Management and Science*, *5*(7), 2191–2195.
Rodriguez, R., Kumar, S., & Taylor, H. (2023). Mental health risk factors in shift workers: A longitudinal assessment. *Journal of Mental Health*, *32*(3), 1–10.
Shaikh, F., Afshan, G., Anwar, R. S., Abbas, Z., & Chana, K. A. (2023). Analyzing the impact of artificial intelligence on employee productivity: The mediating effect of knowledge sharing and well-being. *Asia Pacific Journal of Human Resources*, *61*(4), 794–820. https://doi.org/10.1111/1744-7941.12385
Shittu, W. O., Hassan, S., & Nawaz, M. A. (2018). The nexus between external debt, corruption and economic growth: Evidence from five SSA countries. *African Journal of Economic and Management Studies*, *9*(3), 319–334. https://doi.org/10.1108/AJEMS-07-2017-0171
Sravani, A. (2018). Managing the distribution of employee workload of the hospital staff. *IJRDO - Journal of Business Management*, *4*(1), 33–43. https://doi.org/10.53555/bm.v4i1.1799
Srimarut, T., & Mekhum, W. (2020). The influence of workload and co-worker attitude on job satisfaction among employees of pharmaceutical industry in Bangkok, Thailand: The mediating role of training. *Systematic Reviews in Pharmacy*, *11*(2), 603–611. https://doi.org/10.5530/srp.2020.2.88
Takahashi, K., Muraoka, R., & Otsuka, K. (2020). Technology adoption, impact, and extension in developing countries' agriculture: A review of the recent literature. *Agricultural Economics*, *51*(1), 31–45. https://doi.org/10.1111/agec.12539
Usman, M., & Wan Yusoff, W. Z. (2026). Digital technology adoption and employee productivity in real estate firms: Mediating and moderating effects of technological drivers, barriers, and operational knowledge in North-Central Nigeria. *Mediterranean Journal of Social Sciences*, *17*(1), 92–105. https://doi.org/10.36941/mjss-2026-0075
Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, *46*(2), 186–204. https://doi.org/10.1287/mnsc.46.2.186.11926
Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, *27*(3), 425–478. https://doi.org/10.2307/30036540
Wheatley, D. (2017). Employee satisfaction and use of flexible working arrangements. *Work, Employment and Society*, *31*(4), 567–585. https://doi.org/10.1177/0950017016631447
Widagdo, S., Qibtiyah, M., Rahayu, E., Yuliamir, H., & Palupiningtyas, D. (2022). Hotel employee performance review: The effect of job satisfaction, competence and motivation. *Brilliant International Journal of Management and Tourism*, *2*(2), 111–126. https://doi.org/10.55606/bijmt.v2i2.437
Wilson, J., Thompson, R., & Rodriguez, E. (2024). Systemic approaches to shift work management: Operational efficiency and human sustainability. *Human Factors*, *66*.
Wolman, J., & Kruger, S. (2004). *Research methodology for the business and administrative sciences*. Oxford University Press Southern Africa.
Zhou, Z. E., Meier, L. L., & Spector, P. E. (2019). The spillover effects of coworker, supervisor, and outsider workplace incivility on work-to-family conflict: A weekly diary design. *Journal of Organizational Behavior*, *40*(9–10), 1000–1012. https://doi.org/10.1002/job.2401