

AUTOMATED ATTENDANCE SYSTEM AND EMPLOYEE WORK PERFORMANCE IN OIL AND GAS SECTOR IN RIVERS STATE

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ABSTRACT

This research work is aimed at examining the correlation between automated attendance system and employee work performance of oil and gas sector in Rivers State. Oil and gas sector managers are looking for a strong and reliable means for checking access to their yards by both employees and visitors. Explanatory research design was adopted, the population is 9837, Taro Yemeni was used to determine the sample size and Spareman Rank Order coreelation was used to test the hypotheses, Many oil and gas firms still make use of manual attendance collection to register the names of persons that have gained entrance into their on a daily bases. Hence, this research work proposes face recognition system for its attendance capturing process to avoid or minimize surface contact. This study adopted the explanatory cross-sectional research survey design with data collected at the micro level; data for analysis was gathered from employees of oil and Gas sector in Rivers State, Nigeria. Creating a good automated attendance system with adequate investment from the government would be of benefit to oil and gas companies in remedying security threats and also in ensuring efficiency and accountability in production processes.

Keywords: Automated Attendance System, Employee Work Performance, Oil and Gas Sector

INTRODUCTION

The dependence on oil and gas in Nigeria as a major source of revenue and contribution to the nations GDP and also the rising rate of insecurity in Nigeria has prompted the oil and gas companies in Rivers State to lookout for ways to keep their companies secured and also maintaining high performance (Onyeizugbe, Lilian & Ike 2016). This necessitated the study to determine how biometric attendance system relates to employee work performance of oil and gas companies in Rivers.

According to Tanko (2021), Nigeria is faced with an unprecedented wave of different but overlapping security crises. Oil and gas sector managers are looking for a strong and reliable means for checking access to their yards by both employees and visitors. Many oil and gas firms still make use of manual attendance collection to register the names of persons that have gained entrance into their on a daily bases. This manual practice can be manipulated by both employees and visitors who want to play fast by taking advantage of the possible loop holes they can explore when they find a reason to. This does not only pose a security threat to such work environment it also gives employees room to be absent from work without management notice. This negatively affects work attitudes of the employees and would also reflect in their performance. Hence a more reliable and efficient remedy is needed to keep a more trustworthy recording for employee attendance.

Secondly, workers might be short paid or over paid when the employee work schedule attendance system is faulty. If a more efficient time check system is not put in place, many employees could work overtime that would not be correctly accounted (Rhaman, 2018). Also employees could argue to be paid for the days they were obviously absent at work. The oil and gas sector is a very sensitive sector where employees are paid for work done, especially the field workers. This would require a systematic and reliable process for calculation that would minimize human error to the barest (Bhandari & Shukla, 2019).

In Nigeria, most oil companies have begun the use of biometrics in their operational bases. The expected findings of this research will answer questions on; has the use of biometric attendance system improved on the productivity of the oil and gas sector in Rivers State? What are the areas of challenge management of oil and gas sector in Rivers State could face haven adopted the use of biometrics for time attendance collection? Can there be improvement in technology that would be more efficient in biometric use in Rivers State? As this would guide this study to proffer solution and give recommendations accordingly. Another problem that has necessitated this research work is the dreaded corona virus that is currently plaguing the world. Hence, this research work proposes face recognition system for its attendance capturing process to avoid or minimize surface contact. Also, not enough research has been done in this topic as it concerns biometric attendance system and employee performance in the oil and gas sector in Nigeria. This work tends to add to the body of knowledge in this area.

RESEARCH HYPOTHESES

- Ho₁ There is no significant correlation between automated attendance and employee engagement of oil and gas sector in Rivers State
- Ho₂ There is no significant correlation between automated attendance and workforce planning practice of oil and gas sector in Rivers State
- Ho₃ There is no significant correlation between automated attendance and time utilization of oil and gas sector in Rivers State

Automated attendance

Traditional way of entering attendance involves a typical situation of employees entering their names on a given attendance register book. The attendance is usually entered using hard resources - pen and paper. The huge attendance records that maintained are then used for later references. This makes it difficult to track the day employee came to work, the time he got to the office and the actual time he left the office. In order to reduce manual entry and hard resources, with less time consumption, attendance system is transforming into a biometric application for an efficient task of employees entering their attendance into a easy to use database with no time constraint using fingerprint or face recognition methods (Shirke, et al., 2019). Various research works had been attempted in developing an automated attendance system using biometric traits in recent years. One of such research is that of Rathod et al., (2017). Their research work is titled, automated attendance system using machine learning approach. Automated systems involving use of biometrics like fingerprint and iris recognition are well developed in the recent years however, it is intrusive and cost required for deployment on large scale gets increased substantially. To overcome these issues, biometric feature like facial recognition can be used which involves the phases such as image acquisition, face detection, feature extraction, face classification, face recognition and eventually marking the attendance.

In another research work by Shrivastava et al., (2018), a method for an automated biometric system is proposed. The researchers proposes a sound and secure system for automation of attendance system by the integration of the face recognition technology by using Haar-cascade classifiers to detect faces and Linear Binary Pattern Histogram machine learning algorithm for face identification. The attendance is automatically updated in an attendance log in the attendance record database. The proposed system in this paper also tackles issues that arise in building face recognition system, some of which are information retrieval time, image properties such as size, quality and intensity settings, and orientations of faces, by using a sufficient and accurate training dataset, pre-processing techniques and Haar-cascade classifiers. Another issue with face recognition systems arises during recognition of two faces with similar features where the probability of occurrence of false result is relatively high.

CONCEPT OF EMPLOYEE WORK PERFORMANCE

Individual performance is of high relevance for organizations and individuals alike. Showing high performance when accomplishing tasks results in satisfaction, feelings of self efficacy and mastery. Performance is an output of using the right procedures and following the best practices in doing a particular job.

Employers in different industries have consistently sourced for ways to get the best out of an employee as it has always been a major challenge an employer face in today's competitive environment. These, can be linked to the constantly changing work environment where new methods, skills and policies are necessary to be introduced to the employees. According to Inuwa, Mashi and Salisu (2017), an employee is most dynamic and unpredictable aspect of business resources. It has therefore become imperative for organizations to realize the significance of an employee and also the device strategic means through which an employee can be influenced in order to develop positive job attitudes that can lead to higher performance. Performance level of an employed individual has constantly been a tasking challenge in management of an organization, devising operational methods to motivate an individual employee to succeed and deliver qualitative employee work performance as well as surge the organizational competency level is the central objective of the organization (Inuwa, et al, *ibid*).

Taking a view at the research work of Madukoma and Opeke (2013), it can be deduced that use of information/communication had positive relationship with employee work performance. There is need for a systematic use of information to perform the work and evaluate the performance of an organization by employees including the staff of an institution (Madukoma and Opeke, *ibid*).

Employee work performance linked to individual grounds has strong relationship with cognitive abilities of the individual. Individuals need to have the required mental capacity to carry out certain tasks effectively with the use of the communication resources available and following specified procedures. Cognitive ability refers to qualifications or capacity with respect to mental tasks. In an organizational level, job procedures for task performance can be learned and improved upon. Over time, these explicit knowledge become experience and the employee becomes highly effective and efficient in the job. However, the external environment of the job which can be associated with technology, social and cultural factors, government regulations etc. can influence a need for a change of the conventional procedures. Employees then have to be open, to accept changes in order to perform their specific tasks considering present trends and with a competitive mindset. There are three core performance dimensions, namely proficiency, adaptivity, and proactivity which they classified at three levels (individual, team and organization). Proficiency covers the fulfillment of role requirements that can be formalized, adaptivity refers to the extent of adaptation to changes at the workplace and proactivity describes the extent of self directed action necessary to adapt to changes (Sonnentag, Volmer and Spychala, 2008).

RELATIONSHIP BETWEEN AUTOMATED ATTENDANCE AND EMPLOYEE WORK PERFORMANCE

Ho₁ There is no significant correlation between automated attendance and employee engagement of employees of oil and gas sector in Rivers State.

In many institutions and organization the attendance is a very important factor for various purposes and its one of the important criteria that is to follow for students and organization employees (Saraswat & Kumar, 2010). Traditional way of entering attendance involves a typical situation of employees entering their names on a given attendance register book. The attendance is usually entered using hard resources - pen and paper. The huge attendance records that maintained are then used for later references. This makes it difficult to track the day employee came to work, the time he got to the office and the actual time he left the office. In order to reduce manual entry and hard resources, with less time consumption, attendance system is transforming into a biometric application for an efficient task of employees entering their

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Ho₂ There is no significant correlation between automated attendance and workforce planning of Employees of oil and gas sector in Rivers State.

Workforce planning, also called strategic workforce planning, is about making sure that the right person is in the right job at the right moment. This means that there are not too many people available (overstaffing) nor too few (understaffing). Workforce planning thus solves staffing problems for today and for the future. According to Vulpen (2019), strategic workforce planning is becoming increasingly important for a number of reasons. Which includes; Demographic changes, Cost reduction, Talent management and flexibility in job roles. Brueckar et al (2014) posits that, many managerial studies give an extensive description of the human implications of certain management decisions in particular cases, but fail to provide useful mathematical models to solve workforce planning problems.

Making use of biometrics for automated attendance makes it difficult to track the day employee came to work, the time he got to the office and the actual time he left the office. In order to reduce manual entry and hard resources, with less time consumption, attendance system is transforming into a biometric application for an efficient task of employees entering their attendance into a easy to use database with no time constraint using fingerprint or face recognition methods (Shirke, etal., 2019). Various research works had been attempted in developing an automated attendance system using biometric traits in recent years. One of such research is that of Rathod etal., (2017). Their research work is titled, automated attendance system using machine learning approach. Automated systems involving use of biometrics like fingerprint and iris recognition are well developed in the recent years however, it is intrusive and cost required for deployment on large scale gets increased substantially.

Ho₃ There is no significant correlation between automated attendance and time utilization of employees in oil and gas sector of Rivers State.

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automated attendance system using biometric traits in recent years. One of such research is that of Rathod et al., (2017). Their research work is titled, automated attendance system using machine learning approach. Automated systems involving use of biometrics like fingerprint and iris recognition are well developed in the recent years however, it is intrusive and cost required for deployment on large scale gets increased substantially.

Chaudhari, Devidas, & Surawanshi (2019) in their research work proposed an attendance system that is an attendance using face recognition based on multiple face detection technique. The objective of the project that is being is being understudied is specifically geared towards the implementation of image based face recognition algorithm by using web cam. A research into the aspect of information technology that deals with image detection has broadened the understanding of face detection apps. Chaudhari, Devidas, & Surawanshi (2019) also explains that they have found that there are number of ways for improving upon currently available face authentication systems. In this paper, our purpose is to reduce time consumption, to keep a record & update to students about their attendance is achieved through face recognition system. As such a well developed face detection system for attendance would be very effective and efficient in the management of a work environment. It is possible to estimate automatically whether each employee is present or absent by using face recognition technology with real time tracking technology.

Technology Acceptance Model

Technology Acceptance Model (TAM) is theory majorly in the information system. It focuses on modeling computer users and showing them on how they can accept and adopt a new technology. It was designed to predict the technology adoption decisions of users. Technology Acceptance Model is usually used to predict. It indicates that there are only two components that determine the users' acceptance of a computer system. The two components that determine computer acceptance are the perceived usefulness and the perceived ease of use of the system. The main aim of this model is that it emphasizes the potential of the users. In other words, it underscores, for example, when a developer of a given technology believes that his or her system is friendly to the users. Inversely, the system is not be accepted by the users not unless the developers share the benefits and advantages of the technology system, as stated by

TAM models how users come to accept and use a technology. It distinguishes two concepts. First, the perceived usefulness reflects the expected benefits from using a certain technology. Second, the perceived ease of use reflects pretty much the same thing as the perceived behavioral control in the theory of planned behavior.

Technology acceptance model (TAM) is one of the popular models, which helps to model how peoples come to admit and utilize new technologies. The model focuses on factors determining behavioral intention to use new technologies from the end user's perspective. TAM comprises core variables of user motivation: perceived ease of use, perceived usefulness, and attitudes toward technology. Of these elements, perceived usefulness (PU) and perceived ease of use (PEU) are considered as a principal determinant that directly or indirectly explains the behavioral intention to use ("acceptance") new technology. In this study, we hypothesized that the constructs and associations described in the modified TAM model are valid to measure the behavioral intention to use eHealth technology by health professionals in low-resource settings (Wikipedia, 2021).

Perceived usefulness refers to "the extent to which an individual believes that applying certain technology will advance job performance". Studies conducted on technology acceptance in different domains have suggested that PU as the main determinant factor for new technology acceptance and use. Users perception on the usefulness of a technology could be affected by external factors.

Perceived ease of use is the extent to which a person believes that a particular technology will be effortless and easy to use. PEU is considered as one of the most important constructs of TAM that helps to predict user's acceptance or rejection of technologies.

METHODOLOGY

This chapter explains the research procedures and techniques adopted in carrying out the study. The chapter is discussed under the following subheadings:

RESEARCH DESIGN

This study adopted the explanatory cross-sectional research survey design. This research is at the micro level; data for analysis will be gathered from employees of oil and Gas sector in Rivers State, Nigeria. The target population will be the employees of oil and gas sector in Rivers State Nigeria. The total population of the study will be 9,837 employees of oil and gas companies in Rivers State, Nigeria. In this research work, a non probability sampling technique will be adopted, using the convenience sampling method. This study will adopt the Taro Yamane method for sample size calculation. The total population for the research work is determined by collecting data from sample drawn from the research population. For the purpose of this study, the primary source of data to be used is a structured questionnaire that would be developed in the course of the research. The presentation and analysis of data/results will be done using Statistical Package for Social Science (SPSS) Version 25.0. The analysis of data will be done in two sections: descriptive analysis (univariate analysis) and the test of hypotheses (bivariate analysis). The univariate analysis will be done using mean and standard deviation while the bivariate.

Results

Ho₁ There is no significant correlation between automated attendance and employee engagement of oil and gas sector in Rivers State

Correlations

			Automated Attendance	Employee Engagement
Spearman's rho	Automated Attendance	Correlation Coefficient	1.000	.752**
		Sig. (2-tailed)	.	.000
		N	375	375
	Employee Engagement	Correlation Coefficient	.752**	1.000
		Sig. (2-tailed)	.000	.
		N	375	375

** . Correlation is significant at the 0.01 level (2-tailed).

From the table, the P value of .000 is less than the standard alpha value of 0.05 (p < α). There was a significant positive relationship between Automated Attendance and Employee Engagement. r_s (375) = .000, p < .05.

Ho₂ There is no significant correlation between automated attendance and workforce planning practice of oil and gas sector in Rivers State

Correlations

			Automated Attendance	Workforce Planning
Spearman's rho	Automated Attendance	Correlation Coefficient	1.000	.490**
		Sig. (2-tailed)	.	.038
		N	375	375

Workforce Plannng	Correlation Coefficient	.490**	1.000
	Sig. (2-tailed)	.038	.
	N	375	375

From the table, the P value of .038 is less than the standard alpha value of 0.05 ($p < \alpha$). There was a significant positive relationship between Automated Attendance and Workforce Planning. $r_s(375) = .038, p < .05$.

Ho₃ There is no significant correlation between automated attendance and time utilization of oil and gas sector in Rivers State

Correlations

		Automated Attendance	Time Utilization
Spearman's rho Automated Attendance	Correlation Coefficient	1.000	.461**
	Sig. (2-tailed)	.	.041
	N	375	375
Time Utilization	Correlation Coefficient	.461**	1.000
	Sig. (2-tailed)	.041	.
	N	375	375

From the table, the P value of .041 is less than the standard alpha value of 0.05 ($p < \alpha$). There was a significant positive relationship between Automated Attendance and Time Utilization $r_s(375) = .041, p < .05$.

Discussion of Findings

There was a significant positive relationship between Automated Attendance and Employee Engagement. $r_s(375) = .000, p < .05$. This shows that the null hypothesis of "There is no significant correlation between automated attendance and employee engagement of oil and gas sector in Rivers State" should be rejected, because there is a significantly positive relationship shown from the result of analysis with p value being less than .05. There exist a positive relationship between Automated Attendance and Workforce Planning. $r_s(375) = .038, p < .05$. There was a significant positive relationship between Automated Attendance and Time Utilization $r_s(375) = .041, p < .05$. Though, the relationship between Automated attendance and Time Utilization is weak.

CONCLUSION

This research study is timely as security situation in Nigeria is worsened by the day with the continuous operations of Bandits in the Northern part of the country and fear of agitation from other regions in the country arising from political disagreements. The issue of security in Nigeria has increased to all time high as a result of the sharp rate of inflation that reflects in the hike in food price and general price of goods and services in the country.

The government vested with the responsibility of protecting lives and properties could be more proactive in their approach by ensuring that the oil and gas sector which is a very sensitive part of Nigeria economy is paid reasonable attention so as not to risk shutdown in production activities. Creating a good biometric attendance system with adequate investment from the government would be of benefit to the Nigerian economy. The findings of this research could draw the attention of the Nigerian government to do the needful by inviting very competent and smart information technology experts that can build sophisticated automated attendance system for oil and gas companies especially government owned and managed companies.

Students in tertiary institutions in Bayelsa State and the rest of the world could gain knowledge from the findings of this research work. The entirety of this work is geared towards finding a better way to educate students, passing the required knowledge in a more effective and efficient way, hence this study is very beneficial to students.

RECOMMENDATIONS

1. The use of face recognition automated system. Face recognition is a very safe form of biometric attendance system because it avoids contacts. This becomes important to oil and gas worker with he present trend of the dreaded corona virus disease that is ravaging the world. Every employee would be safer using a biometric system where they would not have to touch or constantly come in contact with the surface of a biometric machine that would leave strains of their body fluids and other bacteria that can lead to disease outbreak. Facial recognition is also easy to use and has been scientifically proven o be very effective. Workers can simply walk through the entry door and simply be captured without any input or effort on the part of the employee.
2. E-generated report for a timely decision making process: this study recommends that the biometric attendance system is enabled to put in gathered data, logically organized to make meaning to users especially human resource managers, accounting department and other top managers in a document format. This makes it possible to have a quick decision making process. Programming the system to deveop an automated report will help the biometric system managing team save time of printing and delivering long list of check in and check outs.
3. Making use of Biometric attendance system to reduce resource wastage: This study recommends the use Biometric attendance system to calculate salaries of oil and gas workers. This will bring about transparency in the calculation of salaries. Especially when it concerns the payment of overtime allowances. In another way, workers who are absent on certain work days would not be paid for days absent. But more importantly, the researcher recommends that biometric attendance system is used for payroll administration to eliminate possibility of fraud from corrupt accountants and workers who will want to manipulate figures to their benefit.
4. Finally, the system recommends that biometrics of visitors be sent to internal security within the company that would enable them easily track down criminal elements that would find their way into the company premises.

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