

**DIGITAL TRANSFORMATION FOR RESHAPING HUMAN RESOURCE MANAGEMENT
OCCUPATIONAL SAFETY AND HEALTH PRACTICE IN OIL AND GAS COMPANIES**

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Abstract

The study investigated digital transformation for reshaping human resource management occupational safety and health practice in oil and gas companies. The objectives of the study are to investigate the impact of digitization on human resource management practice of workplace risks management for occupational safety and health of employees, and to examine how digitalization of human resource management practices strengthen employee's compliance with occupational safety and health policy of oil and gas companies. It adopted descriptive survey research design and quantitative approach for data collection from 82 Human Resource Department personnels and managers from two selected companies using the purposive sampling technique. The study adopted digital innovation and risk perception theories. Data was analyzed in percentage, mean and standard deviation scores on tables. The finding has shown that digitalization has impact on human resource management practice of workplace practice of workplace risks management for occupational safety and health of employees, and that digitalization of human resource management practice strengthens employee's compliance with occupational safety and health policy of oil and gas companies. Based on the findings, the study recommends that management should ensure that digitalization of human resource management practices is effectively integrated for the monitoring and strengthening of employee's compliance with occupational safety and health policy, and that management should digitize risk management practices at the workplace to promote occupational safety and health of employees in oil and gas companies.

Keywords: Digital, Transformation, Human, Resource, Management, Occupational Safety, Health

Introduction

Oil and gas companies need a competent human resource department that is reshaped, having powerful tools that can identify risks in real time, with the capacity to assess and monitor risks, strengthen compliance among employees working with the cognizance of occupational safety and health standards, that can support the rapid control and mitigation of strategies of digitalization in the 21st century. For competence in an era that is marked by new and rapid digital advancement, the human resource (HR) in oil and gas companies must rise to the quest for integrating and adapting to digitalization technology which has become the trending aspect of management tools and practices for an inescapable reality in the oil and gas industry. This digital transformation has been regarded as the "Fourth Industrial Revolution," that has awakened the perception of HR personnel, deeply penetrated into various workplaces, as well as radically reshaping and transforming the way employees work. The term digitalization in this context connotes the integration and adaptation to digital technologies into HR practices as well as in other aspects of oil and gas operations, providing avenues for new possibilities as well as reshaping and transforming existing practices in occupational safety and health in oil and gas firms. Embracing the numerous opportunities provided by digitalization can boost the effective monitoring of occupational safety and health (OSH) compliance and offer tools for efficiency in human resource management (HRM) in handling of occupational safety and health prerogatives in oil and gas operations.

The trends of digital transformations according to (Westermann, Bonnet, & McAfee, 2014) has metamorphosed to vital opportunities in HRM. Therefore, the awareness provided by digitalization technology in HRM becomes crucial for its adaptation in oil and gas work environment, and its strategic relevance can support the safety and health practices in firms that have been reshaped and repositioned to benefit from the digitalized HRM in oil and gas economy (Lengnick-Hall, Nelly, & Stone, 2017). The impact of digitalization on occupational safety and health enhances safety and health modalities, supports in improving the workplace as well as employees working conditions. However, the ILO (2019) posits that digitalization involves the adoption and integration of digital tools, sensors, and wearables that allows real time monitoring, and controlling of workplace risk, hazards detection, and safety of employees and prevention of disease on health matters that are prevalent at the working environment. The use of powerful digitized tools enables immediate detection, and offers rapid intervention tips. To adequately assess, monitor, and manage workplace risk, the integration of digitization of work activities makes it easier to identify workplace hazards, and its management becomes a priority for HRM to strengthen compliance on occupational safety and health standards applicable in oil and gas operational settings.

Embracing digitalization in oil and gas industry without compromising any aspect of occupational safety and health requires strategic steps to strengthen compliance to safety regulations in the risk prone oil and gas exploration and pipeline management systems of multinational oil companies. The HRM and safety professionals must collaborate to provide vital steps that can support comprehensive risk identification, risk assessments, risk monitoring, strengthen compliance, support rapid control, and mitigation strategy. According to EU-OSHA (2018), identifying hazards with digital technologies and powerful tools gives understanding to potential occupational safety and health implications as well as its monitoring. Eurofound (2018) argues that HRM offers targeted training for employees to prepare them on the adoption of digital technology for reshaping and transformation to comply with standards and safety practices. In addition, Eurofound (2018), supports the developing as well as enforcement of clear workplace guidelines that are appropriate in the use of digital technologies that corresponds with organizational standard, values, prospects, and in support of legal regulations. Digitization technology is a powerful force in HRM and safety personnel, with powerful tools to reshape the oil and gas industry. It can sharpen the future of work, redefine the occupational safety and health landscape, and to identify strategies to mitigate disease and hazard at the working environment. Jeske (2020) argues that the adoption of digitalization in occupational safety and health (OSH) in the oil and gas can significantly improve potential risk identification, monitoring, and support rapid strategies for hazard prevention to ensure the safety and well-being of oil and gas company's workforce Digitization implies the application of digital technologies into various business outfits for smoother operations. It provides oil firms and the HRM key transformations in identifying new approaches in occupational safety and health revenue as well as in value-fostering opportunities' (Gartner-Glossary, 2023). In addition, it is a vital trend to changing and reshaping oil and gas work environment to attain to high safety and health work standard, hazard detection, and the utilization of digital tools in occupational safety, health and risk management systems.

New digital technologies in oil and gas sector can support HRM practices, and the workplace in continuous assessing and monitoring of real-time risks for the actualization of safety and health of individuals in hazardous oil and gas working environment as well as updating virtual tools and practices. The digital transformation also encompasses devices for data recording, work modeling, artificial intelligence, as well as typical wireless tools for simulation, data analysis, risk monitoring, and feedbacks on best safety and health practices (Nasirahmadi & Hensel, 2022). The purpose of this technological transformation is to gain strength for compliance to occupational safety and health standards, spontaneous and effective performance of real time tasks, instant recording and processing of work data, as well as for efficient decision-making among HRM personnel Yankın et. al., (2019). Furthermore, it is perceived as a dynamic, and continuous transforming technologies (Demir & Örgütün, 2021). However, it is the technologies that comes with changes in work conditions that consolidates new opportunities for HRM. The effect of digital technologies in

employees work-life as well as corporate life for organizations can enhance changes in work practices. It can accelerate digitalization strategically for organizations to cope with the changes introduced by the integration of new technologies in the ongoing workplace transformation in occupational safety and health HRM practices (Teichert, 2019).

Occupational safety and health (OSH) are a critical purview that needs digitalization of HRM for safeguarding employees' safety, health, and well-being toward enhancing organizational productivity with less incidences of accidents in the oil and gas sector. Integrating digital technology can significantly prevent occupational hazards, accidents, diseases, and mishaps. The adaptation of employees to digital technologies in areas of working with as robots can pose safety and health challenge to the humans in industrial settings. Therefore, working with digital tools and devices such as wearable gears for health, safety, and environmental tracking provide significant solutions. Meanwhile, NIOSH (2019) opines that digital analytics can identify and monitor potential risks, and allows strategic measures that are powerful in mitigating workplace risks common with oil and gas facilities. Eurofound (2018) in a study found that digital technologies facilitated more awareness on OSH transformation by ensuring employees have firsthand knowledge, and are well-equipped and informed in companies by HRM to adhere to health and safety standards at the work environment. Moreso, EU-OSHA (2018) found that digital devices enabled seamless interaction between employee and HR managers in fostering prompt collaboration as well as ensuring the monitoring of safety concerns adequately.

Based on the researches on digital technologies, (Demikhov et. al., 2022) found that healthcare system was integrated with digital technology, and it identified some health risk factors at the workplace. (Prokopenko et al., 2018), also found that digital devices were used to assess and monitor risks that are linked to occupational diseases at the work location (Demikhov et. al., 2022). In a study, found that companies with digital tools utilized the computer-based devices to eliminate certain health risks of employees (Kolesnyk et al., 2022). The transformations ascertained that digitization is a powerful tool for promoting OSH for a safe working environment using the new technologies to strategically to manage potential risks. On this note, the study seeks to review the utilization of digital technology in HRM in consideration of OSH policy of oil and gas companies, as well as identifying the impacts of digital transformations in OSH management systems of oil and gas companies.

Research Objectives

1. To investigate the impact of digitization on Human Resource Management practice of workplace risks management for occupational safety and health of employees in oil and gas companies
2. To examine how digitalization of Human Resource Management practices strengthen employee's compliance with occupational safety and health policy of oil and gas companies.

Research Questions

1. What is the impact of digitization on Human Resource Management practice of workplace risks management for occupational safety and health of employees in oil and gas companies?
2. How does digitalization of Human Resource Management practices strengthen employee's compliance with occupational safety and health policy of oil and gas companies?

Digital Technology and Effective Risks Management in Oil and Gas Companies

The integration and adoption of digital technology strategies in risks management in oil and gas industry is one of the critical measures to mitigate risks and hazards in this digital innovation era. This new innovation provides essential devices that can identify and manage risks in real time. The innovation refers to the utilization of wearable devices or systems such as data glasses, smart watches, articulated sensors, automated computing system that can determine data on workers' performance, as well as the robots that can interface with employees (EU-OSHA, 2023). Several

opportunities in risks management are offered by the tolerance of the technology. Furthermore, oil and gas companies must tune in with digital technology strategies that enhances risks management and ensure occupational safety and health of employees for effective productivity, job satisfaction, as well as complete well-being of individuals. Integrating and adapting digital tools and devices in oil and gas work environment can enable workplace risk monitoring, accident prevention, as well as automating feedbacks and identification of potential risks.

Furthermore, the use of digital technologies in the practice of HRM, and the opportunities it offers in managing risks can transform the oil and gas work locations to low accident area. As digital technology evolves, risks management must be effectively the concern of safety personnel and Human Resource in ensuring the assessing, controlling, and preventing the consequences of risk at the workplace. Meanwhile, digital devices can enable swift responses in identifying potential risks in collaboration with the Human Resource managers and safety personnel (Ekuma, 2024). Furthermore, the transformation necessitates new skills and flexible approaches to risks management. Therefore, oil companies must adopt digitalization, and its integration within HRM enhances the safety, health as well as productivity, efficiency and well-being of employees.

Risk management is the practice that attempt to control the spread of hazards and its consequences in oil and gas vicinity. Addressing potential risk, and preventing work-related accidents that causes injuries, diseases and other sicknesses with the use of digital devices is highly encourage in HRM practice of risk management. The utilization of digital innovations can enable the identification, assessment, evaluation, prevention of associated risks as well as strengthens in offering measures necessary in monitoring and controlling potential and in real time risks (Hairdos, 2017). To this end, digital protocols and work organizations in oil and gas operations necessitate the transformations required in risks management. This involves digitizing occupational safety and health policy, work data, safety analysis, work environment limitations, and compliance constraints. Risk identification is a key function of digital tools in risk management. At every phase of work in oil and gas operations, it is crucial to use these devices to play the role of identifying, classifying and monitoring of risks (Aven et. al., 2007). However, HRM are to play the role of properly documenting, communicating, and classifying the potential consequences of risk (2013).

In line with digital technologies, the use of risk tracking devices can viciously identify potential risk factors and report such data at real time. However, Cagliano et. al., (2015) points that risk management involves planning, tracking, identifying, analyzing data, monitoring, responding and effective controlling of potential risk at work locations. According to Zwikael & Ahn, (2011) the failure to track and identify potential risk can amount to possible consequences of risk effects on employees and workplace. This outcome could become possible where is non-integration of digital devices that can monitor possible risks and accurately provide data analysis (Srivastava & Gupta, 2010). Furthermore, to control risk, it is important for risk managers adopt occupational safety and health policy, while practically utilizing digital tools to intervene. Meanwhile, effective risk management requires planning for possible risks, responding actively, and evaluation of incidences when they occur (Benta et. al., 2011). The use digital technologies can viably support risk management at any given time (Cagliano, Grimaldi, & Rafele, 2015). More so, Salazar-Aramayo et. al., (2013) argued that supporting digital tools for risk management are work-based by nature, and various complex sizes and functions.

Digitalized Human Resource and Employees Compliance to Occupational Safety and Health Policy

The safety of a workplace is both the collective responsibility of safety professionals, Human Resource Department (HRD), and employees. The risks and hazards levels in oil and gas companies calls for great attention to the safety, health, and well-being of lives of individuals working within the work environment. Such working environment could expose workers to harmful substances. However, it is perceived that the oil and gas companies are regulated by occupational safety and health policies that are peculiar to their work practices (Eyayo, 2014), and amidst the dangerous

working environment that intermittently expose employees to risks (Ron, 2003). To promote occupational safety and health, there is need for company's HRD to train and develop employees to comply to all safety policies, rules, and regulations in oil and gas workplace. This effort can prevent occupational accidents, illnesses, injuries, and death (Meswani, 2008). According to World Health Organization (WHO, 2000), workers suffer from back pain, hearing illness, pulmonary disease, asthma, trauma, lung cancer, and leukemia, all of which are preventable when the HRD enforces compliance to occupational safety and health policy digitally. The oil and gas companies in developed and developing countries must ensure that workers in the oil field comply with statutory safety rules and work modalities that are digitally integrated at workplaces to avoid work-related accidents, injuries, and lung diseases from inhaling of poisonous gases (Demba et. al., 2013).

According to Amadi (2012) managers of oil and gas operations must promote occupational safety and health policies for the well-being and welfare of employees. For Haslam & Gibb (2015) safety and health of employees must be seen as priority while ensuring that workers sequentially comply to safety and health regulations at the work locations. Such approach can assist in improving safety consciousness. Furthermore, Okonkwo (2014) argued that for safety and health of employees, safety personnels should view workers' safety as an important area of focus that demands full assessment of compliance to safety and health rules at work environment. The incidences of workplace accidents are preventable when managers and safety practitioners recognize the need to adopt and adapt digitalization technologies to enhance compliance to safety policies as well as using the devices to identify, monitor, and eliminate potential risks factors as well as accident at the workplace. Therefore, using digital tools in oil and gas facilities, evaluating employee's compliance to occupational safety and health policy can help in preventing unanticipated risks consequences, protect workplace facilities, as well as ensures workers well-being (Benson et. al., 2021).

In oil and gas exploration and production settings, certain safety routines are being observed to avert incidences of accident. Meanwhile, investigations have revealed that accidents are not caused by a lone factor, rather such incidents can be caused by instruments malfunctioning, operational lapses, behavioural weaknesses, as well as technological failures. Furthermore, according to International Association of Oil & Gas Producers (2014) reports from accident investigations, postulates that violations or non-compliance to safety rules, regulations, policies as well as sequential work procedures are the most factors that causes high incidences of accident in oil and gas companies. Walker et. al., (2012) also argued that it is the failure to follow safety and health policy that communizes accidents in most workplaces. In addition, the lack of strict compliance to safety rules at the workplace result to frequent accidents, among other potential factors (Dahl & Kongsvik, 2018).

Records of workplace accidents exist in oil and gas operations. Some investigations account to several injuries and deaths related to violation of statutory safety rules in Nigerian oil and gas industry. Investigations attest to fact that neglect to procedural safety engagements are the possible causes of explosions which occurred at Mobil oil company rig platform in 1995, Endeavor oil and gas explosion of 2012 as well as NPDC massive accident in 2020 as provided by (Rigzone Report, 2020). However, safety rules violations were the critical causes of the explosion that occurred at the oil & gas companies' facilities (Hopkins, 2011). Further, it is the violations and non-compliance acts that impacted critical levels of consequences and destruction to oil and gas infrastructure. For the safety of employees, identifying and adhering to safety conditions and digital technologies in compliance to safety and health procedures can promote to safety. This is due to fact that oil and gas industry make safety procedures a mandatory requirement while enforcing compliance.

It should also be noted that safety rules, regulations, and policies govern all oil and gas operations. To protect individuals and facilities at the workplace, a high level of safety regulations compliance is inevitable. Moreso, for effective prevention of accidents, the integration of safety devices, and replacement of obsolete tools are a priority for effective safety compliance management, and for improving compliance with occupational safety and health policy (Mearns et. al., 2003). Employees adherence to occupational safety and health policy at workplace can contribute to accident-free

work hours (Kvalheim & Dahl, 2016). Therefore, safety compliance within organizations having integrated digital technology in their HRM practices can improve safety behaviour of its employees. Safety compliance also involves doing work safely. and maintaining safety standards with the use of digital devices. Finally, safety compliance remains the acceptable behaviour that employees must adapt to in accordance to safety procedures as provided in occupational safety and health policy which promotes safety at work as well as prevention of accidents for the purpose of achieving productivity (Neal et. al., 2000). Hence, safety compliance is the backbone for safety performance. But workers compliance to safety regulations, rules, and safe working conditions a mandatory requirement at the workplace (Masia & Pienaar, 2011).

Theoretical Framework

The study adopts digital innovation and risk perception theories. The digital innovation theory was propounded by Yoo et. al., (2010). Its emphasis holds that developing new devices or products align digital technologies with physical, safety and health needs. Theory believes that digitalization provides more opportunity to transform product for better experiences, and digital technology is the fundamental step for company's advantage (Yoo, 2010). Therefore, digital innovation technology also believes that digital technology plays the fundamental role for companies to maximize information systems for management and workplace practices (Hevner et. al., 2019). The theory concentrates more on the integration as well as effect of digital innovations. Furthermore, digital innovation theory believes that organizations can use digital technologies for safety monitoring activities and to virtually enhance occupational safety and health impact at the workplace (Franceschini et. al, 2018). Risk perception theory propounded by (Fischhoff, 1994) strengthens the study further. It investigates individuals understanding and interpretations of conditions associated with risks. In line with digital perspective, it gives understanding of individuals' perceptions of fundamental risks and its implications on occupational safety and health of employees at work environment.

Materials and Method

The study utilized secondary data from journals and internet sources, and primary data as it adopts descriptive survey research design and quantitative approach for data collection from 82 Human Resource Department personnels and managers from two oil and gas services companies in Nigeria, which are, Aveon offshore Nigeria and Frontier Limited. The questionnaire used for the collection of data were in compliance with Likert's 4-point format of strongly agree, agree, strongly disagree and disagree respectively. The questionnaires were purposively distributed to respondents. The questions were organized in line with objectives of the study to elicit appropriate data from the Human Resource Personnels and managers.

Results and Discussion

Table 1: Summary of responses on impact of digitization on Human Resource Management practice of workplace risks management for occupational safety and health of employees in oil and gas companies.

Variables	Frequency	Percent	Mean	Standard Deviation
Strongly agree	42	51.2	34	11.31
Agree	26	31.7		
Strongly disagree	10	12.2	7	4.24
Disagree	4	5		
Total	82	100		

Source: (Nworgu, 2026)

Table 1 reveals the summary of responses on the impact of digitization on human resource management practice. Therefore, 42 (51.2%) and 26 (31.7%) strongly agree and agree respectively that digitalization impact human resource management practice of workplace risks management for

occupational safety and health of employees in oil and gas companies. But 10 (12.2%) and 4 (5%) strongly disagree and disagree respectively to the stated opinion. The mean and standard deviation score for respondents that agree is 34 and 11.31 respectively. However, the mean and standard deviation score of respondents that disagree are shown as 7 and 4.24 respectively. The study has shown that majority of the respondents agree that digitization impact human resource management practices of workplace risks management for occupational safety and health of employees in oil and gas companies. The research stands to agree to the stated opinion of the objective of the study. The finding has shown that digitalization has impact on human resource management practice of workplace practice of workplace risks management for occupational safety and health of employees in oil and gas companies.

Table 2: summary of responses that digitalization of Human Resource Management practices strengthens employee's compliance with occupational safety and health policy of oil and gas companies.

Variables	Frequency	Percent	Mean	Standard Deviation
Strongly agree	40	48.8	36	5.66
Agree	32	39		
Strongly disagree	4	4.9	5	1.414
Disagree	6	7.3		
Total	82	100		

Source: (Nworgu, 2026)

Table 2 shows the summary responses that digitalization of human resource management practices strengthens employee's compliance with occupational safety and health policy of oil and gas companies. Moreover, 40 (48.8%) and 32 (39%) respondents strongly agree and agree respectively that digitalization of human resource practices strengthens employee's compliance with occupational safety and health policy of oil and gas companies. Whereas, 4 (4.9%) and 6 (7.3%) respondents strongly disagree and disagree respectively to the stated opinion. The respondents that agree to the stated opinion is more in number than those that disagree. Therefore, the study stands to agree that digitalization of human resource management practice strengthens employee's compliance with occupational safety and health policy of oil and gas companies. Furthermore, the mean and standard score for respondents that agree to the stated opinion is 36 and 5.66 respectively. While, the mean and standard deviation scores for respondents that disagree is 5 and 1.414 respectively. The findings of the study also show that digitalization of human resource management practice strengthens employee's compliance with occupational safety and health policy of oil and gas companies.

Conclusion

The digitalization of human resource management practices in the oil and gas companies brings changes that makes occupational safety and health policy to operate effectively. Digital technologies provide support in identifying and monitoring workplace risks and other dangerous situations that can affect the safety of workers in oil and gas working environment. The compliance to safety rules, regulations and procedures in the oil and gas industry contributes in making the workplace safer. Furthermore, integrating digital technologies actively mitigates in offering strategies to manage risks for reduction of potential risk occurrences. The research outcome affirms that improving and ensuring that human resource department practices become digitized, identification of workplace risks can be eliminated through employee's compliance to occupational safety and health policy.

Recommendations

Management should ensure that digitalization of Human Resource Management practices is effectively integrated for the monitoring and strengthening of employee's compliance with occupational safety and health policy of oil and gas companies.

Management should digitize risk management practices at the workplace to promote occupational safety and health of employees in oil and gas companies.

Management should make it a priority in monitoring and supervising workers in their job safety compliance efforts at any sequence of work activities as to assist in improving safety compliance and the task of safety standards through HRM and safety professionals in the companies.

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