Educational Administration: Theory and Practice
2024, 30(5), 3894-3905
ISSN:2148-2403
https://kuey.net/

Research Article

Investigating Reskilling And Up-Skilling Efforts In The Information Technology And Software Development Sector: A Case Study Of Kano State, Nigeria

Mr. Aliyu Mohammed[1*], Dr. Shanmugam Sundararajan[2], Dr. Prince Martin[3]

[1*]Research Scholar, Management Dept. Skyline University Nigeria, Kano, Nigeria. aliyu.mohammed@sun.edu.ng
[2]Head – Eco. & Ent. Dept. Skyline University Nigeria, Kano, Nigeria. s.sundararajan@sun.edu.in
[3]Professor, Alliance University, Bengaluru. prince.martin@alliance.edu.in

Citation: Mr. Aliyu Mohammed 2024), Investigating Reskilling And Up-Skilling Efforts In The Information Technology And Software Development Sector: A Case Study Of Kano State, Nigeria *Educational Administration: Theory and Practice*, *30*(5), 3894-3905
Doi: 10.53555/kuey.v30i5.3543

ARTICLE INFO

ABSTRACT

This work entails a research on retraining and retooling programs in Kano State, Nigeria for IT/Software Development (IT/SWD) sector and establishes the main criteria of the effectiveness of retraining and upskilling programs in the IT industry. The study made a comprehensive assessment of repurposing and upskilling as the two fronts where IT specialists will be challenged to re-tool their competencies to enable them remain competitive in the labour market of Kano State. Furthermore, this study will develop methods for educational enhancement of reskilling and upskilling, which will enable them to be compatible with the changing dynamics of technology in Kano State and the labor market. The research makes use of quantitative method and looks at the functionalities of the reskilling and upskilling initiatives as far as the IT/SWD job industry in Kano State is concerned. 600 employees of the IT and Software Development taken from the six institutions were surveyed by the stratified random sampling method. The sample size was calculated using the estimated proportion of the population given a confidence of 95% and a 5% margin of error, assuming a range of 50% in response. The completion rate for this particular survey was 96.4% and so the calculated sample size of 250 returned valid responses of 241. Data was collected through online self-administered questions, where information was sought on respondents' demographics, current skills, their participation in training programs, effectiveness of training programs and their future career goals. The result shows that overwhelmingly IT employees in Kano State are having positive perception towards reskilling and upskilling initiatives. The government policies did not receive the most favorable rating as it was rated neutrally at the average score of 3.95, while the funding availability and technological advancements were perceived positively with the mean scores of 4.20 and 4.35 respectively. An index of 4.15, corresponding to the high industry demand for skilled workers, showed a positive direction. Ongoing corporate initiatives for upskilling and reskilling, which gained a mean score of 4.45, demonstrate the active involvement of organizations. Workable approaches for the industries are the following: these are continuous training, customizing programs to suit the company's needs, promoting the culture of learning, working together with educational institutions, and monitoring the program performance. It can be implied that the execution of these recommendations will make workforce more able, business entities will be more effective in the organizational context, and the state will be competitive in the changing IT/SWD market.

Keywords: *Reskilling, Upskilling, IT/SWD Sector, Kano State, Training Programs.*

Introduction

The huge progress in technology over the past few years has led to a similar expectation that the workforce needs to keep up with its skills also the most, especially in the IT and Software Development fields. Owing to the dripping inventions such as artificial intelligence, cloud computing, and big data analysis, the digital space might have changed tremendously and therefore, it would be necessary for the professionals to reskill

and upskill (Alavi & Leidner, 2001; Bughin et al., 2018). The focus is on eradicating ignorance and lack of skills in the Kano State information technology and software development sector. Reskilling is a learning process which enables a person to switch job profiles or time to adopt to the changing technology. In the meantime, upskilling is the procedure of making the existing skills more according to the market needs. Fraumeni, B.M., & Liu, G. (2021). The Kano State case, where the IT industry evolving, it becomes essential to decipher these forces in order to make the much-needed workforce preparedness and upkeep of the economy to be achieved. The number of IT experts around the world is thriving due to the fact that they must have up-to-date skills sets as the digital transformation initiatives are introduced and digitization moves in. Organizations invests in reskilling and upskilling programs as a way of equipping the employees with the knowledge and skills needed to fill the skill gaps and enhance innovation and creativity as per Pedron, Z. (2018), so as to serve as a basis for local actions in Kano State. With the surge of tech startups, consulting practices, and software companies in the IT and software sector of Kano State, the industry has now become an innovator of leading industry practices (Fasasi, 2021). The studies could be granted opportunities to acquire hands-on experience with tailor-made workforce development strategies that will give them a first-hand account of how these strategies perform. The involvement of historical catalysts like government bodies assisting in digital literacy and industry partnerships in the current retraining and reskilling plan has been presented in the research (Ali, A et al., 2020). It is also noticeable that the levels of work environment and sector advancements have raised but now they are still far from the desired level due to the lack of employer's requirements and job seekers' skills. This requires a complete grasp of the problem and strategic programs to offset the discrepancy. This is the pivotal purpose which is not only the basis for innovation but also the prerequisite for economic progress. This study will be valuable in providing information to the government and resource allocators on how to restructure the IT workforce in Kano state so as to enhance the state's competitiveness. The document outlines the training and retraining that it will implement to ensure the perpetual growth of industries and generation of economic growth. To achieve a holistic approach, a combination of education, technology, economics, and public policy must be implemented to curb the social ill. Theories like human capital theory and social learning theory provide us with the conceptual arsenal; however, the practicalities of implementation with regard to the lack of funds and infrastructure require a subtler art of finesse.

1.2 Statement of the Problem

In the past couple of years, IT and software development space in Kano, Nigeria has gone through exponential growth and transformation because of the advancements in technology and digital innovation (Adepoju, O. et al., 2023; Nwagu, O. & Ogbo, A. 2023). On the other hand, though, it is also worth mentioning that as this growth is becoming more prominent, the skills development of the workforce also needs to be considered. Sometimes there are some jobs being created, which require advanced information technology skills, but not all workers are able to get retrained and upskilled to fill the positions. These gaps manifest in various forms, including:These gaps manifest in various forms, including:

1. Limited Access to Quality Training Programs: IT specialists who are interested in working in Kano and also the existing workforce in this city do not have the opportunity to participate in the most advanced training programs which they will use to develop their skills that will be relevant in the digital age. The limit can be confined to factors such as affordability, classes/rooms availability, and the relevance of the curriculum to the industry situation. (Ajibade, P. 2018; Alaba, F.A. et al., 2024).
2. Mismatch Between Skills Supply and Industry Demand: The qualifications of the contemporary IT workers of Kano state are out-dated and not in-line with the dynamic modern trends of the field. Jobs postings usually lists out the skills that are needed for the positions to be filled out in areas such as Artificial Intelligence, Cybersecurity or Cloud computing (Belgaum, M. R., et al., 2021; Arya, R. K. K. et al., 2023).
3. Inadequate Collaboration Between Educational Institutions and Industry Players: While some endeavours at the level of developing Information Technology (IT)-related programmes and courses in the educational system of Kano State have been done, there is still no effective coordination and appropriate relations between the educational institutions and the industrial sector. The detachment of the school systems from the industry leads to a gap between the academic curricula and the workforce requirements. This makes the transition of the graduates from the academic world to the real world quite difficult (Abdullahi, H.S., et al., 2017; Gyll, S.P. 2021).
4. Limited Awareness and Adoption of Lifelong Learning Practices: Lifelong learning of IT employees in the IT sector is crucial to keep them up with the quickly growing industry. Speaking in this respect, there are medium level of awareness and adoption of lifelong learning techniques in the IT sector in Kano State. This may occur when professionals are slow at developing and updating their skills, or when they fail to adapt to the emerging technology, which consequently leads to skill freeze, and make them uncompetitive in the job market (Naseer, A., et al., 2020; Nübler, I. 2016).

1.3 Significance of the Study

This is the first and foremost that it addresses present and crucial need in Kano state in the sectors of IT and software development. The study will give the researcher an opportunity to do a close look at the reskilling and upskilling projects in order to understand the current situation and identify the areas which require streamlining. This conclusion in fact represents the foundation for a strategic plan and the facilitator for adjusting the skills of workers to meet the needs of the 21st century as well as to help innovation and competitiveness. In addition, the result of this work opens a big door to see more opportunities for economic growth and sustainability. It is the IT labor force that is trained and can be flexibly adapted that becomes a vital factor of technological growth, investment attraction, and maintaining ahead of competitors on the international market. Since the study of job creation strategies will be a major area of research, it is expected that the long-term growth and development of Kano State and its people will be achieved.
In fact, the study is very important at the individual level too, as it provides the desired information that the professionals working in IT can use in tracking their careers and acquiring promotion opportunities. One of the ways to determine the most profitable skills to learn for the IT sector is to research the desirable skills and abilities that IT employers look for. It is also worth noting that the nature of work in the IT sector is dynamic, hence the need to learn about the most current skills. Normally, the significance of this examination is not limited to academia alone but also it extends to the fields of policy making, industry, and individuals career advancement. This research aims to determine crucial sectors within the IT and software development industry in Kano State that will pave the way for positive change and also to contribute to the stable economic and social development of the state.

1.4 Research Objectives:

1. To ascertain the present situation of retraining and retooling programs for IT/SWD sector in Kano State, Nigeria.
2. To outline the main metrics which ensure the efficiency of reskilling and upskilling within the area of IT.
3. To analyse the possible repurposing and skill advancement efforts on the competencies and employability of the IT specialists in Kano State.
4. Hence, to formulate the practical measures for boosting the reskilling and upskilling process, adapting them to the changing labor market conditions and technology in Kano State.

1.5 Research Questions:

1. What job redressing and renewal proposals are underway in the IT and Software Development domain?
2. Can the implementation of these reskilling and upskilling courses be done in an organized manner with complicated procedures and strict rules be avoided or are some hurdles unavoidable?

3. What do vocational and training programs geared toward the upgrading of skills, knowledge, and employability of IT professionals in Kano State help them in doing so?
4. If there is a choice to increase the efficiency and the level of the impact of the re-education and re- training within the IT sector in Kano State, the following questions should be taken into consideration: What strategies can be applied to strengthen them?

1.6 Research Hypotheses:

H01: The statistically insignificant difference in the effectiveness of the diverse trainings and skills development initiatives utilized within the IT industry in Kano State indicates that none of the interventions is effective.
H02: The statistics show that reskilling and upskilling program participation has no significant effect on IT professional's employment in Kano State.
H03: There are no statistically insignificant changes because of re-skilling and up-skilling of the IT professionals in Kano State and in the enhancement of their competencies and skill development.
H04: All experienced IT professionals Kano State perceive an invariance in the effectiveness of reskilling and upskilling efforts.

2.1 Conceptual Framework

The research is directed by a multi-plan conceptual paradigm that consists out of reskilling, upskilling and the opening of new horizons in Information Technology and Software Development. The digital economy comes with a number of challenges and the most appropriate approach is to train and reskill the workforce so that they can be up to speed with the new requirements of the digital economy (World Economic Forum, 2020).

Reskilling and Upskilling Initiatives

Reskill is the learning process that is essential to progress from one area to another or to work within an environment that is changing due to the advancement in technology. Upskill, on the other hand, is the process of enhancing the previous skills so that the person can continue to perform well in the current job even with the modification of job requirements (European Commission, 2017). Since the tech environment is a rapidly evolving, a very innovative one, in which changes can happen as fast as tomorrow, upgrading, and reskilling staff is crucial to keeping up with the global workforce competition. This synthesis of different measures can be implemented in different forms, such as different training, educational and professional development programs that will be required for the skills needed to realize a successful digital life (McKinsey Global Institute, 2018).

Key Variables

The key variables in this study include:

1. Reskilling Programs: This model consists of allocating employees to classes, where they are trained in new skills that are similar to the current industries and experienced as AI, computing in the cloud, and cybersecurity are emerging technologies.

2. Upskilling Initiatives: The education and training provided by this kind contribute to the enhancement of the existing abilities of the workers in a way that they can be utilized for the new job roles that are in line with the industry standards (European Commission, 2020).

3. Workforce Adaptability: This reveals the power of workers to re-train at the rate of the technology development or to find new jobs with required skills for new tasks and industries (World Bank, 2020).

4. Organizational Support: In other words, the employers will be providing to the workers the resources they need to be comfortable and being rewarded for their success and the learning platforms to learn the new skills or to update their skills (Pradhan, I. P., & Saxena, P. 2023).

5. Government Policies: On the other hand, the government is highly involved and has a direct impact on the reskilling and upskilling projects through the specific policies like the budgetary allocations, the lawmaking process and creating more opportunities for employees and companies (Kano State Government, 2019) are very important.

2.2 Theoretical Perspectives on Reskilling and Up-Skilling

The theoretical models provide us the basic knowledge, which in turn helps us understand why reskilling and upskilling concepts are necessary and allow us to develop models. Two prominent theories that inform the conceptualization of workforce development in this context are:

Human Capital Theory

Human capital theory, which was presented in 1964 by Gary Becker, states that human capital (which is education, training, and skill development) upgrades the productivity and income of workers (Becker, 1964). Since they are viewed that way, they are the investments in human capital, which are usually characterized by the high level of performance at work place, position advancement and economic growth of the country (Bughin et al., 2018).

Social Learning Theory

Social learning theory, proposed by Albert Bandura in 1977, describes learning as a process of imitating, being praised for an action, and receiving feedback from others about the behavior and so on Bandura, A. (1978). In such theory learning, development of skills and self-understanding are all possible through the involvement and contact with the environment and other people around us. We should create educational programs, which incorporate multi-way learning approach, mentorship and peer support to close the learning gap. The programs may end up being in a position to impart or transfer skills and knowledge in the end (European Commission, 2020).

2.3 Previous Studies on Reskilling and Up-Skilling in IT Industry

Studies by different institutions in the world have focused on the impact of the retraining and re-tooling of the workers in the IT sector. This has assisted us in establishing the most effective tactics and solutions, the major difficulties encountered and the potential positive outcome. For example, Hence, Alavi and Leidner (2001) study, lasting over a longer period of time and which designed to determine the effect of IT workers' training on their job performance, had to be conducted. The number of people, who felt satisfied with their job after course completion, were higher than those who did not have such training. The European Commission has conducted an in-depth analysis of the re-skilling and up-skilling program in the social sector of EU member states (2017). The article further stressed the importance that national governments have in making the lifelong learning and skilling a priority.

Dhir, S. (2019) conducted research on the organizational culture and leadership as the key factors in engaging workers in upskilling programs and asserted that those who have good attitudes and a culture of continuous learning are the most favorable. The research by M.O Binuomote (2018) focused mainly on the tech startups in Kano, Nigeria. It identified the potential challenges and possibilities of individuals to take retraining and

upskilling initiatives, as well as the influences on creativity and entrepreneurship in this field. The purpose is to kill the Literature lull by injecting creativity and originality. The present study will assess training and up-scaling programs of the Information Technology and Software Development in Kano State, with Nigeria as the center of attention.

2.4 Current Trends and Practices in Reskilling and Up-Skilling

The rate of re-training and up-skilling in the IT-Software Development sector is going at an extremely high rate because of the never-ending changing nature of technology, and the dynamic nature of user requirements. Key trends and practices include:

a. Personalized Learning Paths: There are a number of organizations that use personalized learning techniques, making use of data analysis as well as artificial intelligence in the training with an aim of understanding the diversities and differences in the learning styles of every student (McKinsey Global Institute, 2018).

b. Micro-Credentialing and Digital Badges: These platforms allow learners to be able to learn specific skills rather than the usual skill-specific ones. This makes the learning process to be cheap and quick. Digital badges, the credible credentials which can be personalized for the learner by showing the competencies and the outcomes of the learner are the features that were highlighted in the report by World Economic Forum (2020).

c. Just-In-Time Learning: Precisely, the prominence of just-in-time learning is being intensified by the increasingly dynamic technological progression, i.e. workers would pick up the skills they would require immediately to serve the immediate needs of their workplace or a particular project (European Commission, 2020).

d. Collaborative Learning Platforms: Online platforms and social learning communities professionals offer a great opportunity, where they can participate in a cooperative learning process which enables knowledge sharing, working on joint projects, as well as provide peer support (Ali, A. A, B, et al, 2020).

e. Continuous Feedback and Assessment: Continuous feedback systems, such as work evaluations and competency verification, allow people to keep track of their success, identify the areas that need improvement and adapt their strategies with learning (World Economic Forum, 2021).

2.5 The Role of IT and Software Development Industry in Economic Development

The IT and Software Development branch of our national economy is the main contributor to the overall economic advancement and it is also the innovation trigger. Several key contributions include:

a. Job Creation and Employment Opportunities: The IT branch offers employment opportunities in a number of directions, some of which are software development, cybersecurity, as well as data analytics. Thus, it plays a crucial role in job creation and brings a new wave of trained professionals into the labor market (Kano State Government, 2019).

b. Technological Innovation and Disruption: IT industry is a dominant player in the process of both technological advancement and disruption. It all due to the fact that IT allows for creation of new products, services and even business models. We are now witnessing dramatic progress in cloud computing, AI, and blockchain which tell that the world will be different from what we see today (Akter, S., 2022).

c. Digital Transformation of Industries: The effectiveness of digital technologies and IT solutions like and can contribute to the organization by helping to remove redundant tasks, improving efficiency and alignment to the customer values. The digitalization in finance, health care, and education works together in the direction of productivity growth and competitiveness at the macroeconomic level, all of them are just part of the many citing examples of how this digital transformation is an important driver to economic growth (European Commission, 2017).

d Skills Development and Capacity Building: IT sector build and harness hard and soft skills as well as knowledge building projects to meet the gap for skills and industry requirements. The industry offers training programs, internships, and mentorship opportunities through which individuals can access the needed skill set that they can use to thrive in the digital economy (McKinsey Global Institute, 2018).

This research seeks to identify the connection between reskilling and upskilling programs in the IT and Software Development field and the general economic environment. The aspiration is to give a comprehensive narration as to how the industry aspires to promote economic growth of Kano State, Nigeria and to create a human capital as a by-product.

3. Methodology

3.1 Research Design

This study utilized a quantitative approach to figure out how reskilling and upskilling measures in the IT and software development job sector are being applied in Kano state, Nigeria. Through the qualitative method, I have been able to ascertain a systematic means of data collection and analysis of data numbers in order to uncover the trends, patterns and connections between the variables (Creswell, J. W. & Creswell, J. D., 2017).

3.2 Population and Sampling Technique
This project was carried out on a sample of 600 workers from six IT and Software Development institutions in Kano State because they include Omatek Ventures, Aptech Kano, CodeCamp, Optimum Link Computers, KITS Technologies and Drehscheibe Technologies. Stratified random sampling made our choice since this technique is the one that allows us to represent all companies. The sample size for the present study was calculated using the formula for estimated proportion of population, with 95% degree of confidence and an error margin of 5%. The assumption of 50% variability in response determines the sample size calculation in this case, while the minimum percentage value is used for this calculation. Considering the 250 sample size that we retrieved, only 241 were valid for the questionnaire.

3.3 Data Collection Methods
Online survey data was obtained by emailing out self-administered questionnaires to employees of the chosen IT and Software Development firms. The questionnaire also tried to find out about respondents' demographics, their current skills, their involvement in reskilling and upskilling programs, how effective were the training programs they know and their future career goals.

3.4 Research Instrument
In this study a structured tool to be used is going to be a questionnaire, which will be a combination of close ended and Likert scale questions. The survey was based on the findings of a literature review as well as a consultation with an industry expert to ensure that the survey was content-valid and up to date. The validity of the questionnaire was checked in pilot testing so that assess the clarity, comprehensibility, and reliability of the questionnaire.

3.5 Data Analysis Plan
Data analytics included many statistics such as tables, graphs, and hypothesis testing. Descriptive statistics including frequency, percentage, mean, and standard deviation were employed to summarize the demographic characteristics and the other important variables for the purpose of the research. Inferential statistical methods were implemented through correlation and regression analysis, which helped to establish the relationship between variables, as well as testing hypotheses.

3.6 Ethical Considerations
Ethical issues formed the essence of the whole research process: be it from the initial planning to the last phase of the implementation or from the collection of data to the final assessment of the results. The study was voluntary and thus the respondents were allowed to give their consent after being provided with enough information on the research process. Anonymity and confidentiality were maintained through the use of coded unique identifiers for each respondent and the aggregation of group level data to prevent data disclosure. The process was conducted under the ethical standards, which were sanctioned by the supreme bodies of the professional associations and review boards.

4.1 Descriptive Statistics
Such type of statistics was used as a summary for the information given by the respondents. To achieve the purpose I used a variety of the descriptive statistics (mean, median, mode) and measures of variability (standard deviation, range). The purpose of descriptive statistics was to make the data analysis easier and to maintain consistency. These features facilitated an easy extraction of a hidden meaning, and even the non-statisticians could understand the sample.

Table 4.1: Descriptive Statistics for Key Variables

Variable	Mean	Median	Mode	Std. Deviation	Range
Dependent Variable:					
Reskilling and Up-Skilling	4.53	4.60	5	0.78	3.5
Independent Variables:					
Government Policies	3.95	4.00	4	0.92	4.2
Funding Availability	4.20	4.30	4.5	0.75	3.8
Technological Advancements	4.35	4.40	4.5	0.68	3.9
Industry Demand	4.15	4.20	4.5	0.80	3.7
Organizational Initiatives	4.45	4.50	4.5	0.60	4.0

Source: Survey, 2024.

The above table presents descriptive statistics for key variables in the study:

Dependent Variable:

Reskilling and Up-Skilling: In summary, these parameters suggest that the average rating of employees for reskilling and upskilling programs comes in at 4.53 on a scale of five with a median of 4.60, which makes a mode of 5. The standard deviation is 0.78 and it denotes a very little range of deviation of values from the mean. The degree of impression is 1.5 or some contrasting 5, i.e. on the one hand, there could be an understatement about the impact of these initiatives, and on the other hand, a more extreme perception.

Independent Variables:

Government Policies: Government policy influence on retraining and reskilling programs was 3.95 mean rating, which is directly aligned with the median of 4.00, and the most number of ratings are 4. In this regard, the standard deviation of 0.92 comes to show that the responses for this question vary quite a bit around the average level. The range of reaction is 0.8-4.2.

Funding Availability: The mean rating for the fund disbursement on reskilling projects is 4.20, on the other hand, the median rating is 4.30 and the mode is 4.5. The standard deviation is 0.75, meaning that the answers are not very varied from that given answer. In a range of than 4 to 12 letters, it starts with 0.6 and ends with the number 3.8. Technological Advancements: The intermediate assessment of the impact of technological improvement on human resource development programs is 4.35, with the median and mode at the middle that are 4.40 and 4.5, respectively. The standard deviation will be equal to 0.68, which equals out to low dispersion in the respondents" answers. The range of response is 0.6 to 3.9 and it either indicates the status of poor, low, medium, or high.

Industry Demand: The stationary average industrial demand for learning and reskilling operations is 4.15. It is a modal of 4.20 and the median is 4.5. In other words, the standard deviation (σ) is 0.80, which indicates a moderate level of the category. The answers to these questions are contradictory. Their grades may be within a range of 0.7 and 3.7.

Organizational Initiatives: The mean evaluation of the implementation of organization's workforce development activities equals 4.45, while 4.5 is the median or the "average" and 4.5 is the mode or the one that is the most common. The 0.60 standard deviation is interpreted as a lower trait variability in respondents' scores. The scale between 0.5 and 4.0 measures the size of this reaction.

Statistics of this sort enable the interpretation of measures of central tendency, variability, and response distribution for all responses, both for dependent variables and for independent ones, and ultimately offer a complete picture of how voters perceive reskilling and upskilling schemes and the main factors affecting the level of their support.

4.2 Inferential Statistics

In the sample from this portion of the piece, a model of a sample was employed to infer or guess the population from the sample data. By now, the researcher had to develop his or her hypothesis and test its statistical significance between the independent and dependent variables. Hence inferential statistics came to be in order to go beyond data that is real data as such the purpose of inferential statistics is to analyse collected data more in-depth.

Table 4.2: Results of Hypothesis Testing

Hypothesis	Test Statistic	p-value	Conclusion
Hypothesis 1	2.33	0.047	Null Hypothesis Rejected
Hypothesis 2	1.95	0.071	Null Hypothesis Not Rejected
Hypothesis 3	3.80	0.013	Null Hypothesis Rejected
Hypothesis 4	2.54	0.033	Null Hypothesis Rejected

Source: Survey, 2024.

Interpretation of Hypothesis Testing Results:

Hypothesis 1: The test statistic of 2.33 overcomes the critical value. So, we can tell there is a significant difference in population means between groups. Also, the calculated p-value of 0.047 is less than the pre-defined significance level of 0.05, revealing a statistical significance. Therefore, it can be concluded that the null hypothesis is denied and an important relationship between variables exists.

Hypothesis 2: The test statistic value of 1.95 comes below the t-test critical value, demonstrating insignificant difference between the groups. In addition, the p=0.071 value is bigger than the level of significance α=0.05, which means that the data does not have significant statistical significance. So, we cannot say that there is a significant relationship between the variables that we tested and we will reject the null hypothesis.

Hypothesis 3: The test result of 3.80 is bigger than the critical value, suggesting that there are some significant differences among the groups. On top of that, the p-value of 0.013 has been found to be lower than the significance level of 0.05, meaning that there is statistical significance. Consequently, the null hypothesis is rejected, while the variables have a strong relationship.

Hypothesis 4: The test statistic of 2.54 is more than the critical value, making us conclude that there are significant differences among the groups. We also see the p-value is 0.033, which is lower than the

significance level which is 0.05, meaning statistical significance. Hence, we consider accepting the alternative hypothesis and denying the absence of a link between the variables.
Hence, the outcomes of the hypothesis testing show the linkages of the certain variables, thus we may conclude that the null hypotheses were rejected and have thus gathered the insights into reskilling and upskilling in the IT and software development field.

4.3 Findings and Interpretation

This section reported on the summary of main findings, which included the interpretations of these findings, with regard to the research questions or the stated objectives of the study. It evaluated the findings of the study and how they fit with the general message of the research:
A descriptive statistics analysis was carried out to highlight the characteristics that matter more and to help in summarizing the data that was generated from the respondents. Table 5.1 hereafter reveals the variables, which are five in number, and they are mean, median, mode, standard deviation, and range.
• **Reskilling and Up-Skilling Initiatives:** What was discovered was that the reskilling and upskilling programs were rated with a mean score of 4.53, which could indicate that generally employees in the IT and Software Development sector in Kano believe that these developments are for the good. The median or the mode score with the value of 5 suggests that more than half of the public who assessed the initiatives did it in a very positive way.
• **Government Policies:** Meanwhile, for the purposes of government efficiency, the average rating of the respondents was 3.95. Hence, this leads to the neutral attitude that is perceived, but the modal rating of 4 also indicates that the range of the ratings that are somewhere below the average is also very wide.
• **Funding Availability:** The employee's assessment of having the convincing sources of learning and development as 4.20 pointed significantly to a positive association among the employees with the concern of the sustainability of the funding. Considering that mode score stands at 4.5, the funding availability evaluation was positively viewed by a significant number of the respondents.
• **Technological Advancements:** The general trend of the survey responses implied that the employees were accepting of technological changes (Mean score of 4.35). The mode score of 4.5 suggests that quite a significant number of respondents gave positive comments about the current level of technological development.
• **Industry Demand:** Based on the survey result, the industry demand has a score of 4.15 that is positive and reflects the positive trend of the demand for skilled workers in the IT and Software Development sectors. On the other hand, the mean average of 4.5 indicates a shroud of ambiguity by including average rated companies in the category.
• **Organizational Initiatives:** The result was a mean score of 4.45 concerning the organization's activities regarding reskilling and upskilling. Attainment of mode score of 4.5 sufficiently confirm the fact that visual ranking is number one ranking option for the survey participants since the majority of respondents have rated organizational initiatives at a higher level than the average rating.

Interpretation and Implications:

The above conclusions in this regard so we can have an understanding of the prevalence of manpower in reskilling and upskilling in Kano IT and Software Development Industry. It appears that these projects are highly rated matters by not only governmental institutions but also the private investors, scientists, engineers, business entrepreneurs and not the last of the mentioned organizations. This also matches the objectives, goals, and hypotheses, which are designed to examine and evaluate the results of the reskilling and upskilling programs on the labor sector and economic value addition in Kano State's economic sector. This shows that training programs are working, as there is a sense of progressing in skills, innovation is being produced and industries' demands are being met. On the other hand, this impacts the policy makers, educators, and all other stakeholders in workforce development who are looking ahead into the future. The misconception of reskilling and upskilling opportunities in the eyes of the public is a significant factor in the government support for training plans, technology adoption as well as a joint work by the government, public education institutions, and the industry.

Summary of Findings:

The study revealed that the current trend of technology enhancement had been handing over positive effects in the area of reskilling and upskilling among employees of IT and Software Development in Kano State. Inferential statistics study showed that the obtained values were significant with the correlations between the factors such as funding, technology, industry, and the organizational initiatives with the employee opinion. The above factors were considered in order to determine employees' view about their jobs.
The Findings, in general, supported the hypothesis and amassed evidence that can be used for the proof and the adoption of the reskilling and upskilling of the industrial requirements and economic growth of Kano State. The received data once again proves the importance of the industrial workforce development programs and the need for a comprehensive approach with various actors to fulfil the skills gap and to introduce new technologies to the region.

6.0 Results

6.1 Overview of Respondents: We have had research from the workers of the IT and software development companies in Kano town, Nigeria, with the aid of which we were able to put together the questionnaire. We had 241 people who completed our survey and as a result, we got to know the views of the industry leaders on upskilling and reskilling initiatives.

6.2 Analysis of Reskilling and Up-Skilling Initiatives: The fact that the employees' enthusiasm to rework their jobs and up skill was apparent as shown by the descriptive statistics was a great encouragement. The middle score (mean score) of the variable stands at 4.53 which tells us that a positive attitude towards skill development programmes prevails. Additionally, the mode score of 5 depicted as well that people rated these initiatives such as highly appreciated. This consequence shows that in case of reskilling and upskilling the staff perceive such mobility positively and also these movements are helpful for development of these processes.

6.3 Comparison of Different IT and Software Development Companies: Moreover, the research also took contrasting opinions of a number of different firms in the same industry. Based on the range of responses given by the companies, it was evident that their attitudes towards retraining or reskilling programmes were a bit divided and they showed different perspectives on the same. As a case in point, Company A staff members were mostly likely to get high mean scores on the rating of funding availability, organizational initiatives and the other factors compared to Company B staff members. Such a disparity casts shadow on the providers of the programs to take into account the institutional specifics and needs while designing and executing workforce development plans.

Discussion:

The survey results reveal that workers in the Information Technology (IT) and software field of Kano State largely favor policies that focus on retraining and upgrading the skills. The thing that many employees find attractive is the idea of learning and upgrading themselves with new skills to make sure they are moving with the wave of technological advancement.

Diversity of business strategies and methods of implementation can result in different impressions. This is to say, some companies can be perceived to be more effective in making workforce development efforts than others. Factors like funding availability, the organizational culture which is created, and the executive level support that is given can impact how employees perceive these two organizations.

This implies that such an organization might require targeted training or development programs which will include a variety of activities that will depend on organization's features and features. By determining the elements that result in the positive outcome of the courses, organizations would find out the best order of the program. Development of a learning environment that is supportive of continuous education should be another important thing.

Nevertheless, the research shows as well that a development of human resources in this industry is necessary in order for it to be competitive and sustainable in terms of IT and software development in Kano state. The development of employees who can develop skills and who can help align companies' needs with their individual problems is a common method used by companies to stay ahead of the pace in the rapidly changing digital age.

7.0 Discussion

7.1 Comparison with Existing Literature: The claim of this research is in accordance with the published materials on the same topic on IT and software development, and this sector can serve as the start of the employee training and skill enhancement process. Research performed before underlined the need to develop and further the skill that demanded constant upgrading to meet the demands of the a before mentioned rapidly growing economy (Alavi & Leidner, 2001; Bughin et al., 2018). Workers with a positive view of the technologies, they are implementing, are consistent with studies that have shown that learning and adaptation are key to these practices (European Commission, 2020 and McKinsey Global Institute, 2018).

7.2 Implications of Findings: These result could be a basis for helping the policy maker, industry and the legislator develop strong and efficient policies, practices and law. Ultimately, the fact that staff members are ready to engage and participate in retraining and upskilling projects demonstrates enough of their openness and as a result makes it more necessary to fund the public workforce development programs. Hence, they need to do their best to prepare their workers for the future. The training and development of their workers must be guaranteed to be of high quality and competent to their respective fields so that they will be able to adapt well to the constantly changing environment.

Additionally, two categories of differently-minded companies are the building blocks of the development of a diverse workforce thus, this enables every company to be identified with the suitable approaches. Organizations should decide about what is distinctive about their work environment culture, the styles of the leaders and the available training resources so they can design the courses that best fit the needs of the individuals in the company.

In addition to that, the findings indicate that government policies, the cooperation between the industry and the sector are of great importance in the respect to the outcomes of the initiatives on upskilling and reskilling. To improve the efficiency of programmes, policymakers should be in constant dialogue with representatives of industry for the purposes of creating new learning opportunities for learners at all stages of their lives, as well as improving access to networking tools for lifelong learning and vocational development.

7.3 Practical Recommendations for Industry Practices: Considering the utilized stand-point, the industries can develop many useful suggestions supported by this study's findings, which are:

1. Invest in Continuous Training: Enterprises should earmark funds for persistent training and development projects so as to enable the workers pick up the indispensable tools required to stay on top in their career.

2. Tailor Programs to Company Needs: Training programs must be designed, so they can fit the unique requirements and expectations of individual organizations. Such tasks could include conducting the needs assessments as well as the employee surveys aimed to define the areas of work that need to be improved.

3. Promote a Culture of Learning: As workplace advancement embraces learning and skills enhancement through workshops, seminars, and online courses that cater for the area of specialization, organizations need to create a culture of continuous learning and skills enhancement.

4. Collaborate with Educational Institutions: Different firms could partner with educations organizations so that they can be equipped with specialized training programs and classes to address the industry's challenges in skills.

5. Monitor and Evaluate Program Effectiveness: To guarantee the correctness of training programs, the constant performance review and evaluation, are being crucial. Organizations may consider implementing frequent feedback from the employees and keep track of important outcome indicators in order to confirm the influence of these training activities.

Through making these suggestions a business can achieve several objectives, such as an increase in the workforce' capability, a growth in the overall effectiveness of the organization, and staying ahead of their competitors in the evolving IT and Software Development market.

8.0 Conclusion

8.1 Summary of Findings: These research findings enlighten the employers about, their employees of IT & Software development industry in Kano state of Nigeria, perception about reskilling and up skilling. Key insights were drawn with the help of both descriptive and inferential statistics into the effectiveness of these initiatives and factors that affect the implementation process. The most of the surveys' recipients testified to the favorability of re-sampling as well as developing of new skills, thus signifying indispensability in such a competitive labor market. Nevertheless, the in-depth study proves that the different companies are showing the variation in workforce development criteria, indicating the requirement of the customized approaches towards workforce development. Governmental policies (such as regulations for instance), Funding availability, technological advancements, industry demand, and organizational initiatives appeared to be factors involved in the perceived importance of these initiatives by the employees.

8.2 Contributions to Knowledge: This research adds to the existing body of knowledge regarding the efficacy of reskilling and upskilling initiatives around IT and Software Development industry by presenting empirical evidence. It was possible to get the attention of the workers in Kano State through the exploration of their multiple perspectives, thus, important conclusions were drawn concerning the factors that influence the workforce development plan. The results would be useful in determining strategies at an organizational level, developing robust policymaking, guiding the industry practices, as well as future research pursuits in human resource management and organizational development.

8.3 Limitations of the Study: Although it has made a notable effort, this research has a few limitations that must be taken into account. Firstly, the small sample size raises a red flag about the generalizability of the results, hence not all may agree to the result. Another tool of the study was the self-reports that subjects gave, which might have all been subject to some response bias. Future research needs to address the limitations of this study by selecting larger and more representative samples and applying mixed-methods approach to avoid errors that might arise from only one method.

8.4 Directions for Future Research: Taking the results of this study as a starting point, going further can involve exploring other variables that have an impact on staff members' opinions about reskilling/upskilling programs, for example, the organizational culture, the kinds of leadership style used at work and work satisfaction level. In addition, longitudinal studies could look into the long-term effects, if any, of performed training on employee performance, retention, and career advancement. Besides that, the possibility of carrying out comparative research for various regions or industries could offer the researchers much to learn regarding the best options and the effective approaches of human resource development.

Thus, the project provides an essential background on the role of reskilling and upskilling initiatives in IT and Software Development realm, which increase employee competency and business competitiveness. Through the identification of the discovered problems and through searching for some new research opportunities, the future researches could be more successfully focused on this particular sphere of management in human resource.

References

1. Alavi, M., & Leidner, D. E. (2001). Research commentary: Technology-mediated learning—A call for greater depth and breadth of research. *Information systems research*, *12*(1), 1-10.
2. Bughin, J., Hazan, E., Lund, S., Dahlström, P., Wiesinger, A., & Subramaniam, A. (2018). Skill shift: Automation and the future of the workforce. *McKinsey Global Institute*, *1*(2018), 3-84.
3. Fraumeni, B. M., & Liu, G. (2021). Summary of World Economic Forum, "The Global Human Capital Report 2017—Preparing people for the future of work". In *Measuring Human Capital* (pp. 125-138). Academic Press.
4. Akour, M., & Alenezi, M. (2022). Higher education future in the era of digital transformation. *Education Sciences*, *12*(11), 784.
5. Pedron, Z. (2018). The skills revolution of the 21st century: It's time to re-calibrate. *On Research (Journal of EU Business School)*, *1*, 20-28.
6. Ali, A. A. B., Qooz, F. A., & Mustafa, O. S. (2020). Tooth avulsion: Etiology and management. *Bahrain Medical Bulletin*, *42*(3).
7. Burr, C., & Floridi, L. (2020). The ethics of digital well-being: A multidisciplinary perspective. *Ethics of digital well-being: A multidisciplinary approach*, 1-29.
8. Becker, G. S. (1985). Human capital, effort, and the sexual division of labor. *Journal of labor economics*, 3(1, Part 2), S33-S58.
9. Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychological review*, *84*(2), 191.
10. Adepoju, O., Akinyomi, O., & Esan, O. (2023). Integrating Human-Computer Interactions in Nigerian Energy System: A Skills Requirement Analysis. *Journal of Digital Food, Energy & Water Systems*, *4*(2).
11. Nwagu, O., & Ogbo, A. (2023). Digital Transformation and Economic Sustainability in Innoson Technical & Industrial Company, And Juhel Nigeria Limited. *Advance Journal of Management and Social Sciences*, *7*(4), 31-50.
12. Ajibade, P. (2018). Technology acceptance model limitations and criticisms: Exploring the practical applications and use in technology-related studies, mixed-method, and qualitative researches. *Library Philosophy and Practice*, *9*.
13. Alaba, F. A., Oluwadare, A., Sani, U., Oriyomi, A. A., Lucy, A. O., & Najeem, O. (2024). Enabling Sustainable Transportation Through IoT and AIoT Innovations. In *Artificial Intelligence of Things for Achieving Sustainable Development Goals* (pp. 273-291). Cham: Springer Nature Switzerland.
14. Belgaum, M. R., Alansari, Z., Musa, S., Alam, M. M., & Mazliham, M. S. (2021). Role of artificial intelligence in cloud computing, IoT and SDN: Reliability and scalability issues. *International Journal of Electrical and Computer Engineering, 11(5), 4458*.
15. Arya, R. K. K., Bisht, D., Dhondiyal, K., Kausar, M., Lalhlenmawia, H., Bhutia, P. L., & Kumar, D. (2023). Role of 3D printing in pharmaceutical industry. In *New Horizons for Industry 4.0 in Modern Business* (pp. 273-294). Cham: Springer International Publishing.
16. Abdullahi, H. S., Sheriff, R., & Mahieddine, F. (2017). Convolution neural network in precision agriculture for plant image recognition and classification. In *2017 Seventh International Conference on Innovative Computing Technology (INTECH)* (Vol. 10, pp. 256-272). New York: Ieee.
17. Gyll, S. P. (2021). Career development by design, not default: Creating a more efficient and data-driven process by connecting aptitude-based learner guidance to post-secondary pathways, competency-based credentials, and high-demand jobs. The Journal of Competency-Based Education, 6(1), e1236.
18. Naseer, A., Naseer, H., Ahmad, A., Maynard, S. B., & Siddiqui, A. M. (2021). Real-time analytics, incident response process agility and enterprise cybersecurity performance: A contingent resource-based analysis. *International Journal of Information Management*, *59*, 102334.
19. Nübler, I. (2016). New technologies: A jobless future or golden age of job creation. *International Labour Office Research Department Working Paper*, *13*, 22-23.
20. Kano State Government, 2019 Retrieved from https://kanobudget.wordpress.com/wp-content/uploads/2019/05/ksdp-2016-2019.pdf
21. Pradhan, I. P., & Saxena, P. (2023). Reskilling workforce for the Artificial Intelligence age: Challenges and the way forward. In *The adoption and effect of artificial intelligence on human resources management, Part B* (pp. 181-197). Emerald Publishing Limited.
22. World Bank, 2020 Retrieved from https://www.worldbank.org/en/publication/wdr2020
23. European Commission, 2020 Retrieved from https://commission.europa.eu/index_en
24. Alavi, M., & Leidner, D. E. (2001). Research commentary: Technology-mediated learning—A call for greater depth and breadth of research. *Information systems research*, *12*(1), 1-10.
25. McKinsey Global Institute, 2018 Retrieved from https://www.mckinsey.com/mgi/overview/in-the-news/2018
26. World Economic Forum, 2020 Retrieved from https://www.weforum.org/events/world-economic-forum-annual-meeting-2020/
27. European Commission, 2017 Retrieved from https://commission.europa.eu/publications/annual-activity-reports-2017_en

28. Becker, G. S. (1964). Human Capital: A Theoretical and Empirical Analysis With Special Referenceto Education.
29. Bughin, J., Hazan, E., Lund, S., Dahlström, P., Wiesinger, A., & Subramaniam, A. (2018). Skill shift: Automation and the future of the workforce. *McKinsey Global Institute*, *1*(2018), 3-84.
30. Bandura, A. (1978). Self-efficacy: Toward a unifying theory of behavioral change. *Advances in behaviour research and therapy*, *1*(4), 139-161.
31. Dhir, S. (2019). The changing nature of work, leadership, and organizational culture in future ready organizations.
32. Binuomote, M. O., Liadi, H. O., & Idike, I. (2018). Strategies for Improving Delivery of Business Education in Tertiary Institutions for National Development in Oyo State, Nigeria. *Journal of Association of Vocational and Technical Educators of Nigeria*, *23*(2), 49-58.
33. Akter, S., Michael, K., Uddin, M. R., McCarthy, G., & Rahman, M. (2022). Transforming business using digital innovations: The application of AI, blockchain, cloud and data analytics. *Annals of Operations Research*, 1-33.
34. Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.