ISSN: 1118-5872

FOS

MULTI-DISCIPLINARY JOURNAL

(Alvan Ikoku Federal University of Education)

TECHNOLOGICAL READINESS AS PREDICTOR OF ARTIFICIAL INTELLIGENCE ACCEPTANCE AMONG LECTURERS IN FACULTY OF SCIENCES, AIFUE, OWERRI, IMO STATE

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Abstract

In this era of digital revolution, artificial intelligence stands to be one of the emerging technologies to revolutionize the way we live, work, or communicate. While everyone is fighting to lead in this technology, their readiness differs, and acceptance challenges arise in the education sector. Therefore, this paper examined technological readiness as a predictor of artificial intelligence acceptance among lecturers in the Faculty of Sciences, Alvan Ikoku Federal University of Education, Owerri, Imo State. Three research questions guided the study. The study is a predictive design of a correlational type. All the 147 Faculty members formed the sample based on census sampling technique. Two instruments (Technological Readiness Index (TRI) and Questionnaire Acceptance of Artificial Intelligence (QAAI)) were used to collect data for this study. A single administration and Cronbach's Alpha ensured the reliability index of TRI (0.87) and QAAI (0.81) for the instruments. The data collected were analysed using multiple regression analysis, Pearson correlation coefficient, and coefficient of determination with the aid of Statistical Package for Social Sciences (SPSS) version 20.0. The results of the study revealed that each of the four variables of technological readiness (optimism, innovativeness, discomfort, and insecurity) relates positively and significantly to artificial intelligence acceptance. Also, there was a high relative predictive power of each of the four variables of technological readiness to artificial intelligence acceptance. The result also showed that the four variables of technological readiness jointly accounted for about 68.7% of the variance observed in lecturers' artificial intelligence acceptance. However, innovativeness had the highest predictive power. It was recommended that lecturers should always be ready to utilize AI in their academic activities and to increase its acceptance.

Keywords: Artificial Intelligence, AI-Acceptance, Technological Readiness

Introduction

Rapid technological innovations have become a defining feature of modern society, serving as a catalyst for economic progress and societal development. Among the current wave of technological innovations, Artificial Intelligence (AI) stands out as a pivotal force driving transformation across various sectors globally. AI is a broad field of computer science that focuses on creating intelligent machines or systems capable of imitating certain functionalities of human intelligence, including perception, learning, reasoning, problem solving, language interaction, and even producing creative work (COMEST, 2019). This combination of technologies allows AI systems to perform tasks that typically require human intelligence.

This rapid progress demands adaptability; what once took years may now happen in months or days. The role of artificial intelligence (AI) in our daily lives is increasingly evident, impacting our attitudes, activities, and interactions with others (Chen et al., 2020a). A particularly rapid growth in the use of AI technologies has been observed in the field of

education, where they are radically changing the nature of classroom instruction (Zhang & Aslan, 2021). In Nigeria, the education sector stands to benefit from harnessing the potential of AI to propel advancements and achieve the ambitious goals outlined in the country's agenda for 2050. To this end, the Minister of Communications, Innovation, and Digital Economy, Bosun Tijani, convened over 120 experts in AI to design a national AI strategy aimed at benefiting Nigeria's economy (punch, 2024). This strategy includes the introduction of AI into the education system, from primary to tertiary levels, to cultivate competitiveness and innovation. The emergence of AI presents both opportunities and challenges for the education sector. Boulay (2016) suggested that AI has the potential to be an effective learning tool, lessening the burdens on both teachers and students while offering personalized learning experiences. Some researchers believe AI can address some of education's core challenges, such as the lack of qualified teachers, student underachievement, and the achievement gap between students from different socioeconomic backgrounds (Seldon & Abidoye 2018; Davies et al. 2020; OECD 2021).

The integration of AI into educational settings may hold immense potential for enhancing research, teaching and learning experiences, particularly in disciplines such as sciences and mathematics. Despite the potential benefits of AI integration in education, challenges persist in its adoption, particularly among educators. These challenges include resistance to change, fear of job displacement, and lack of technological readiness and competence (Lacity & Willcocks, 2017; Reiss, 2021). However, the successful adoption of AI by educators relies heavily on their readiness and acceptance of technological innovations. There is indeed a need for educators to be ready to adjust, skill up, and continue to align with the AI tools in teaching and learning. Recognizing the importance of preparing educators for the AI-driven future, institutions like Alvan Ikoku Federal University of Education have taken proactive measures. Workshops and training sessions have been organized to equip faculty members with the necessary skills and competencies to leverage AI in both research and teaching, promoting readiness and acceptance.

Technology Readiness refers to a person's propensity to embrace and use new technologies in order to accomplish goals in home and work settings (Parasuraman & Colby, 2015). The technology readiness for AI technology is characterized by both positive and negative factors influencing the educator’s willingness to interact with AI technology. Technology readiness, according to Garg (2017), is the sense of eagerness to use technological innovations. Theory of Technology Readiness Index (TRI) can be seen as emerging from four personality dimensions: optimism (being hopeful about new things), innovativeness (enjoying trying new ideas), discomfort (feeling anxious about change), and insecurity (worrying about being left behind). According to Lin et al (2016), optimism and innovativeness represent individuals’ motivation, which contribute positively to an increase in an individual’s readiness, while discomfort and insecurity denote inhibition, showing adverse effects on readiness.

Technological optimism, as defined by Parasuraman and Colby (2015), represents a positive view of technology and a belief that it offers people increased control, flexibility, and efficiency in their lives. Optimism is a construct that reflects people’s positive attitude and intention to embrace and utilize new technology (Kuo et al, 2013). An optimistic view regards new technology as more beneficial, helpful, and user-friendly, with less concern

about its limitations. This definition can be extended to AI, as people may perceive it as either a "hell" or a "heaven" (Kaplan and Haenlein, 2020). It can be observed that optimists generally exhibit positive attitudes towards new technologies and display a higher level of enthusiasm for adopting them. Optimism has a significant influence on the perceived usefulness and perceived ease of use dimensions of the Technology Acceptance Model (Ekşioğlu & Ural, 2022). Additionally, optimism is a significantly strong predictor of the perceived usefulness of adopting new technology (Mahmood, 2023). The findings of the study by Kampa (2023) reveal that optimism contributes positively to the perceived ease of use (PEOU) and perceived usefulness (PU) of m-learning. Optimism and innovativeness of the users, which are positive readiness, are strong predictors of integrating technology readiness.

Technological innovativeness is characterized by a propensity to lead the way in technology adoption and spearhead innovative ideas (Parasuraman & Colby, 2015). The willingness to try out and adopt new technologies. Innovators are distinguished by their eagerness to embrace emerging technologies (Martens et al., 2017). Those with high levels of innovativeness typically exhibit an open-minded attitude and a greater inclination to utilize cutting-edge technologies (Oliveira et al., 2016). Moreover, innovativeness serves as a precursor to adoption intentions; those classified as innovative often maintain a positive perception of technology functionality even in situations where its potential value may be uncertain (Prodanova et al., 2018). Individuals characterized by high levels of technological innovativeness exhibit a heightened intrinsic motivation to embrace new technology and derive enjoyment from exploring novel technological advancements. Parasuraman and Colby (2015) define technology discomfort as a perceived lack of control over technology and a feeling of being overwhelmed by it. Discomfort is a sense of being outmatched by technology and a lack of control over it. Individuals who experience discomfort with technologies often view them as overly complex and incapable of meeting their needs (Lu et al., 2012). This dimension typically gauges the fears and concerns individuals encounter when faced with technology.

Technology insecurity is described as distrust of technology, stemming from skepticism about its ability to work properly and concerns about its potential harmful consequences (Parasuraman &Colby, 2015). Users require at least a basic understanding of how AI systems function to develop confidence in them (Kaplan & Haenlein, 2019). Two dimensions related to negative perceptions in technology readiness are discomfort and discomfort. Rahim et al. (2022) found that Insecurity has no significant moderating effect on the relationships between technology acceptance factors. The academic staff perceive security as a non-issue in their acceptance of the new technology, especially when they believe that the technology offers numerous benefits for facilitating teaching and learning within the Open and Distance Learning (ODL) environment.

Technology acceptance can be defined as a user's willingness to employ technology for the tasks it is designed to support (Teo, 2011). The recent research on technology acceptance in the educational context is based on the Technology Acceptance Model (TAM) (Scherer & Teo, 2019; Tarraga-Minguez et al., 2021). The Technology Acceptance Model (TAM), proposed by Davis in the 1980s, The Technology Acceptance Model (TAM), proposed by Davis in the 1980s, is one of the most influential theories used to understand and

may predict technology acceptance. Three critical factors contribute to a user's acceptance of a new technology: the perceived usefulness (PU), perceived ease of use (PEOU), and the user's attitude towards its usage (ATU), as highlighted by Mugo et al. (2017). Additional external factors were incorporated into the model in response to growing criticism of TAM, to contribute its further development: self-esteem, behavioural intention, self-efficacy, subjective norm, age, anxiousness/ stress, and confidence (Guner & Acarturk, 2020). In this study the researchers considered perceived usefulness, perceived ease of use, attitude, self-esteem and behavioural intention as factors for AI acceptance.

Perceived Usefulness is defined as the degree to which a person believes that use of technology will produce better outcomes (Farahat, 2012). Perceived ease-of-use is the extent to which a user feels that a particular technology (AI) will require a small amount of energy in its applicability, Attitude Towards Usage is defined as the evaluative effect of negative or positive feeling of the individual in performing a particular behaviour (Ajzen & Fishbein, 2000). Self-esteem includes all positive and negative self-evaluations related to perceiving oneself as a respectable and valuable person (Rosenberg, 1979). Behavioural Intention to Use is defined as the extent to which a lecturer formulates a conscious plan to use or not to use AI for teaching and learning purposes (Davis, 1989).

Studies have shown a positive correlation between Technology Readiness Index (TRI) sub-dimensions like innovativeness, optimism, discomfort, and insecurity with technology acceptance of specific new technologies, such as information technology ICT, Open and Distance Learning (ODL), M-learning etc. (Panday, 2015c; Rahim et al, 2022; Kampa, 2023). Individuals who exhibit high levels of innovativeness and optimism often show greater receptiveness and ease in learning novel technologies, resulting in increased levels of acceptance. It has been argued that technological readiness can predict AI adoption (Damerji and Salimi, 2021). They applied the Technology Adoption Model to predict user behaviour concerning AI in accounting. Their findings suggest that this model can also be utilized to comprehend lecturer adoption. In contrast, the study conducted by Tunmibi and Okuonghae (2023) on librarians in Nigeria found no significant direct relationship between technological readiness and AI adoption. This suggests that other factors might also play a significant role in influencing the adoption of AI among librarians in Nigeria.

There is no record of a study on the utilization of artificial intelligence in their practice by Nigerian educators, including AIFUE lecturers. Extant literature suggests that educators with high technological readiness are more likely to embrace educational technology. A review of literature on predictors of AI acceptance revealed that the technological readiness of lecturers as factors has yet to be explored in the Nigerian educational sector. Therefore, this paper focused on the technological readiness as predictor of artificial intelligence acceptance among lecturers in Faculty of Sciences, Alvan Ikoku Federal University of Education, Owerri, Imo State. The researchers applied the theory of Technology Readiness Index (TRI) and combined it with the Technology Acceptance Model (TAM). These two theories serve as research paradigms to elucidate technology adoption and acceptance, as suggested by Porter and Donthu (2006).

Research Questions

The study provides answers to the following research questions:

1. To what extent does each of the four variables of technological readiness (optimism, innovativeness, discomfort, and insecurity) relate significantly to Artificial Intelligence acceptance?
2. What are the relative predictive powers of each of the four variables of technological readiness to Artificial Intelligence acceptance?
3. What is the joint predictive power of the four variables of technological readiness to Artificial Intelligence acceptance?

Methods

The study is a predictive design of a correlational type. All the 147 Faculty members of Alvan Ikoku Federal University of Education (AIFUE), Owerri, formed the sample based on census sampling technique. Two instruments were adapted to collect data for this study: the Technological Readiness Index (TRI) by Parasuraman and Colby (2015) and Questionnaire Acceptance of Artificial Intelligence (QAAI) from the works of Davis (1989) and Chuttur (2009). TRI consisted of 16 items for the four dimensions (optimism, innovativeness, discomfort, and insecurity) with 4 question items for each dimension. While QAAI consisted of 20 items that measured five factors, which were perceived usefulness, perceived ease of use, attitude, self-esteem, and behavioural intention, with 4 items each. A single administration and Cronbach's Alpha ensured the overall reliability index of TRI (0.87) and QAAI (0.81) for the instruments. The data collected were analysed using simple and multiple regression analysis, Pearson correlation coefficient and coefficient of determination with the aid of Statistical Package for Social Sciences (SPSS) version 20.0. Decision was done at a 0.05 alpha level of significance.

Results

Table 1: Summary of the correlation matrix

Variables	Optimism	Innovativeness	Discomfort	Insecurity	AIA
Optimism	1.000				
Innovativeness	0.699	1.000			
Discomfort	0.228	0.159	1.000		
Insecurity	0.256	0.277	0.849	1.000	
AIA	**0.635***	**0.726***	**0.427***	**0.568***	**1.000**

*Significant at $p < 0.05$

The results in Table 1 show that each of the four variables of technological readiness (optimism, innovativeness, discomfort and insecurity) related positively and significantly with artificial intelligence acceptance. This implies that an improvement in each of the technological readiness (optimism, innovativeness, discomfort and insecurity) would lead to increased artificial intelligence acceptance.

Table 2: Relative predictive powers of the independent variables

	Optimism	Innovativeness	Discomfort	Insecurity
R	0.635	0.726	0.427	0.568
R-Square (R^2)	0.404	0.527	0.183	0.323
Predictive powers	**40.4%**	**52.7%**	**18.3%**	**32.3%**

Table 2 presents the relative predictive powers of the technological readiness variables to the variance observed in artificial intelligence acceptance. The result shows that optimism, innovativeness, discomfort, and insecurity predicted 40.4%, 52.7%, 18.3% and 32.2% respectively, of the variance observed in artificial intelligence acceptance. However, innovativeness had the highest predictive power, and discomfort the least.

Table 3: Summary of the multiple regression analysis

Sources of variation	Sum of squares	df	Mean square	F	Sig.
Regression	47819.356	4	11954.839	77.137	.000
Residual	20922.437	135	154.981		
Total	68741.793	139	**Total**		

R=0.834, R^2= 0.696, Adjusted R^2= 0.687, Standard Error=12.449

Table 3 presents a summary of the multiple regression analysis of the prediction of the technological readiness variables when joined together. The result shows that the predictor variables jointly accounted for about 68.7% of the variance observed in artificial intelligence acceptance. The prediction is significant as attested to by the multiple regression analysis carried out ($F = 77.137$, $p < 0.05$).

Discussion of Findings

The study's findings underscore the crucial role of technological readiness in shaping attitudes towards artificial intelligence (AI). By examining four key variables-optimism, innovativeness, discomfort, and the research illuminates their positive and significant relationship with AI acceptance. This suggests that enhancing any of these readiness factors could effectively bolster acceptance levels. Moreover, the study highlights the predictive power of these variables, with innovativeness emerging as the most influential predictor. This insight underscores the importance of fostering a culture of openness to innovation and technological optimism to facilitate AI integration. Furthermore, the study reveals that the combined influence of technological readiness variables accounts for a substantial portion of the observed variance in AI acceptance.

This corroborates the findings of Panday (2015), Parasuraman and Colby (2015), Martens et al. (2017), Damerji and Salimi (2021), Mahmood et al. (2022), Tunmibi and Okuonghae (2023). These findings indicate that individuals' attitudes towards AI are not isolated phenomena but are deeply intertwined with their broader technological readiness. The findings suggest that efforts to promote AI acceptance could focus on addressing multiple facets of technological readiness concurrently. By doing so, organizations and policymakers can better anticipate and address potential barriers to AI adoption, ultimately fostering a more receptive environment for technological advancement. Importantly, the

study's use of multiple regression analysis validates the predictive strength of the technological readiness variables in shaping AI acceptance. This statistical rigor lends credence to the practical implications of the findings, suggesting that interventions targeting these readiness factors are likely to yield tangible improvements in AI acceptance levels. This is in agreement with Rahim et al. (2022) who stated that as AI continues to permeate various aspects of society, understanding and addressing the underlying drivers of acceptance becomes increasingly critical. By elucidating the role of technological readiness, this research offers valuable insights for guiding strategies aimed at fostering widespread AI acceptance and integration (Tunmibi & Okuonghae, 2023).

In conclusion, the findings of this study shed light on the intricate relationship between technological readiness and artificial intelligence acceptance. The positive and significant associations observed between optimism, innovativeness, discomfort, and insecurity with AI acceptance underscore the importance of addressing these readiness factors to foster a more receptive environment for AI integration. Furthermore, the predictive power of these variables, particularly innovativeness, highlights the need to cultivate a culture of openness to technological advancement. The collective influence of technological readiness variables on AI acceptance suggests the interconnectedness of individuals' attitudes towards AI with broader technological attitudes and beliefs. This study's rigorous analysis, supported by multiple regression, validates the practical significance of these findings, emphasizing the value of targeted interventions to enhance technological readiness and promote widespread AI acceptance. As societies navigate the evolving landscape of AI, understanding and addressing the underlying drivers of acceptance remain paramount for realizing the potential benefits of this transformative technology.

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