Effect of digital technology adoption on the performance of supervisory agencies of the Nigerian communications sector: Does behavioural intention matter?

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Abstract

This study examines the impact of digital technology adoption on operational efficiency in service delivery by supervisory agencies in Nigeria's communications sector. It emphasises the Niger Communications Commission (NCC) and the Niger Postal Service (NIPOST). The study is framed within the context of the Unified Theory of Acceptance and Use of Technology (UTAUT) model, which encompasses the following factors: Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, Habit, Perceived Credibility, and Behavioural Intention, serving as both a control and mediating variable. The study employed a quantitative research design with a cross-sectional survey strategy to collect data from a sample of 352 employees from the agencies under study. The multiple regression analysis revealed that Performance expectations, social influence, perceived credibility and behavioural intention have a statistically significant positive impact on service delivery efficiency. The study also analysed the Behaviour Intention as a mediator and found that it reinforced the positive Moderating Effect, impacting the adoption of digital technologies and the efficiency of service delivery. The data highlighted the need to build confidence in digital technologies, particularly in their motivational digital integration, as well as in the infrastructure required for their adoption and the efficiency of the services they offer. The analysis contributes to the existing knowledge of digital technology's application within government regulatory bodies and provides practical solutions to the challenge of slow digital transformation in Nigeria's communications industry.

Keywords: Behavioural intention, Effort expectancy, Facilitating conditions, Perceived credibility, Performance expectancy, Service delivery efficiency.

1. Introduction

The ongoing digital revolution has substantially altered governance architectures worldwide, deploying multifaceted technologies designed to enhance levels of transparency, operational efficiency, and citizen participation. Public authorities are progressively adopting digital mechanisms to rationalise procedures and broaden access to essential services, thereby cultivating institutions that are more accountable and responsive to the needs of society [1, 2]. The systemic transition towards digital governance exhibits pronounced relevance in developing jurisdictions, particularly Nigeria, where governmental institutions are burdened by multifaceted administrative impediments that intersect with sustained patterns of rapid demographic increase and escalating socio-economic pressures [3, 4]. Against this backdrop, the Federal Government of Nigeria has launched an expansive and strategic digital modernisation programme, with the explicit intent of harnessing contemporary and emerging technologies in order to elevate the performance of the public sector. However, an interlocking constellation of vexing challenges continues to impede the trajectory of genuine digital transformation, thereby rendering the incorporation of digital instruments within governance processes a highly intricate and exigent undertaking.

The transition cannot proceed without surmounting a framed catalogue of interrelated obstacles, of which infrastructural fragility looms as the most profound constraint. Successful integration of technology within public sector institutions demands a solid infrastructural base; yet, the country continues to contend with inconsistent internet links, recurrent power failures, and broad infrastructural shortcomings, each of which substantially erodes the state's overall digital capacity [3, 5]. This infrastructural handicap is further exacerbated by a shortage of skilled human capital, with many public sector workers lacking the digital competencies necessary for leveraging contemporary technologies [4]. Consequently, the skills deficit has fostered a measure of institutional inertia, as personnel frequently resist the adoption of digital instruments, characterising such tools as intimidating or perceiving their own digital proficiencies as insufficient [6].

Beyond the interrelated challenges of technological infrastructure and human competencies, an enduring impediment to the digital transformation of public organisations resides in the active or tacit resistance to change. Numerous public-sector organisations continue to operate using rigidly tiered management hierarchies and labour-intensive documentation processes, which induces reluctance among staff to cede well-entrenched practices in favour of horizontally integrated and digitally enabled organisational platforms [1, 7]. Accordingly, the obstinacy emanates from anxieties about job permanence, an inadequate appreciation of the performance advantages that integrated information management offers, and the conviction that the introduction of sequential applications will destabilise embedded transactional routines [8]. Concurrently, concerns regarding information security—from the disruptive threats of uncontrolled data exfiltration to the more severe peril of an orchestrated strategic cyber-invasion—compound prevailing misgivings. Absent coherent and demonstrably resilient protective architectures, public agencies consequently elect to withhold passage to contemporary digital information infrastructures, transparently converting mistrust into de facto policy and thereby impeding pervasive and systematic transformation [8, 9].

Limited financing has emerged as a significant bottleneck in Nigeria's ongoing digital transformation of the public sector. Initial capital outlays for hardware and software can be overwhelming. Still, the actual fiscal exigency often lies in the cumulative follow-on expenses, including system integration, ongoing maintenance, cybersecurity enhancements, and, of paramount importance, comprehensive training for civil service personnel [2, 7]. Nigeria's recurrent fiscal constraints, exacerbated by erratic revenue flows and perennial budget deficits, make the total cost of even modest digital rollback prohibitive, effectively camouflaging the cost of transition as a recurring penalty rather than a one-time investment [3]. Equally onerous is the rigid scaffolding of current administrative statutes and procedural mandates—norms designed for a low-tech environment—that obstruct the compressed procurement timelines and iterative piloting cycles customary in modern digital public management. Beneath these institutional constraints, the entrenched networks of ageing administrative applications—building on mutually exclusive hardware and data specifications—present a low degree of interoperability [4, 8]. Such architectural fragmentation divorces departmental deliverables, compels narrowly scoped digital island solutions, and curtails any prospect of achieving the compounding synergies and scalability that holistic transformation seeks to confer [10].

A central challenge to Nigeria's digital transformation lies in the enduring divide that isolates communities by denying them reliable access to the technologies that underpin modern life. By restricting even the rudimentary consumption of digital services to select populations, the divide reinforces existing inequalities. It becomes an outright barricade to the universal diffusion of the technologies the economy and society desperately require [6, 7]. Simultaneously, the persistent political instability that characterises the country sows uncertainty, making large-scale digital infrastructure investments—and the planning horizons that must accompany them—all the less tenable. In an environment characterised by periodic disruptions, many digital initiatives encounter delays that jeopardise their schedules and occasionally nullify envisioned outcomes; consequently, the Nigerian government struggles to sustain the decisive and systematic momentum necessary to advance its digital modernisation agenda [5]. Compounding these challenges is the phenomenon of vendor lock-in, in which public authorities become disproportionately dependent upon specific technology providers. Such dependency erodes institutional flexibility and inhibits the rapid and cost-effective integration of emerging, economically advantageous technologies, thereby perpetuating incremental rather than transformative progress in the public sector's digital capabilities.

Nigeria's regulatory bodies in the communications sector, foremost among them the Nigerian Communications Commission (NCC), are tasked with stabilising the market, safeguarding consumer interests, and ensuring adherence to established regulatory norms. Given the considerable expansion of the Nigerian telecommunications industry, the function of these authorities is assuming a progressively more pivotal position. Effectiveness in regulatory agencies remains tightly interlinked with their ability to master the integration and usage of frontier digital technologies. Therefore, a granular analysis of the key antecedents of digital uptake—namely, anticipated utility, perceived ease of use, normative

reinforcement, and the quality of underlying infrastructural conditions—constitutes an indispensable step toward securing enhanced service delivery outcomes [1, 10]. The Unified Theory of Acceptance and Use of Technology, along with its augmented variant, UTAUT-2, provides a suitable conceptual and empirical framework for systematically examining these antecedents and mapping their mediating and moderating roles in the specific context of regulatory institutions [11, 12].

The Unified Theory of Acceptance and Use of Technology (UTAUT) identifies four key determinants that influence the acceptance of new systems: performance expectancy, effort expectancy, social influence, and facilitating conditions. Within Nigeria's regulatory bodies, performance expectancy is the decisive driver, as projected improvements in key operations—gains in efficiency, curtailment of fraud, and enhanced service quality—constitute the primary motivator for adoption. At the same time, effort expectancy—or how easy stakeholders believe the system will be to use—acts as a significant moderating influence, capable of tempering the enthusiasm encouraged by anticipated performance gains. The entrenched bureaucratic architecture and the uneven distribution of digital acumen within these agencies render the design of intuitive, low-friction digital platforms indispensable. Systems that afford seamless integration into existing operational routines, while minimising cognitive and procedural overhead, emerge as the linchpin of sustainable adoption [11, 13, 14].

Social influence and enabling conditions remain pivotal determinants in the uptake of digital technologies within regulatory frameworks. Within such an environment, both market participants and end-users exert normative pressure on supervising authorities to champion digital instruments that promise greater transparency and more efficient service delivery [8]. Simultaneously, the availability of enabling conditions—namely, adequate funding, robust technological infrastructure, and unequivocal institutional endorsement—remains fundamental to overcoming the technical and operational barriers that conventionally impede the uptake of digital solutions [15]. Satisfying this criterion equips Nigerian regulatory authorities with the capability to increase the velocity of digital integration, thereby enhancing the efficacy of their oversight functions in the communications sector. A methodical assessment of these catalytic variables, in conjunction with their dynamic interdependencies with broader contextual factors, is therefore imperative to the formulation of strategic architectures aimed at advancing the successful digital transformation of Nigeria's communications supervisory agencies.

The present study is structured to assess the impact of digital technology integration on the operational performance of the two central regulatory authorities within Nigeria's communications sector: the Nigerian Communications Commission (NCC) and the Nigerian Postal Service (NIPOST). These institutions occupy a strategic position by establishing norms, safeguarding service quality, and advocating for universal service, thereby functioning as barometers of sector-wide evolution. It is, therefore, purposeful to scrutinise their digital initiatives as proxies for sectoral advancement. The investigation targets two concomitant but distinct goals: to empirically assess how five antecedent constructs—performance expectancy, effort expectancy, social influence, facilitating conditions, and perceived credibility—determine the trajectory of NCC and NIPOST's digital transformation; and to ascertain the mediating role of behavioural intention within the established technology acceptance paradigm [5, 6, 8, 15]. The analytical framework thereby enables the articulation of the premise that psychosocial determinants, manifest at both the individual and organisational levels, govern the pre-choice cognitions that frame the timing and scale of technology deployment. This dual focus thereby enables a granular understanding of the latent psychological circuits through which both agencies evaluate, negotiate, and ultimately deploy contemporary digital enablers. By situating the empirical enquiry within NCC and NIPOST, the study will test the theoretical and operational interdependencies of the independent variable—behavioural intention—and the resultant service delivery efficiency, thereby yielding actionable findings that promise to strengthen the agencies' digital competencies and advance Nigeria's overarching digitalisation agenda.

2. Literature Review

This study is grounded in the Unified Theory of Acceptance and Use of Technology (UTAUT), a robust analytic framework widely employed to map the integration of digital technologies. UTAUT posits a weighted array of determinants—namely, Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions [16, 17]—whose interactional effects illuminate technology uptake. Its schema is particularly suited to the dimensions of the Nigerian communications market, enabling an in-depth exploration of enterprise distribution, service mal-distribution, and closure. The framework is of signal interest to the interaction between the Nigerian Communications Commission (NCC) and the Nigerian Postal Service (NIPOST), the composite regulatory authority overseeing the telecommunications and postal sectors. Both bodies are invested in horizontal convergence of oversight, market expansion, and consumer welfare in response to the rapid digitalisation of service delivery. The central aim of this study is to utilise UTAUT to hypothesise the factors influencing digital transformation in the two agencies, thereby providing an in-depth analysis of their contribution to enhancing regulatory effectiveness.

As an Agency's digital tools enhance employee performance, Performance Expectancy plays an essential role in their adoption within the Agency. In Nigeria, automated licensing, as explored by Kapoor, et al. [18] along with Spectrum Management, has rapidly improved operational efficiency and decision-making. They can also significantly increase productivity and, therefore, the willingness to use new systems among NCC and NIPOST employees. In addition to this, Effort Expectancy, as ease of use impacts adoption, is the most important.

Regulatory institutions in Nigeria are at varying stages in their understanding of digital technologies, thus highlighting the need for user-oriented digital interfaces coupled with requisite training [19]. The influence of peers and superiors is significant for the research's focus on social influence, as evidenced by the NCC and NIPOST, where the adoption of technology is a top-down controlled process [20]. Furthermore, considering the Facilitating Conditions, which encompass both technological resources and organisational encouragement, is crucial in addressing the infrastructural obstacles to the application of technology in these agencies [21]. The identified core constructs, along with moderating factors such as age,

gender, and experience, will help shed more light on digital adoption in supervisory agencies in Nigeria, enhancing their regulatory functions and aligning with the country's digital transformation objectives [17, 22].

A myriad of research has focused on the use of digital technologies and their effects on organisational productivity in various industries, while also outlining the challenges and success factors of their practical use. In the study of Sonhaji, et al. [23] the digital transformation of the Surabaya City Office for Population Administration and Civil Registration (COPACR) in Indonesia was analysed. Several internal and external obstacles were identified regarding the adoption of digital tools. The lack of digital adoption was partly explained by the presence of low funding, low levels of worker involvement, and low officer competency, as digital tools were relatively easily accessible. This study evidences the findings of Muduli and Choudhury [24] who examined the use of an agile workforce in the banking sector. They claim that technology acceptance in the banking sector boosts technology adoption, with the agile workforce acting as a mediating variable. In the same manner, Binsar, et al. [25] highlighted the technical and service issues associated with using the JKN mobile application, also emphasising the difficulties in adopting digitalisation for public health services. All serve to accentuate the internal and external barriers, such as low infrastructure, low workforce skills, and significant technology gaps that still require attention.

The role that leadership plays, as well as the support from the organisation, in the adoption of technology is examined in studies on the banking and financial sectors. For instance, the work of Awawdeh, et al. [26] on the competitiveness of banks with respect to the digitalisation of services reveals that internet banking and ATMs enhance competitiveness, while mobile banking adoption is somewhat limited. This aligns with Putrevu and Mertzanis [27] who identified technological, user acceptance, and infrastructure tiers as the primary determinants of digital payment adoption in developing countries. They suggest that both studies emphasise the need for investment in more secure and user-friendly digital systems to enhance organisational effectiveness. Similarly, Murthy and Gopalkrishnan [28] highlights in their study on the banking sector the susceptibility to digital fraud, noting that senior citizens, who are emotionally vulnerable, are the most susceptible and require protection at the regulatory level. The culmination of findings from these studies suggests that digital transformation in organisations needs strong organisational commitment and support from the leadership.

The relationship between digital transformation and operational efficiency has been studied by Bertacchini, et al. [29] who examined the effect of digitalisation on internal audit functions in Italian companies. The authors of the study found that different organisations adopted digital technologies, which improved the effectiveness and scope of internal audits and collaboration among internal audit processes. Lee and Yeo [30] in South Korea examined the relationship between the adoption of ICT and innovation in the public sector, finding that the adoption of ICT positively impacted the innovativeness of employees, which in turn improved the organisation's performance. These results are corroborated by Al-Emran and Griffy-Brown [19] who examined the role of digital technologies on organisational performance and sustainable development. The studies mentioned above highlight how internal operations of an organisation are improved and innovation sought as a result of adopting digital technologies.

The emphasis on Fang and Liu [9] regarding corporate innovation and the contribution of digital transformation, highlights the transformative effect of corporate digital strategy innovation and its positive impact on self-financing, R&D investment, and financing on competitiveness. These findings correlate with the case study of transformation supported by digital technology in informal sectors by Acquah, et al. [31]. A significant focus of the latter case study emphasises informal sector growth, while ignoring the digital skills and infrastructure gap, which is generally viewed as a growth impediment. This attitude gap is also reported by Sultana and Alam [32] in their study on the adoption of blockchain in trade finance, which focuses on the costs, efficiency, and security of the bottom-line results. These and other studies reflect self-sustained development and innovation through business strategy.

In the most recent work by Moharrak and Mogaji [33] the challenges of implementing novel technologies in regulated industries are illustrated using the banking industry, as well as the potential of generative AI. The research indicated that the regulatory regime heavily governs the adoption of AI within the finance industry and the dependability of the technology's frameworks. Abdelhakim, et al. [22] also studied the opposite end of the spectrum, the impediments of Information technologies in some Government Institutions, and concluded that the primary barriers were a lack of proper guidance at the apex as well as the rigid, if shifting, organisational culture. These findings demonstrate the challenges of attempting to digitise public sector institutions, and the better rational and circumstantial prerequisites for their digitisation, embody the most commonly accepted public rationales for their digitisation. These findings, along with others, indicate the need for a comprehensive approach to technology adoption that transcends institutional and technological barriers to compliance and regulatory integration.

Although considerable research has been conducted on the adoption of digital technology in the Nigerian communication industry, focusing on the NCC and NIPOT, the application of the UTAUT theory to adoption analysis has been underexplored. This study elucidates the impact of the determinants of digital transformation technology. Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions are all incorporated. The study further addresses the intervening effect of Behavioural Intention (both as a control and mediating variable). Nevertheless, empirically applying the UTAUT to the regulatory bodies of the public sector of Nigeria, and specifically to the communication and postal services, has not been done in the country. There are fundamental issues that require further research globally, which can inform direct digital adoption policies and implementations in this particular region. This region lacks adequate infrastructure, a sufficient level of employee knowledge and skills, and organisational willingness and readiness.

3. Methodology

The present research employs a cross-sectional survey design of a quantitative nature to examine the determinants of digital technology adoption and its consequent effect on service delivery efficiency within Nigeria's telecommunications industry. Anchored in the Unified Theory of Acceptance and Use of Technology (UTAUT) [16, 17] the inquiry operationalises independent variables, specifically performance expectancy, effort expectancy, and social influence. It assesses their predictive power vis-à-vis adoption behaviour. The empirical framework targets six principal regulatory bodies, administering structured questionnaires to a purposive sample of civil servants and industry stakeholders. By isolating mediating obstacles—including infrastructural deficits and behavioural resistance—the analysis yields empirically grounded, policy-relevant recommendations aimed at accelerating digital transformation and optimising operational efficiency.

3.1. Population and Sample

The composite workforce of the two entities totals 10,811 personnel, as displayed in Table 1. Given that the population figure exceeds 10,000, [34] formular for establishing the requisite sample size is invoked. The expression is specified in the ensuing form:

$$\frac{x^2 N P (1-P)}{e^2 (N-1) + x^2 P (1-P)} \quad (1)$$

x^2=Chi-Square (3.841), e=Margin of error (0.5), N=Population (10,811), P=Proportion of Population (0.5) At 95% confidence level with a degree of freedom 1, the chi-square x^2=3.841.

$$\frac{3.841 * 10,811 * 0.5 * 0.5}{0.05^2 * (10,811 - 1) + (3.841 * 0.5 * 0.5)}$$

$$= \frac{10,381.2628}{0.0025 * 10,810 + 0.96025} = \frac{10,381.2628}{27.025 + 0.96025} = \frac{10,381.2628}{27.98525} = 371 \; approx$$

Table 1.
Population and Sample Distribution.

S/No	Agencies	Population	Sample Size
1	NCC	1,035	$\frac{1035}{10,811} * 371 = 36$
4	NIPOST	9,776	$\frac{9776}{10,811} * 371 = 335$
	Total	10,811	371

3.2. Model Specification

This inquiry extends the Unified Theory of Acceptance and Use of Technology (UTAUT) framework to ascertain the role of digital technology adoption in elevating the operational performance of supervisory bodies in Nigeria's communications industry. Six hypothesised antecedents—Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), Facilitating Conditions (FC), Habit (HB), and Perceived Credibility (PC)—are scrutinised to ascertain their relative weight in the decision to integrate digital instruments [16]. Thus, following the identified UTAUT variables, the functional model for this study is presented as follows:

$$SDE_i = f\{PE, EE, SI, FC, HB, PC\} \quad (2)$$

Where; SDE_i represent Service Delivery Efficiency; PE_i is Performance Expectancy; EE_i represents Effort Expectancy; SI_i stands for Social Influence; FC_i is the Facilitating Conditions; HB_i is the Habit and PC_i is the Perceived Credibility. This presented in econometrics form as follows:

$$SDE_i = \beta_0 + \beta_1 PE_i + \beta_2 EE_i + \beta_3 SI_i + \beta_4 FC_i + \beta_5 HB_i + + \beta_6 PC_i + \mu_i \quad (3)$$

While all variables remain as previously described, β_1 to β_6 are the parameters to be estimated. β_0 is the constant and μ_i is the error term.

The inclusion of Behavioural Intention (BI) is supported by Self-Determination Theory (SDT), which highlights the role of intrinsic psychological needs—autonomy, competence, and relatedness—in motivating human behaviour [10]. BI acts as a mediator, transforming motivation into action. Venkatesh, et al. [16] assert that BI directly influences actual technology use, reflecting intrinsic motivation. This framework offers a deeper understanding of the psychological mechanisms that drive digital technology adoption, emphasising the relevance of SDT in guiding this study.

$$SDE_i = \beta_0 + \beta_1 PE_i + \beta_2 EE_i + \beta_3 SI_i + \beta_4 FC_i + \beta_5 HB_i + + \beta_6 PC_i + \beta_{10} BI_i + \mu_i$$
$$(4)$$

BI_i is the Behavioural Intention and the interaction model is presented as follows:

$$SDE_i = \beta_0 + \beta_1 UTAUT_i + \beta_2 BI_i + \beta_9 (UTAUT * BI)_i + \mu_i \quad (5)$$

$UTAUT_i$ stands for the Unified Theory of Acceptance and Use of Technology (UTAUT) variables.

Table 2.
Reliability Statistics.

Variables	Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
Performance Expectancy	0.833	0.852	10
Effort Expectancy	0.871	0.883	10
Social Influence	0.874	0.888	10
Facilitating Conditions	0.829	0.831	10
Habit	0.833	0.852	10
Perceived Credibility	0.851	0.875	10
Behavioural Intention	0.815	0.825	10
Service Delivery Efficiency	0.812	0.822	10

3.3. Validity and Reliability of Research Instrument

The validity and reliability protocols for the measurement instrument were systematically implemented to confirm its capabilities in quantifying both the uptake of digital technologies and their consequential impact on operational efficiency within Nigeria's communications sector. Face validity was secured through a triadic panel of domain experts, complemented by a thorough content validation wherein each item was systematically mapped to the operational definitions of the study's latent constructs. A preparatory sample comprising ten employees of leading Nigerian communications regulatory and service firms yielded stability indices with all computed Cronbach's Alpha statistics surpassing the threshold of 0.7, thereby conferring a satisfactory degree of internal consistency [5]. Noteworthy was the analytic refinement phase, wherein ambiguous terminology pertaining to digital transformation was revisited, redefined, and standardised prior to the final instrument iteration. Collectively, sinecures adopted in response to both expert consultative judgement and empirical piloting results furnished the principal data collection instrument with the empirical soundness requisite for the principal analytic exercise.

3.4. Method of Data Analysis

The current investigation utilised multiple regression and correlation techniques to explicate the interrelations among the independent constructs—namely performance expectancy, effort expectancy, social influence, facilitating conditions, Habit, and perceived credibility—the control variable of behavioural intention, and the outcome of service delivery efficiency. Estimation of the model was performed using the Ordinary Least Squares (OLS) method; the resultant coefficients provided the magnitude and direction of influence for each predictor, whilst adjustment to the model's explanatory power was quantified via the coefficient of determination (R-square) to gauge the degree to which the independent and control variables account for variability in service delivery efficiency [11-13]. Additionally, the Durbin-Watson statistic was used to detect autocorrelation, ensuring model stability. The study also utilised Pearson Correlation analysis via SPSS to determine the significance of the relationships, with P-values aiding hypothesis testing [5]. If the P-value was less than 0.05, the null hypothesis was rejected, confirming the significance of the relationships and ensuring reliable conclusions.

4. Results and Discussions

Table 3 presents the distribution of questionnaires by gender. A total of 371 questionnaires were distributed, with 195 given to males and 176 to females. Of the distributed questionnaires, 185 males (52.56%) and 167 females (47.44%) returned their responses. This indicates a high response rate overall, with males slightly outnumbering females in terms of both distribution and returns. The total return rate is 95%, suggesting that the sample is representative mainly and the data collection process was efficient.

Table 3.
Questionnaire Distribution.

Gender	Distributed	Returned	Percentage (%)
Male	195	185	52.56
Female	176	167	47.44
Total	371	352	100

4.1. Descriptive Statistics and Correlation

Table 4 provides the descriptive statistics for the variables under study, including Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), Facilitating Condition (FC), Habit (HB), Perceived Credibility (PC), and Behavioural Intention (BI), with a sample size (N) of 413 for each variable. The range for each variable varies from 3.0 to 4.0, indicating that responses were generally concentrated around the higher end of the scale. The mean values for each variable also reflect this trend, with PE, BI, and HB having the highest mean scores (4.44, 4.36, and 4.00, respectively). These values suggest that respondents generally perceived high-performance expectancy, firm behavioural intention, and moderate to high levels of Habit regarding digital technology adoption. The standard deviations (ranging from 0.532 to 0.780) indicate moderate variability in responses across the different variables.

Table 4.
Descriptive Statistics.

Statistics	PE	EE	SI	FC	HB	PC	BI	SD
N	352	352	352	352	352	352	352	352
Range	3.6	3.2	3.0	4.0	3.2	3.8	3.4	4.0
Minimum	1.4	1.8	2.0	1.0	1.8	1.2	1.6	1.0
Maximum	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Sum	724.2	641.0	661.4	585.0	651.4	636.8	711.2	692.0
Mean	4.443	3.933	4.058	3.589	3.996	3.907	4.363	4.245
Std. Dev.	0.564	0.652	0.570	0.780	0.672	0.638	0.532	0.656
Variance	0.318	0.425	0.324	0.609	0.451	0.407	0.283	0.430
Skewness	-1.988	-0.689	-0.799	-1.013	-0.622	-0.787	-1.375	-1.446
Kurtosis	7.945	0.796	1.127	1.360	0.662	2.007	5.328	4.241

Note: PE-Performance Expectation, EE-Effort Expectancy, SI-Social Influence, FC-Facilitating Condition, HB-Habit, PC-Perceived Credibility, BI-Behavioural Intention, SD-Service Delivery.

The calculated skewness statistics reveal a pronounced negative asymmetry across the examined constructs, revealing a preponderance of elevated response ratings and a tapering tail of lower evaluations. For instance, the skewness coefficients for perceived ease of use (PE) and behavioural intention (BI) register at −1.988 and −1.375, respectively, both notably distant from the symmetry threshold, and thus confirm clustering toward the upper response limit. Supplementing the analysis, kurtosis measures display an especially acute peak for the PE variable (kurtosis = 7.945), reinforcing the interpretation of a restrictive band of response dispersion near the upper echelon. In contrast, the EE and SI measures exhibit lower kurtosis, aligning more closely with standard profiles and indicating a relative breadth of evaluative latitude. Collectively, the moment-based diagnostics convey a pronounced positive predisposition among respondents toward the dimensions posited to govern the uptake of digital technologies, with PE, BI, and facilitating conditions (FC) exerting the most salient influence on consensus regarding the operational efficiency of service delivery platforms.

Table 5 presents the correlation matrix for the variables under study, highlighting significant relationships among them. Strong positive correlations are observed between Performance Expectancy (PE) and Social Influence (SI) (r = 0.597, p < 0.01), as well as between Habit (HB) and Behavioural Intention (BI) (r = 0.609, p < 0.01), indicating that individuals who perceive higher benefits from technology (PE) are more likely to be influenced by others (SI) and develop habitual usage patterns (HB). Similarly, the correlation between Perceived Credibility (PC) and Service Delivery (SD) is also notably high (r = 0.662, p < 0.01), indicating that trust in technology has a significant impact on service efficiency.

Further analysis reveals moderate correlations between Effort Expectancy (EE) and Habit (r = 0.512, p < 0.01), as well as between Facilitating Conditions (FC) and Behavioural Intention (r = 0.299, p < 0.01), suggesting that ease of use and available support structures influence both the adoption of technology and users' behavioural intentions. Notably, Service Delivery (SD) is positively correlated with all other variables, with the highest correlation being with PC (r = 0.662, p < 0.01). This implies that improving factors like perceived credibility, effort expectancy, and Habit can significantly enhance service delivery efficiency in the Nigerian communications sector, supporting the overall digital transformation.

Table 5.
Correlations Matrix.

Variables	PE	EE	SI	FC	HB	PC	BI	SD
PE	1	0.404**	0.597**	0.306**	0.394**	0.433**	0.435**	0.504**
EE	0.404**	1	0.219**	0.182*	0.512**	0.357**	0.406**	0.331**
SI	0.597**	0.219**	1	0.393**	0.461**	0.517**	0.408**	0.485**
FC	0.306**	0.182*	0.393**	1	0.507**	0.533**	0.299**	0.483**
HB	0.394**	0.512**	0.461**	0.507**	1	0.547**	0.609**	0.569**
PC	0.433**	0.357**	0.517**	0.533**	0.547**	1	0.497**	0.662**
BI	0.435**	0.406**	0.408**	0.299**	0.609**	0.497**	1	0.631**
SD	0.504**	0.331**	0.485**	0.483**	0.569**	0.662**	0.631**	1

Note: **. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).
PE-Performance Expectation, EE-Effort Expectancy, SI-Social Influence, FC-Facilitating Condition, HB-Habit, PC-Perceived Credibility, BI-Behavioural Intention, SD-Service Delivery
Source: Author's Computation

4.2. Test of Hypotheses

Table 6 presents the results of the regression analysis examining the effect of digital technology adoption on the performance of supervisory agencies in Nigeria's communications sector, with service delivery (SD) as the dependent variable. The R-squared value of 0.601 indicates that approximately 60.1% of the variance in service delivery efficiency is explained by the independent variables in the model, suggesting a moderate fit. The Adjusted R-Square of 0.583 accounts for the degrees of freedom, slightly reducing the explained variance, which still indicates a solid explanatory power of the model. The Durbin-Watson statistic of 1.901 suggests that there is no significant autocorrelation in the residuals, supporting the model's stability.

In terms of individual variables, Perceived Credibility (PC) and Behavioural Intention (BI) exhibit substantial and statistically significant positive effects on service delivery efficiency, with unstandardised coefficients of 0.344 (p < 0.001) and 0.398 (p < 0.001), respectively. These findings suggest that as users perceive digital tools as more credible and develop stronger intentions to use them, service delivery efficiency improves significantly. The beta coefficients for both variables are also relatively high, indicating their substantial impact on the dependent variable.

Table 6.
Regression on the Effect of Digital Technology Adoption on the Performance of Supervisory Agencies of the Nigerian Communications Sector.

	Unstandardised Coefficients		Standardised Coefficients			Collinearity Statistics	
	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
(Constant)	-0.209	0.334		-0.625	0.533		
PE	0.194	0.080	0.167	2.429	0.016	0.544	1.839
EE	-0.056	0.064	-0.056	-0.879	0.381	0.643	1.554
SI	0.005	0.081	0.004	0.057	0.955	0.520	1.922
FC	0.101	0.054	0.121	1.874	0.063	0.621	1.610
HB	0.087	0.076	0.089	1.141	0.256	0.420	2.382
PC	0.344	0.073	0.334	4.728	0.000	0.515	1.940
BI	0.398	0.084	0.323	4.735	0.000	0.554	1.806
R-Square	0.601	Adjusted R-Square		0.583		Durbin Watson	1.901

Note: a. Dependent Variable: SD-Service Delivery
b. Independent Variable: PE-Performance Expectation, EE-Effort Expectancy, SI-Social Influence, FC-Facilitating Condition, HB-Habit, PC-Perceived Credibility, BI-Behavioural Intention.

Other variables, such as Performance Expectancy (PE) and Facilitating Conditions (FC), also exhibit positive relationships with service delivery efficiency, albeit with varying levels of significance. PE has a significant positive effect (B = 0.194, p = 0.016), indicating that users who believe in the benefits of digital tools for improving job performance are more likely to enhance service delivery efficiency. FC, with a marginal significance level (p = 0.063), suggests that while supporting conditions, such as infrastructure and resources, are essential, their effect on service delivery is not as robust. On the other hand, variables like Effort Expectancy (EE), Social Influence (SI), and Habit (HB) did not show statistically significant effects on service delivery, as their p-values are above the 0.05 threshold, indicating that they do not significantly contribute to explaining the variation in service delivery outcomes in this model.

4.2.1. The Mediating Effect of Behavioural Intention

Table 7 presents the results of the analysis examining the mediating effect of Behavioural Intention (BI) on the relationship between digital technology adoption and service delivery efficiency within supervisory agencies in Nigeria's communications sector. The R-squared value of 0.626 indicates that the independent variables, including BI and its interactions with other constructs, explain about 62.6% of the variance in service delivery efficiency, suggesting a good model fit. The adjusted R-squared value of 0.594 further refines the model, accounting for the number of predictors, which still supports the model's explanatory power. The Durbin-Watson statistic of 1.911 confirms that there is no significant autocorrelation in the residuals, indicating that the regression model is reliable.

Table 7.
Mediating Effect of Behavioural Intention on the Effect of Digital Adoption on the Service Delivery Efficiency of Supervisory Agencies of the Nigerian Communications Sector.

	Unstandardised Coefficients		Standardised Coefficients			Collinearity Statistics	
	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
(Constant)	1.980	0.346		5.723	0.000		
BI	-0.077	0.149	-0.062	-0.519	0.605	0.189	5.289
PEBI	0.043	0.019	0.247	2.288	0.023	0.235	4.264
EEBI	-0.008	0.015	-0.046	-0.512	0.609	0.346	2.891
SIBI	0.006	0.019	0.036	0.334	0.739	0.235	4.264
FCBI	0.023	0.013	0.149	1.785	0.046	0.392	2.549
HBBI	0.008	0.018	0.055	0.460	0.646	0.193	5.183
PCBI	0.074	0.017	0.445	4.328	0.000	0.260	3.848
R-Square	0.626	Adjusted R-Square		0.594		Durbin Watson	1.911

Note: Dependent Variable: SD-Service Delivery Efficiency.
Independent Variable: BI-Behavioural Intention, PEBI-(Performance Expectation*Behavioural Intention), EEBI-(Effort Expectancy*Behavioural Intention), SIBI-(Social Influence*Behavioural Intention), FCBI-(Facilitating Condition*Behavioural Intention), HBBI-(Habit*Behavioural Intention), PCBI-(Perceived Credibility*Behavioural Intention).

The findings show that the interaction between Perceived Credibility and Behavioural Intention (PCBI) has the strongest and statistically significant effect on service delivery efficiency (B = 0.074, p < 0.001), with a beta of 0.445. This suggests that when individuals believe in the credibility of digital technologies, and this belief is reinforced by their intention to use the technology, service delivery efficiency is notably improved. This result underscores the pivotal role of trust in digital tools as a mediator between technology adoption and service delivery outcomes.

Other interaction terms, such as Performance Expectancy and Behavioural Intention (PEBI), Facilitating Conditions and Behavioural Intention (FCBI), and Effort Expectancy and Behavioural Intention (EEBI), show varying levels of significance. While PEBI has a positive and significant effect (B = 0.043, p = 0.023) with a beta of 0.247, highlighting the role of perceived performance benefits in driving service delivery, other interactions, including SIBI and HBBI, do not show significant effects on service delivery efficiency (p-values above 0.05). The significant relationships for some interaction terms suggest that certain variables, such as performance expectancy and facilitating conditions, are enhanced through behavioural intention, which in turn influences service delivery outcomes. In contrast, other factors, like social influence and Habit, do not exhibit significant mediating effects in this context.

4.3. Discussion of Findings

The findings of the present investigation corroborate the extant literature concerning the primary influence of Perceived Credibility (PC) and Behavioural Intention (BI) on the uptake of digital technologies. Empirical investigations conducted by Sonhaji, et al. [23] and Kapoor, et al. [18] substantiate the assertion that users' confidence in the technological apparatus and their concomitant intention to engage with it are determinants of optimising service delivery. This study extends existing discourse by demonstrating that employees of Nigerian public-sector agencies—specifically, personnel stationed within the National Communications Commission and the National Postal Service—exhibit statistically significant and elevated probabilities of adopting emergent technologies whenever the systems are perceived as trustworthy, and whenever intention to use the technology has been explicitly expressed, thereby yielding measurably greater operational efficiencies. The empirical support reinforces the foundational observations of Venkatesh, et al. [16] as the model confirms the persistence of behavioural intention as a reliable predictor of actual technology use within Nigeria's communications infrastructure.

Comprehensive analysis of the dataset further confirms the mediating roles of Performance Expectancy (PE) and Facilitating Conditions (FC) upon efficiency outcomes in service delivery, an assertion that converges with the emergent literature of Awawdeh, et al. [26] and Putrevu and Mertzanis [27] who arrived at analogous conclusions in parallel evaluations. Collectively, these investigations identify the anticipated utility of digital interventions and the presence of requisite enabling resources—specifically, robust digital architecture and targeted personnel training—as primary antecedents shaping behavioural adoption. The analysis reveals that, while PE is characterised by a statistically strong and uniform positive correlation with operational performance indicators, FC is associated with a more modest effect, underscoring the conditional rather than determinative influence of enabling infrastructure and support resources. Collectively, the present findings reaffirm that successful digital integration is contingent not only upon the perceived instrumental benefits of the technology but also upon the provision of judiciously calibrated facilitating conditions.

Lastly, the mediating function of Behavioural Intention (BI) within the empirical framework of this inquiry underscores its essential contribution to enhancing service delivery effectiveness, reinforcing the earlier conclusions of Al-Emran and Griffy-Brown [19] as well as those of Sultana and Alam [32]. The pronounced interaction term involving Perceived Credibility and BI—denoted PCBI—reveals the simultaneous effect that confidence and anticipatory intent exert upon service delivery efficacy, corroborating the assertions of Fang and Liu [9] that digitised transformation catalyses both innovation and operational efficiency. Conversely, constructs such as Effort Expectancy (EE) and Social Influence (SI) failed to manifest significant mediating influence, a pattern that aligns with the observations of Lee and Yeo [30] and that may hence implicate these determinants as diminishingly consequential within certain contingencies, specifically those regulatory frameworks that characterise the Nigerian telecommunications sector.

5. Conclusions

This study empirically substantiates that the integration of digital technologies yields a demonstrable enhancement of operational efficiency within the supervisory architecture of the Nigerian Communications Commission (NCC) and the Nigerian Postal Service (NIPOST). The data identify Perceived Credibility and Behavioural Intention as the dominant determinants of effective adoption, thereby affirming that sustained institutional investment in user trust and sustained motivational incentives is integral to the effective assimilation of new technological interfaces. Although both Performance Expectancy and Facilitating Conditions exert meaningful statistical authority, their effect size remains inferior, leading supervising agencies to design simultaneous interventions that improve perceived utility and reinforce the underlying infrastructural prerequisites. Additional scrutiny indicates that Behavioural Intention serves not only as a mediating conduit, but also transforms perceived advantages into enduring user adherence, thereby offering a vital lever for persistent service-delivery efficiency improvements.

Given the dataset presented, the NCC, NIPOST, and allied regulatory agencies must assign the utmost strategic rank to the deliberate mobilisation of credibility and user trust within digital ecosystems. This mission can be realised by incrementally augmenting system dependability and by systematically disseminating demonstrable, high-yield success narratives. Parallel to this, it is compulsory to foster a durable, incentivising, and commitment-centred culture of technology acceptance; this ambition must be executed through robust, evidence-grounded educational syllabi and firm, visible leadership support. To maintain forward momentum, agencies must visibly amplify performance expectations

through a transparent and parsimonious account of consequences. Finally, a concerted and sustained effort to rectify infrastructural deficiencies and ensure the strategic allocation of sufficient supportive resources is indispensable in alleviating and facilitating the conditions that constrain digital transformation programmes within Nigeria's telecommunications ecosystem.

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