

IMPACT OF REMOTE WORK MODELS ON EMPLOYEE PERFORMANCE IN MANUFACTURING FIRMS IN SOUTH-EAST NIGERIA

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ABSTRACT: The adoption of remote and hybrid work arrangements has altered how organisations manage labour and measure output. Yet evidence from manufacturing settings in sub-Saharan Africa remains thin, and the South-East Nigerian context is almost entirely unexplored in the peer-reviewed literature. This study examines how remote work models affect employee performance in manufacturing firms across the five states of South-East Nigeria: Anambra, Enugu, Abia, Imo, and Ebonyi. Four specific objectives guided the inquiry: to assess the effect of hybrid models on employee productivity; to determine the relationship between remote work autonomy and task performance; to evaluate the influence of technological infrastructure on remote work effectiveness; and to examine the effect of remote arrangements on operational efficiency. A cross-sectional survey design was employed, with data collected from 312 employees across selected firms using a structured questionnaire and supplementary organisational performance records. Data were analysed using descriptive statistics, Pearson product-moment correlation, and multiple regression analysis. Findings indicate that hybrid models significantly predicted administrative productivity ($\beta = .37, p < .001$), that autonomy was positively correlated with task performance ($r = .62, p < .01$), and that technological infrastructure was the strongest single predictor of remote work effectiveness ($\beta = .41, p < .001$). Production-line efficiency gains were statistically negligible, suggesting that the benefits of remote arrangements in manufacturing may be confined to non-production functions. The paper argues for context-sensitive implementation strategies and prior investment in digital infrastructure as conditions for any meaningful productivity gain in this sector.

Keywords: Remote Work, Hybrid Work Model, Employee Performance, Manufacturing Firms, South-East Nigeria, Technological Infrastructure

INTRODUCTION

The organisation of work has rarely been static. Over the past three decades, technological change, competitive pressure, and shifting worker expectations have combined to push flexibility in work arrangements from the margins of management thinking to the centre. The COVID-19 pandemic accelerated this trend dramatically: organisations in sectors as varied as banking, logistics, and tertiary education moved significant portions of their workforce to remote arrangements within weeks, often without pre-existing infrastructure or policy frameworks to guide the transition. Much of the evidence that subsequently emerged evaluated white-collar, service-sector workers, particularly in North America and Europe. The performance implications for employees in

manufacturing settings, and specifically in developing economies, have attracted considerably less scrutiny.

Manufacturing firms in South-East Nigeria present a distinctive case for examining these dynamics. The region is home to several operationally significant industrial enterprises, including Innoson Vehicle Manufacturing in Nnewi (Anambra State), Emenite Limited in Emene (Enugu State), and numerous agro-allied and light manufacturing establishments spread across Imo, Abia, and Ebonyi. These firms depend, to varying degrees, on physical presence at production sites, synchronised workflows among workers, and close supervisory oversight of machinery-bound processes. At the same time, a growing proportion of their workforce occupies administrative, planning, procurement, and logistics roles that are, in principle, amenable to partial remote working. Whether hybrid or remote arrangements can improve performance in these non-production functions, without disrupting production-line coordination, is both practically and theoretically significant.

Early experimental evidence suggested that remote work could yield meaningful productivity gains. Bloom et al. (2015) reported a 13% improvement in output among home-based call-centre employees in a Chinese firm, with attrition also declining substantially. More recently, Bloom et al. (2024) published a large-scale randomised controlled trial involving over 1,600 employees at Trip.com, finding that a hybrid arrangement of two days working from home per week reduced quit rates by approximately 33% with no measurable decline in performance ratings or promotion outcomes. These findings are persuasive within their own contexts. Whether they translate to a manufacturing firm in Owerri or Enugu, where power supply is intermittent, broadband penetration is limited, and managerial norms tend to emphasise physical presence, is a genuinely open question.

The literature gap is not merely geographical. Most studies that examine performance outcomes in remote work contexts focus on knowledge workers: patent examiners, software engineers, call centre agents, and university academics (Allen et al., 2015; Choudhury et al., 2021). The specific dynamics of hybrid adoption within manufacturing firms in Nigeria, including the role of technological infrastructure, sectoral operational constraints, and variation by functional unit, remain largely unexplored in peer-reviewed work. This study addresses that gap.

Statement of the Problem

Despite growing adoption of hybrid work models globally, there is a notable absence of empirical research on the performance effects of remote arrangements in manufacturing firms within developing economies, and South-East Nigeria in particular. Production-intensive environments impose particular constraints: machinery-bound tasks cannot be relocated, assembly processes require coordinated physical presence, and quality control is difficult to manage at a distance. Administrative functions, including human resources, procurement, sales coordination, finance, and logistics planning, may be more amenable to remote working, but even these face infrastructural challenges particular to the Nigerian context, such as irregular electricity supply and inconsistent internet connectivity.

Existing Nigerian studies that touch on remote work tend to concentrate on the banking and financial services sectors, typically based in Lagos, and use engagement or satisfaction as the

primary outcome variable rather than objective performance measures (Abioro, 2021; Ogueyungbo & Osibanjo, 2022). Manufacturing managers in South-East Nigeria, therefore, lack sector-specific empirical guidance on how remote arrangements are likely to affect measurable employee output. This study was designed to fill that gap by examining the relationship between remote work models and employee performance using both survey-based and organisational performance data from firms across all five South-East states.

Objectives of the Study

The principal objective is to examine the impact of remote work models on employee performance in manufacturing firms in South-East Nigeria. The specific objectives are to:

1. examine the effect of hybrid remote work models on employee productivity;
2. determine the relationship between remote work autonomy and task performance;
3. assess the influence of technological infrastructure on remote work effectiveness; and
4. evaluate the effect of remote work arrangements on operational efficiency indicators.

Research Hypotheses

H₀₁: Hybrid remote work models have no significant effect on employee productivity.

H₀₂: There is no significant relationship between remote work autonomy and task performance.

H₀₃: Technological infrastructure does not significantly influence remote work effectiveness.

H₀₄: Remote work arrangements do not significantly affect operational efficiency indicators.

REVIEW OF RELATED LITERATURE

Conceptual Issues

Remote work refers to work arrangements in which employees perform their duties outside the conventional organisational site, typically using digital tools and internet-enabled platforms (Allen et al., 2015). In popular usage, the term encompasses a spectrum of models, ranging from occasional off-site days to permanent, fully remote contracts. The most prevalent arrangement in industrial firms in developing economies appears to be the hybrid model, in which employees alternate between on-site and off-site working depending on task requirements (Barrero et al., 2023). For manufacturing firms in South-East Nigeria, where production-floor work cannot practicably be relocated, the hybrid model may be the only realistic form of remote working, and even then, only for non-production personnel.

Employee performance is understood here in terms of the framework proposed by Koopmans et al. (2011), which distinguishes three dimensions: task performance (the core technical and role-specific duties of a job), contextual performance (supporting behaviours that sustain the broader organisational environment), and counterproductive work behaviour (actions that detract from

organisational functioning). Output-based indicators, such as units processed, reports submitted on time, and procurement cycles completed, are generally more tractable for remote measurement than presence-based supervisory assessments. In manufacturing firms, where production data are often recorded systematically, this distinction is particularly useful.

Theoretical Framework

This study is theoretically situated within three intersecting frameworks: the Job Demands-Resources (JD-R) model, Self-Determination Theory (SDT), and Contingency Theory. Together, they provide a coherent lens for understanding why remote work may or may not improve performance depending on context.

The JD-R model, initially articulated by Demerouti et al. (2001) and subsequently developed into a broader motivational theory (Bakker & Demerouti, 2017), holds that employee well-being and performance are shaped by the interplay between job demands, such as workload and communication barriers, and job resources, such as autonomy, supervisory support, and digital tools. Remote work, in principle, reduces certain demands, including commuting time and office-based interruptions, while augmenting certain resources, particularly scheduling flexibility and autonomy over the work environment. However, it simultaneously introduces new demands, especially where infrastructure is unreliable. In South-East Nigeria, frequent power outages and inconsistent broadband access may offset the resource gains that remote working would otherwise generate, thereby limiting any performance benefit. Wang et al. (2021) applied a JD-R and work-design perspective to examine remote working during the pandemic and found that autonomy in task scheduling was a significant buffer against role strain, contingent on adequate digital infrastructure. The implication for manufacturing firms operating in infrastructure-constrained environments appears to be that technology investment is a precondition for performance gain, not an optional enhancement.

The SDT, as formulated by Ryan and Deci (2000) and elaborated in the organisational context by Deci, Olafsen, and Ryan (2017), identifies three psychological needs whose satisfaction drives intrinsic motivation: autonomy, competence, and relatedness. Remote working generally supports the autonomy dimension by giving employees greater control over their time and workspace. The relatedness dimension, however, may be undermined where social interaction with colleagues is curtailed. Brunelle and Fortin (2021), in a study of 448 employees across teleworker and office-worker groups, found through structural equation modelling that telework conditions were associated with greater satisfaction of autonomy and competence needs, though the relatedness dimension showed more variable results. In manufacturing contexts, where teamwork and sequential task coordination are central to production, a reduction in relatedness, even among administrative staff who work partly at a distance, may carry indirect consequences for cross-departmental collaboration. Gagne and colleagues (2022) extend this reasoning to hybrid work, arguing that whether hybrid arrangements support or undermine SDT-need satisfaction depends heavily on the quality of digital communication tools and the norms governing their use.

Contingency Theory (Lawrence & Lorsch, 1967) provides a useful corrective to any tendency to treat remote work as universally beneficial or universally harmful. The core proposition, that

organisational effectiveness depends on the alignment between structure and environmental conditions, suggests that remote work outcomes will vary across task types, firm sizes, and technological contexts. For manufacturing firms in South-East Nigeria, this implies that no single remote work policy is likely to be optimal across all functional units: production personnel require physical co-location, whereas procurement and HR staff may perform comparably or better under hybrid arrangements, provided the technological conditions for effective communication are met.

Empirical Evidence

The most influential empirical study in this literature remains Bloom et al.'s (2015) randomised controlled trial at Ctrip, a Chinese travel agency, which documented a 13% productivity gain among home-based workers, driven partly by reduced breaks and sick days and partly by a quieter working environment. Although Ctrip is a service firm, the task structure of its call-centre operations, individual, measurable, and output-based, bears some resemblance to the administrative and customer service functions found in manufacturing firms. A more recent and arguably more directly relevant study is Bloom et al. (2024), whose large-scale RCT at Trip.com demonstrated that hybrid workers showed no performance decline relative to their fully on-site counterparts, whilst exhibiting substantially lower attrition. For manufacturing firms evaluating the costs of remote work adoption, a model that preserves performance whilst reducing staff turnover may represent a meaningful operational gain.

Gajendran and Harrison (2007) conducted a meta-analysis spanning 46 studies and over 12,000 participants and concluded that telecommuting had a modest but statistically significant positive relationship with job performance, with perceived autonomy emerging as the primary psychological mediator. This finding provides empirical grounding for both the JD-R and SDT predictions outlined above. Choudhury, Foroughi, and Larson (2021) added further nuance through a natural experiment at the United States Patent and Trademark Office, where geographic flexibility was associated with a 4.4% increase in patent examiner output. The knowledge-work nature of that setting limits direct generalisation to manufacturing, but the mechanism, reduced commuting burden and greater schedule control, is plausible for non-production roles in manufacturing firms.

Evidence from sub-Saharan Africa specifically is sparse in the Q1 and Q2 literature. Ndubuisi et al. (2021) analysed panel data from 45 sub-Saharan African countries spanning 1996 to 2017 and found that digital infrastructure had a positive but institutionally conditional effect on services-sector employment and productivity, with gains concentrated in countries where regulatory quality was higher. The implications for South-East Nigeria are mixed: digital infrastructure investment may be necessary, but it is unlikely to be sufficient on its own. Sekhampu (2025), in one of the few published studies examining remote work in Nigeria's manufacturing sector, found through regression analysis that remote work arrangements were positively associated with employee well-being, though the effect on objective performance was more modest and appeared contingent on training provision and institutional support. These findings are consistent with the broader international pattern and carry particular contextual value given their sectoral specificity.

Within the Nigerian management literature, Abioro (2021) reported that remote work positively influenced productivity in the banking sector, and Ogueyungbo and Osibanjo (2022) found that

flexible work arrangements improved engagement across a range of service organisations. Both studies are limited by their sector focus and their reliance on self-reported satisfaction measures rather than objective productivity data, and neither examined manufacturing firms in the South-East.

Gaps in the Literature

Several gaps motivate this study. Most empirical work on remote work and performance is concentrated in service-sector firms within developed economies, leaving manufacturing settings in developing countries substantially underexplored. Within Nigeria, existing studies have almost exclusively examined Lagos-based service organisations and have prioritised engagement and satisfaction outcomes over measurable performance metrics. The specific operational and infrastructural realities of South-East Nigeria, including the significance of agro-allied and light manufacturing firms, the prevalence of generator-dependent operations, and the uneven quality of broadband connectivity across the five states, have not been examined in connection with remote work adoption. The theoretical integration of JD-R, SDT, and Contingency frameworks within a single empirical model, applied to this sector and region, also represents a contribution that the existing literature does not currently offer.

METHODOLOGY

Research Design

This study adopted a cross-sectional survey design, which was considered appropriate for capturing the range of perceptions and performance indicators across a heterogeneous set of manufacturing firms at a single point in time. The target population comprised employees of selected manufacturing firms across Anambra, Enugu, Abia, Imo, and Ebonyi States. Firms were selected purposively to include a range of sizes and sub-sectors, covering vehicle assembly, agro-processing, packaging, and building materials manufacture.

Sample and Sampling Procedure

The final sample of 312 participants was determined using the Taro Yamane (1967) formula for finite population sampling, with a 95% confidence level and a margin of error set at $\pm 5\%$. Stratified random sampling was employed to ensure representation across functional departments, including production, administration, finance, logistics, and human resources, and across all five states.

Instrument and Measurement

Data were collected using a structured questionnaire developed from established instruments and adapted to the South-East Nigerian context. The instrument measured hybrid work model adoption (six items), perceived remote work autonomy (five items), technological infrastructure quality (seven items), and operational efficiency (six items), all on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Face and content validity were established through expert review by three academic reviewers in management and industrial psychology. Cronbach's alpha

coefficients ranged from .78 to .86 across subscales, indicating acceptable internal consistency (Nunnally, 1978). Where available, supplementary performance data, including output logs and administrative processing records, were obtained from participating firms' HR departments.

Data Analysis

Data were analysed using descriptive statistics to characterise the sample and scale distributions, Pearson product-moment correlation to examine bivariate relationships, and multiple regression analysis to assess the predictive value of hybrid model adoption and technological infrastructure on performance outcomes. All analyses were conducted using SPSS Version 26. The significance threshold was set at $p < .05$ for all tests.

DATA PRESENTATION AND ANALYSIS

Demographic Profile of Respondents

Tables 1 to 3 present the gender, age, and educational distribution of the 312 respondents.

Table 1: Gender Distribution of Respondents

Category	Frequency	Percent (%)	Valid Percent (%)
Male	248	79.5	79.5
Female	64	20.5	20.5
Total	312	100.0	100.0

Table 1 shows that 248 respondents (79.5%) identified as male and 64 (20.5%) as female. The predominance of male respondents reflects the broader gender composition of manufacturing sector employment in South-East Nigeria, where women remain underrepresented in both production and administrative roles, a pattern consistent with structural inequities documented across Sub-Saharan African industry.

Table 2: Age Distribution of Respondents

Age Band	Frequency	Percent (%)	Valid Percent (%)
21-30 years	72	23.1	23.1
31-40 years	113	36.2	36.2
41-50 years	86	27.6	27.6
Above 50 years	41	13.1	13.1
Total	312	100.0	100.0

As shown in Table 2, the largest age cohort was the 31 to 40 years group (36.2%, $n = 113$), followed by the 41 to 50 years group (27.6%, $n = 86$). This distribution suggests that the sample comprised predominantly mid-career employees, who would typically occupy a mix of supervisory, technical, and administrative roles within their firms.

Table 3: Educational Level of Respondents

Educational Level	Frequency	Percent (%)	Valid Percent (%)
O' Level and below	34	10.9	10.9
OND/HND	96	30.8	30.8
University Degree	170	54.5	54.5
Master's or Higher	12	3.8	3.8
Total	312	100.0	100.0

Table 3 indicates that 54.5% ($n = 170$) held a university degree, with a further 30.8% ($n = 96$) holding an OND or HND qualification. The relatively high educational attainment of the sample is notable and may partly reflect the fact that non-production administrative staff, who are most likely to have experienced remote work arrangements, tend to hold higher formal qualifications than production-floor operatives.

Descriptive Statistics

Mean scores indicated moderate adoption of hybrid remote work models among the sampled firms ($M = 3.41$, $SD = 0.87$ on a five-point scale). Perceived technological infrastructure quality showed the widest distributional spread ($M = 2.98$, $SD = 1.12$), pointing to considerable variability in the digital environment across firms and states. Remote work autonomy scores were comparatively higher ($M = 3.67$, $SD = 0.79$), indicating that where remote work had been adopted, employees generally experienced meaningful control over their schedules and tasks.

Hypothesis Testing

Hypothesis One

Table 4: Model Summary on Hybrid Work Models Predicting Employee Productivity

Model	R	R ²	Adjusted R ²	Std. Error of the Estimate
1	.461	.213	.208	.728

Note. Predictors: (Constant), Hybrid Work Model Adoption, Department Type.

Table 5: ANOVA on Hybrid Work Models Predicting Employee Productivity

Model	Sum of Squares	df	Mean Square	F	Sig.
1 – Regression	44.54	2	22.27	41.83	< .001
1 – Residual	164.51	309	.533		
1 – Total	209.05	311			

Note. Dependent variable: Employee Productivity. ^a Predictors: (Constant), Hybrid Work Model Adoption, Department Type.

Table 6: Regression Coefficients on Hybrid Work Models Predicting Employee Productivity

Model	B	Std. Error	β	t	Sig.
1 – Constant	2.07	.185	—	11.19	< .001
Hybrid Work Model	.35	.060	.37	5.84	< .001
Department Type	.38	.111	.22	3.41	.001

Note. Dependent variable: Employee Productivity. B = unstandardised coefficient; β = standardised coefficient. $R = .461$, $R^2 = .213$, Adjusted $R^2 = .208$, $F(2, 309) = 41.83$, $p < .001$.

Multiple regression analysis was conducted to examine whether hybrid remote work model adoption significantly predicted employee productivity. The analysis yielded a positive and statistically significant regression coefficient ($\beta = .37$, $t = 5.84$, $p < .001$), indicating that hybrid model adoption was a significant predictor of administrative productivity. H_{01} was accordingly rejected. It is worth noting, however, that this effect was concentrated in administrative and logistics roles; production-floor output data did not exhibit a comparable pattern, which is discussed further in Section Five.

Hypothesis Two

Table 7: Pearson Correlation Matrix of Study Variables

Variable	M	SD	1	2	3	4	5
1. Hybrid Work Model	3.41	0.87	-				
2. Remote Work Autonomy	3.67	0.79	.38**	-			
3. Tech. Infrastructure	2.98	1.12	.27**	.31**	-		
4. Task Performance	3.58	0.81	.44**	.62**	.41**	-	
5. Employee Productivity	3.52	0.82	.46**	.48**	.39**	.57**	-

*Note. N = 312. M = mean; SD = standard deviation. Correlations on the diagonal are replaced with dashes. ** $p < .01$ (two-tailed). All significant correlations are two-tailed.*

Pearson product-moment correlation analysis, as presented in Table 7, revealed a positive and statistically significant association between remote work autonomy and task performance ($r = .62$, $p < .01$), indicating that employees who experienced greater autonomy under remote arrangements also tended to record higher task performance scores. H_{02} was therefore rejected. This finding is consistent with Gajendran and Harrison's (2007) meta-analytic conclusion that autonomy is the primary mechanism through which telework affects performance, and with SDT's autonomy-need proposition as elaborated by Ryan and Deci (2000).

Hypothesis Three

Table 8: Model Summary on Technological Infrastructure Predicting Remote Work Effectiveness

Model	R	R ²	Adjusted R ²	Std. Error of the Estimate
1	.537	.288	.283	.659

Note. Predictors: (Constant), Technological Infrastructure Quality, Remote Work Autonomy.

Table 9: Technological Infrastructure Predicting Remote Work Effectiveness

Model	Sum of Squares	df	Mean Square	F	Sig.
1 – Regression	54.46	2	27.23	62.50	< .001
1 – Residual	134.63	309	.436		
1 – Total	189.09	311			

Note. Dependent variable: Remote Work Effectiveness. ^a Predictors: (Constant), Technological Infrastructure Quality, Remote Work Autonomy.

Table 10: Regression Coefficients on Technological Infrastructure Predicting Remote Work Effectiveness

Model	B	Std. Error	β	t	Sig.
1 – Constant	1.67	.210	—	7.95	< .001
Tech. Infrastructure Quality	.29	.046	.41	6.37	< .001
Remote Work Autonomy	.23	.064	.23	3.62	< .001

Note. Dependent variable: Remote Work Effectiveness. B = unstandardised coefficient; β = standardised coefficient. $R = .537$, $R^2 = .288$, $Adjusted R^2 = .283$, $F(2, 309) = 62.50$, $p < .001$.

Regression analysis revealed a significant positive effect of technological infrastructure quality on remote work effectiveness ($\beta = .41$, $t = 6.37$, $p < .001$). Firms with more reliable connectivity and

better digital tools consistently reported superior remote work outcomes, including faster task turnaround and lower incidence of communication breakdown. H_{03} was rejected. This result aligns with Ndubuisi et al.'s (2021) findings on digital infrastructure and productivity in sub-Saharan Africa and with the JD-R prediction that resource adequacy is a precondition for performance under demanding conditions (Bakker & Demerouti, 2017).

Hypothesis Four

Table 11: Model Summary on Remote Work Arrangements Predicting Operational Efficiency (Two Models)

Model	R	R ²	Adjusted R ²	Std. Error of the Estimate
Model 1 – Administrative Efficiency	.344	.118	.112	.714
Model 2 – Production-Floor Efficiency	.220	.048	.042	.917

Note. Predictors for both models: (Constant), Remote Work Arrangements, Technological Infrastructure Quality.

Table 12: ANOVA – Remote Work Arrangements Predicting Operational Efficiency (Two Models)

Model	Sum of Squares	df	Mean Square	F	Sig.
Model 1 – Regression	21.21	2	10.61	20.68	< .001
Model 1 – Residual	158.55	309	.513		
Model 1 – Total	179.76	311			
Model 2 – Regression	13.20	2	6.60	7.79	.001
Model 2 – Residual	261.72	309	.847		
Model 2 – Total	274.92	311			

Note. Dependent variable – Model 1: Administrative Operational Efficiency; Model 2: Production-Floor Operational Efficiency.

Table 13: Regression Coefficients – Remote Work Arrangements Predicting Operational Efficiency (Two Models)

Model	Model 1: Admin. Efficiency					Model 2: Production Efficiency				
	B	SE	β	t	Sig.	B	SE	β	t	Sig.
Constant	2.20	.220	—	10.00	< .001	2.62	.260	—	10.08	< .001
Remote Work Arrange.	.25	.098	.29	2.55	.011	.09	.110	.08	0.82	.413
Tech. Infrastructure	.13	.044	.19	2.94	.004	.12	.055	.14	2.19	.029

Note. B = unstandardised coefficient; SE = standard error; β = standardised coefficient. Model 1: $R = .344$, $R^2 = .118$, $F(2, 309) = 20.68$, $p < .001$. Model 2: $R = .220$, $R^2 = .048$, $F(2, 309) = 7.79$, $p = .001$.

Results indicated that remote work arrangements were a statistically significant predictor of operational efficiency for administrative units ($\beta = .29$, $p < .05$) but not for production-floor operations, where the effect was negligible and non-significant ($\beta = .08$, $p = .41$). H_{04} was therefore partially rejected: remote arrangements appear to improve operational efficiency in non-production functions but have limited bearing on core production processes, where physical co-location remains functionally necessary.

DISCUSSION

The findings align broadly with the international literature but also reveal patterns that are specific to the South-East Nigerian manufacturing context. The significant relationship between hybrid model adoption and administrative productivity supports the general position taken by Bloom et al. (2024), whose RCT at Trip.com found that hybrid arrangements preserved or marginally improved output among knowledge and administrative workers. That said, the present study extends this finding to a developing-economy manufacturing context, where the conditions facilitating remote work are considerably more constrained. The β coefficient of .37, whilst meaningful, falls below effect sizes reported in studies conducted in countries with stronger digital infrastructure. This pattern is consistent with the moderating role of technology quality predicted by the JD-R framework (Bakker & Demerouti, 2017) and supported empirically by Wang et al. (2021).

The strong correlation between remote work autonomy and task performance ($r = .62$) warrants careful interpretation. This association does not establish causation, and it is possible that the coefficient partly reflects a selection effect: firms that have invested in remote work infrastructure may also be better managed in other respects, making their employees' performance gains attributable to factors beyond autonomy per se. Nevertheless, the consistency of this finding with Gajendran and Harrison's (2007) meta-analytic results and with SDT's autonomy-need proposition (Deci et al., 2017) makes a motivational interpretation plausible. Employees who are trusted to manage their own schedules may develop a stronger sense of ownership over their output, which in turn may sustain performance over time.

The finding that technological infrastructure was the strongest single predictor of remote work effectiveness ($\beta = .41$) carries perhaps the most direct practical implication. In South-East Nigeria, where grid-based electricity supply is unreliable and broadband penetration remains below the national average in parts of the region, the structural conditions for effective remote working are compromised for many firms. Sekhampu's (2025) finding that institutional support and training provision moderated remote work outcomes in Nigeria's manufacturing sector aligns with this pattern: technology alone appears insufficient if employees cannot access or use it reliably. Ndubuisi et al.'s (2021) conclusion that digital infrastructure effects in sub-Saharan Africa are contingent on regulatory quality and governance further suggests that improvements at the organisational level may have limited reach without commensurate public investment in connectivity and stable power supply.

The partial rejection of Hypothesis Four is perhaps the most conceptually instructive finding. Production-line efficiency did not respond to remote work adoption in any meaningful way, a result that is neither surprising nor problematic in theoretical terms. The hypothesis that location-independent arrangements would improve physically-bound production tasks would have been difficult to defend from the outset. What the finding confirms is that manufacturing firms in South-East Nigeria should approach remote work as a function-specific strategy rather than a blanket organisational policy. For administrative, planning, procurement, and logistics staff, hybrid arrangements appear to offer genuine performance benefits. For production-floor workers, they are simply inapplicable in the current technological environment. This differentiation accords with the contingency perspective (Lawrence & Lorsch, 1967), which holds that organisational structures must be calibrated to the specific demands and conditions of each functional unit.

One limitation of this study is its cross-sectional design, which precludes causal inference and cannot account for the possibility that high-performing firms are also the ones most likely to have adopted structured hybrid policies. A longitudinal or quasi-experimental design would offer stronger evidence of directionality. The sample is also weighted heavily towards male respondents, which may limit the generalisability of findings to female employees, who may encounter different experiences of remote work within the Nigerian cultural context. Future research might examine whether firm-level characteristics, including ownership structure, firm age, and sector sub-type, moderate the performance effects identified here, and whether findings from the South-East replicate in other Nigerian industrial zones.

Summary of Findings

This study has produced four substantive findings. Hybrid remote work models significantly predicted administrative productivity but showed no meaningful effect on production-floor output. Remote work autonomy was positively and significantly correlated with task performance, supporting the view that motivational processes are an important mechanism in this relationship. Technological infrastructure emerged as the strongest structural determinant of remote work effectiveness across the sampled firms. Finally, operational efficiency gains were confined to administrative and logistics functions, with production-line efficiency remaining largely unaffected by remote arrangements.

Conclusion

Remote work models, when applied selectively and supported by adequate digital infrastructure, appear capable of improving employee performance in the administrative and non-production functions of manufacturing firms in South-East Nigeria. The evidence from this study indicates that hybrid arrangements are the most appropriate model for this sector, given the inherent location-dependency of core production activities. Autonomy emerges as a meaningful psychological mechanism, and technological infrastructure as the primary structural enabler of whether remote work realises its potential in this context. Full remote adoption is neither feasible nor advisable for production-intensive operations, at least under current infrastructural conditions.

Recommendations

Manufacturing firms in South-East Nigeria would benefit from clearly delineating which roles are hybrid-eligible, rather than extending remote work policies uniformly or prohibiting them categorically. Investment in reliable power supply, broadband infrastructure, and relevant hardware is, on the basis of the current findings, a prerequisite for any performance gain rather than an afterthought. Managers responsible for remote or hybrid teams would also benefit from targeted training in output-based performance management, since the supervisory practices suited to a physical shopfloor transfer poorly to distributed administrative teams. Performance measurement systems should incorporate remote-specific productivity indicators, such as task completion rates, response times, and procurement cycle durations, rather than relying solely on presence-based metrics. At the policy level, state governments and industry associations in the South-East might consider developing sector-specific frameworks for hybrid work adoption in manufacturing, aligned with ongoing investments in digital infrastructure and electricity supply.

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