

**CAUSAL MODELLING OF THE INFLUENCE OF INSTRUCTIONAL SUPERVISION, TEACHERS' MOTIVATION AND PRINCIPALS' DECISION-MAKING STYLES ON MATHEMATICS TEACHERS' JOB PERFORMANCE IN ENUGU STATE, NIGERIA**

*MODELAGEM CAUSAL DA INFLUÊNCIA DA SUPERVISÃO INSTRUCCIONAL, DA MOTIVAÇÃO DOS PROFESSORES E DOS ESTILOS DE TOMADA DE DECISÃO DOS DIRETORES NO DESEMPENHO PROFISSIONAL DOS PROFESSORES DE MATEMÁTICA NO ESTADO DE ENUGU, NA NIGÉRIA*

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### **Abstract**

This study examined the causal modeling of the influence of instructional supervision, teachers' motivation, and principals' decision-making styles on Mathematics teachers' job performance in public secondary schools in Enugu State, Nigeria. The study adopted a model-fit correlational survey research design. The sample size of 227 Mathematics teachers in public secondary schools was used for the study. The sample was obtained through multistage sampling procedure. Data were collected using a structured questionnaire developed by the researcher titled; Instructional Supervision Questionnaire (ISQ), Teachers' Motivation Questionnaire (TMQ), Principals' Decision-Making Styles Questionnaire (PDMSQ) and Mathematics Teachers' Job Performance Questionnaire (MTJPQ). Reliability coefficient of 0.87, 0.92, 0.88, and 0.84 were obtained for ISQ, TMQ, PDMSQ and MTJPQ respectively using Cronbach Alpha method. The study adopted structural equation modeling (SEM), specifically the partial least squares (PLS-SEM) for data analysis. The findings revealed that teachers' motivation exerted a strong and statistically significant direct effect on Mathematics teachers' job performance, while principals' decision-making styles such as top-down and disturbed exerted moderate but significant direct effects. Principals' instructional supervision was found to exert a significant indirect influence on teachers' job performance through teachers' motivation. Collectively, the three exogenous variables of instructional supervision, teachers' motivation, and principals' decision-making styles explained 93% of the variance in Mathematics teachers' job performance, indicating strong explanatory power of the causal model. The study concludes that teacher motivation is the most influential factor in determining job performance, while effective supervisory and participatory leadership practices further enhance teachers' effectiveness. It is recommended that school principals strengthen instructional supervision, adopt participatory decision-making approaches, and implement strategies to enhance teacher motivation to improve Mathematics teaching outcomes in secondary schools.

### **Resumo**

*Este estudo examinou a modelagem causal da influência da supervisão instrucional, da motivação dos professores e dos estilos de tomada de decisão dos diretores no desempenho profissional dos professores de matemática em escolas secundárias públicas no estado de Enugu, na Nigéria. O estudo adotou um projeto de pesquisa correlacional de ajuste de modelo. A amostra de 227 professores de matemática em escolas secundárias públicas foi utilizada para o estudo. A amostra foi obtida por meio de um procedimento de amostragem em várias etapas. Os dados foram coletados usando um questionário estruturado desenvolvido pelo pesquisador intitulado: Questionário de Supervisão Instrucional (ISQ), Questionário de Motivação dos Professores (TMQ), Questionário de Estilos de Tomada de Decisão dos Diretores (PDMSQ) e Questionário de Desempenho Profissional dos Professores de Matemática (MTJPQ). Foram obtidos coeficientes de confiabilidade de 0,87, 0,92, 0,88 e 0,84 para ISQ, TMQ, PDMSQ e MTJPQ, respectivamente, utilizando o método Cronbach Alpha. O estudo adotou a modelagem de equações estruturais (SEM), especificamente os mínimos quadrados parciais (PLS-SEM) para a análise dos dados. Os resultados revelaram que a motivação dos professores exerceu um efeito direto forte e estatisticamente significativo no desempenho profissional dos professores de matemática, enquanto os estilos de tomada de decisão dos diretores, como o top-down e o perturbado, exerceram efeitos diretos moderados, mas significativos. Verificou-se que a supervisão instrucional dos diretores exerceu uma influência indireta significativa no desempenho profissional dos professores por meio da motivação dos professores. Coletivamente, as três variáveis exógenas de supervisão instrucional, motivação dos professores e estilos de tomada de decisão dos diretores explicaram 93% da variação no desempenho profissional dos professores de matemática, indicando um forte poder explicativo do modelo causal. O estudo conclui que a motivação dos professores é o fator mais influente na determinação do desempenho profissional, enquanto práticas eficazes de supervisão e liderança participativa aumentam ainda mais a eficácia dos professores.*

**Keywords:** Causal Modelling. Instructional Supervision. Teachers' Motivation. Principals' Decision-Making Styles. Mathematics Teachers. Job Performance.

*Recomenda-se que os diretores escolares reforcem a supervisão pedagógica, adotem abordagens participativas de tomada de decisão e implementem estratégias para aumentar a motivação dos professores, a fim de melhorar os resultados do ensino de matemática nas escolas secundárias.*

**Palavras-chave:** Modelagem Causal. Supervisão Pedagógica. Motivação Dos Professores. Estilos De Tomada De Decisão Dos Diretores. Professores De Matemática. Desempenho Profissional.

## 1 INTRODUCTION

Education is widely recognized as a fundamental instrument for national development and social transformation. Nations across the world rely on effective educational systems to produce skilled manpower capable of driving technological advancement, economic productivity and sustainable development. In Nigeria, education is regarded as an essential tool for national growth and social stability, as reflected in the objectives of the national education policy which emphasizes the development of individuals into useful members of society (Federal Republic of Nigeria, 2014). Secondary education in particular occupies a strategic position in the Nigerian educational system because it prepares learners for higher education and equips them with the knowledge and skills required for productive living (FRN, 2014).

Among the subjects taught at the secondary school level, Mathematics occupies a unique and indispensable position. Mathematics is considered the foundation of scientific and technological advancement and plays a vital role in fields such as engineering, medicine, economics and information technology (Akinsola & Tella, 2017; Odili, 2006). As a result, Mathematics is a compulsory subject in the Nigerian secondary school curriculum and is required for admission into many tertiary education programmes. Despite its importance, students' achievement in Mathematics in public examinations such as those conducted by the West African Examinations Council and the National Examinations Council has remained persistently low over the years (WAEC, 2020-2025).

The continuous poor achievement of students in Mathematics has generated serious concern among educators, policymakers and stakeholders in the education sector.

One of the factors that may associate with students' academic achievement in Mathematics is the job performance of teachers. Teachers are the most critical human resource in the educational system because they translate educational policies and curricula into practical classroom instruction (Okorie, 2019). Teachers' job performance refers to the effectiveness with which teachers carry out their professional responsibilities, including lesson planning, classroom instruction, student assessment, classroom management and participation in school activities (Campbell, Kyriakides, Muijs, & Robinson, 2004). When teachers perform their duties effectively, they enhance students' learning outcomes and contribute to the achievement of educational objectives. Conversely, poor teacher performance may negatively affect students' academic success and overall school effectiveness (Stronge, 2018).

Several organizational and administrative factors may influence teachers' job performance in secondary schools. One of these is instructional supervision. Instructional supervision refers to the process through which school administrators; monitor, guide and support teachers in order to improve the quality of teaching and learning in schools (Glickman, Gordon, & Ross-Gordon, 2018). It involves activities such as classroom observation, review of lesson plans, monitoring of instructional delivery and providing feedback to teachers for professional improvement. Instructional supervision is regarded as a critical leadership responsibility of school principals because it helps to ensure that teaching practices align with curriculum objectives and educational standards (Igwe, 2001).

Effective instructional supervision may enhance teachers' professional competence and job performance. When principals regularly observe classroom teaching and provide constructive feedback, teachers become more aware of their instructional strengths and weaknesses and are better able to improve their teaching practices (Sergiovanni & Starratt, 2013). In addition, supervision promotes accountability and encourages teachers to maintain high professional standards in lesson preparation, delivery and evaluation of learning outcomes (Akinwumi & Fadeyi, 2012). Studies have also indicated that effective supervisory practices such as classroom visitation, mentoring

and professional support contribute significantly to improved teacher productivity and student achievement (Adeyemi, 2010; Olatunji, 2015).

Another important factor that may influence teachers' job performance is motivation. Motivation refers to the internal and external forces that stimulate individuals to perform tasks with enthusiasm and commitment (Herzberg, Mausner, & Snyderman, 1959). In the educational context, teacher motivation involves the factors that influence teachers' willingness, enthusiasm and commitment to perform their professional duties effectively (Adair, 2009). Motivated teachers are more likely to demonstrate dedication to teaching, maintain effective classroom management and adopt innovative teaching strategies that enhance student learning (Hoy & Miskel, 2013). Teacher motivation can be influenced by several factors including leadership support, working conditions, professional recognition, opportunities for career advancement and participation in decision-making processes (Evans, 2011). When teachers feel valued and supported by school administrators, they tend to exhibit greater commitment to their work and higher levels of job performance. Conversely, lack of motivation resulting from poor leadership practices, inadequate remuneration and limited professional development opportunities may reduce teachers' morale and productivity (Armstrong, 2014; Mullins, 2016).

Closely related to teacher motivation and job performance is the decision-making style adopted by school principals. Decision-making is a central function of educational administration and involves selecting appropriate courses of action for addressing school issues and achieving institutional goals (Hoy & Tarter, 2007). The manner in which decisions are made within schools can significantly influence teachers' attitudes, commitment and performance. Principals who adopt participatory and inclusive decision-making approaches often create a positive organizational climate that promotes collaboration, trust and professional engagement among teachers (Bush, 2011).

Different decision-making styles may be adopted by school principals in managing schools. These decision-making styles include; top-down, consultative, collaborative, delegative, and disturbed. These styles are largely derived from the leader-participation decision-making theory developed by Vroom and Yetton (1973). Their normative decision model explains leadership decision processes based on the degree of subordinate participation, ranging from autocratic decisions made solely by the leader to consultative and group-based decisions involving followers. These participatory levels

have been widely adapted in educational administration research to describe principals' decision-making styles in school management (Vroom & Yetton, 1973).

The top-down decision-making style is often referred to as autocratic decision-making. In this style, the principal makes decisions independently with minimal or no input from teachers (Vroom & Yetton, 1973). While this approach may facilitate quick decision-making, it may limit teachers' sense of ownership and participation in school activities. Consultative decision-making involves seeking the opinions and suggestions of teachers before making final decisions. In this approach, the principal still retains the authority to make the final decision but values the input of teachers in the decision-making process (Yukl, 2013). Collaborative decision-making goes a step further by encouraging joint problem-solving and shared responsibility among school administrators and teachers (Leithwood & Jantzi, 2006). This participatory style fosters teamwork and strengthens the professional relationship between teachers and school leaders.

Delegative decision-making, on the other hand, involves assigning authority and responsibility to teachers or committees to make certain decisions independently (Robbins & Judge, 2017). This approach empowers teachers and enhances their professional autonomy, which may lead to increased motivation and improved job performance. However, ineffective leadership practices may result in what can be described as disturbed or dysfunctional decision-making, characterized by inconsistency, lack of coordination and poor administrative judgment. Such leadership practices may create confusion within the school system and negatively affect teachers' morale and performance (Hoy & Miskel, 2013).

Research in educational leadership has consistently demonstrated that principals' leadership behaviours and decision-making styles significantly influence teachers' job performance and school effectiveness (Hallinger & Heck, 2010). When teachers are actively involved in school decision-making processes, they tend to develop a stronger sense of responsibility and commitment to their work (Somech, 2010). Participatory leadership practices have also been associated with higher levels of teacher satisfaction, improved organizational climate and enhanced instructional quality (Leithwood, Harris, & Hopkins, 2020).

Despite the recognized importance of instructional supervision, teacher motivation and decision-making styles in enhancing teachers' performance, many Nigerian secondary schools, especially in Enugu State, continue to face challenges related to teacher effectiveness and students' academic achievement, particularly in Mathematics (Odili, 2006; Okeke, 2007; Nworgu, 2015; WAEC, 2023). These challenges may be attributed to weak supervisory practices, inadequate teacher motivation and ineffective leadership behaviours among school administrators (Okeke, 2007; Nworgu, 2015). In many schools, principals may rely heavily on centralized decision-making structures that limit teachers' participation in school management and reduce their motivation to perform effectively.

In Enugu State, concerns have been raised about the academic achievement of secondary school students in Mathematics and the effectiveness of teaching practices in public schools. While several studies have examined leadership styles, instructional supervision or teacher motivation independently, limited attention has been given to examining how these variables interact simultaneously to influence teachers' job performance. Most previous studies have relied on simple correlational analyses that do not adequately capture the complex relationships among leadership practices, teacher motivation and instructional supervision.

The application of causal modelling approaches provides a more comprehensive framework for examining the direct and indirect relationships among these variables. Causal modelling techniques such as structural equation modelling and path analysis enable researchers to examine complex relationships among multiple variables simultaneously and to determine the pathways through which these variables influence outcomes (Kline, 2016). Such an approach is particularly useful in educational research where multiple administrative and organizational factors interact to influence teachers' job performance. Therefore, examining the causal relationships among instructional supervision, teachers' motivation and principals' decision-making styles is essential for understanding how these factors influence Mathematics teachers' job performance in secondary schools. Understanding these relationships will provide empirical evidence that can guide policymakers, educational administrators and school leaders in developing effective leadership practices and management strategies that enhance teachers' effectiveness and improve students' learning outcomes in Mathematics. Therefore, this

study seeks to develop a causal model explaining the influence of instructional supervision, teachers' motivation and principals' decision-making styles on Mathematics teachers' job performance in secondary schools in Enugu State, Nigeria.

## **2 PURPOSE OF THE STUDY**

The purpose of the study aimed at developing a causal modelling of the influence of instructional supervision, teachers' motivation and principals' decision-making styles (top-down, consultative, collaborative, delegative, disturbed) on Mathematics teachers' Job performance in Enugu State, Nigeria. Specifically, the study sought to;

1. develop a parsimonious causal model involving instructional supervision, teachers' motivation and principals' decision-making styles on Mathematics teachers' Job performance;
2. estimate the magnitude of direct influence of instructional supervision, teachers' motivation and principals' decision-making styles on Mathematics teachers' Job performance;
3. estimate the magnitude of indirect influence of instructional supervision, teachers' motivation and principals' decision-making styles on Mathematics teachers' Job performance;
4. estimate the magnitude of composite influence of instructional supervision, teachers' motivation and principals' decision-making styles on Mathematics teachers' Job performance.

## **3 RESEARCH QUESTIONS**

The following research questions were raised to guide the study:

1. What is the parsimonious causal model involving the influence of instructional supervision, teachers' motivation and principals' decision-making styles on Mathematics teachers' Job performance?
2. What is the magnitude of direct influence of instructional supervision, teachers' motivation and principals' decision-making styles on Mathematics teachers' Job performance?

3. What is the magnitude of indirect influence of instructional supervision, teachers' motivation and principals' decision-making styles on Mathematics teachers' Job performance?
4. What is the magnitude of composite influence of instructional supervision, teachers' motivation and principals' decision-making styles on Mathematics teachers' Job performance?

#### **4 HYPOTHESES**

The following null hypotheses were formulated and tested at .05 level of significance.

1. The fit and quality indices of the hypothesized causal model involving the influence of instructional supervision, teachers' motivation and principals' decision-making styles on Mathematics teachers' Job performance are not significantly supported by the empirically validated model.
2. The magnitude of all the estimated direct influence of the exogenous variables (instructional supervision, teachers' motivation and principals' decision-making styles) on Mathematics teachers' Job performance in the parsimonious causal model developed are not statistically significant.
3. The magnitude of all the estimated indirect influence of the exogenous variables (instructional supervision, teachers' motivation and principals' decision-making styles) on Mathematics teachers' Job performance in the parsimonious causal model developed are not statistically significant.
4. The magnitude of composite influence of the exogenous variables (instructional supervision, teachers' motivation and principals' decision-making styles) on Mathematics teachers' Job performance in the parsimonious causal model developed is not statistically significant.

#### **5 METHODS**

The study adopted a correlational survey research design. Specifically, model-fit correlational research design was used for the study. The use of causal modelling in this

study allows the researchers to examine both direct and indirect relationships among the variables and to determine the structural paths through which the variables influence one another. Causal modelling techniques such as structural equation modelling are widely used in educational research to analyze complex relationships among multiple variables (Kline, 2016). The study was conducted in Enugu State, Nigeria. Enugu State is located in the South-East geopolitical zone of the country and shares boundaries with Anambra, Ebonyi, Benue, Abia and Kogi States. The state has several public secondary schools distributed across six education zones namely Enugu, Nsukka, Udi, Agbani, Awgu and Obollo-Afor education zones.

The sample size of 227 Mathematics teachers in public secondary schools in Enugu State was used for the study. The instrument used for data collection was a structured questionnaire developed by the researcher titled Instructional Supervision Questionnaire (ISQ), Teachers' Motivation Questionnaire (TMQ), Principals' Decision-Making Styles Questionnaire (PDMSQ) and Mathematics Teachers' Job Performance Questionnaire (MTJPQ). The instrument was structured using a four-point Likert scale of Strongly Agree, Agree, Disagree and Strongly Disagree. Likert-type scales are widely used in educational research because they allow respondents to express their degree of agreement or disagreement with statements (Likert, 1932). The instruments were subjected to face validation by three experts from the Faculty of Education, University of Nigeria, Nsukka. The experts included one specialist in Educational Administration and Planning, one expert in Measurement and Evaluation and one expert in Mathematics Education. The validators examined the instruments to determine the clarity, relevance and adequacy of the items in measuring the variables of the study. Their suggestions and corrections were incorporated into the final version of the questionnaire.

The reliability of the instruments was determined through a pilot study conducted in public secondary schools in Anambra State, which is outside the study area but with similar characteristics to those in Enugu State. The data obtained from the pilot study were analyzed using Cronbach Alpha reliability coefficient to determine the internal consistency of the instruments. Cronbach Alpha was used because the items of the instruments were polytomously scores. A reliability coefficient of 0.87, 0.92, 0.88, and 0.84 were obtained for ISQ, TMQ, PDMSQ and MTJPQ respectively. To collect pertinent data for the study, the researchers personally administered the instruments for data

collection to the Mathematics teachers in the sampled secondary schools. The respondents were given adequate time to complete the instruments and the completed copies were collected immediately after completion. Personal administration of questionnaires helps to increase the rate of return and ensures that respondents understand the instructions properly (Nworgu, 2015).

Data collected were sorted, coded, screened and analyzed using a PLS-SEM computer-based statistical software called SmartPLS. All the research questions and null hypotheses were addressed based on the evaluation of the measurement and structural aspects of the estimated (empirical) causal model. The measurement model evaluated using the convergent and discriminant validity indices. The convergent validity was determined using i) item loadings, ii) composite reliability index and iii) the average variances extracted (AVE); whereas, the discriminant validity was evaluated using the square root of AVE (acceptable if the square root of AVE for each latent variable is greater than the correlations involving all the latent variables).

The structural model were evaluated using Stone Gassier's  $Q^2$  ( $Q^2 < 0$ ) and the path coefficients ( $\beta$ ) (Avkiran, & Ringle, 2018). The direct, indirect and total effects were determined using effect size ( $\omega^2$ ), values,  $\geq 0.35$ ,  $0.15$  and  $0.02$  imply large, medium, and small effect size respectively of exogenous variable(s) on an endogenous variable. Based on these criteria, values below  $0.02$ , even with statistically significant corresponding  $p$ -values suggested that the effects are too weak to be considered relevant from a practical point of view (Avkiran, & Ringle, 2018). The Adjusted R-square coefficient was used to describe the magnitude of variance in the endogenous variables that is account for by the exogenous variables. Lastly, the model fit indices; Standard Root Mean Square Residual (SRMSR) value  $< 0.08$ , and NFI  $> 0.95$ , TenenhausGoF (GoF) =  $0.518$ ; small  $> = 0.1$ , medium  $> = 0.25$ , large  $> = 0.36$  evaluated to determine the degree of fitness of the model (Kock, 2020).

Based on the model evaluation criterion, research question one was answered using the empirical and parsimonious causal models that was generated, by comparing it with the hypothesized causal model. Research questions two and three were answered using the effect size ( $\omega^2$ ) while research question four was answered using the Average R-square and Adjusted R-square coefficient. The null hypothesis one was tested using the model fit indices generated while t-test was used in testing null hypotheses two and three

for the significance of the beta weight ( $\beta$ ). All the null hypotheses were tested at 0.05 level of significance ( $\alpha < .05$ ). The decision rule for testing hypotheses two to four was to: Reject  $H_0$  if the associated exact probability values to the test statistic are less than 0.05 level of significance ( $\alpha < .05$ ), otherwise do not reject  $H_0$ .

## **6 RESULT**

### **6.1 Research question one**

What is the parsimonious causal model involving the influence of instructional supervision, teachers' motivation and principals' decision-making styles on Mathematics teachers' Job performance?

The hypothesized model involves latent (unobserved) variables, which are multidimensional; thus, a single stage Partial Least Square Structural Equation Modelling (PLS-SEM) causal model was hypothetically developed for this study. After the development of the model, the indicators of the variables in the model were assessed for convergent and discriminant validities. Based on the recommended threshold for the validities, modifications were made to the hypothesized model to achieve the most parsimonious causal model that explains the instructional supervision, teachers' motivation and principals' decision-making styles on Mathematics teachers' Job performance. The estimated hypothesized model results are presented in figure 1 below.

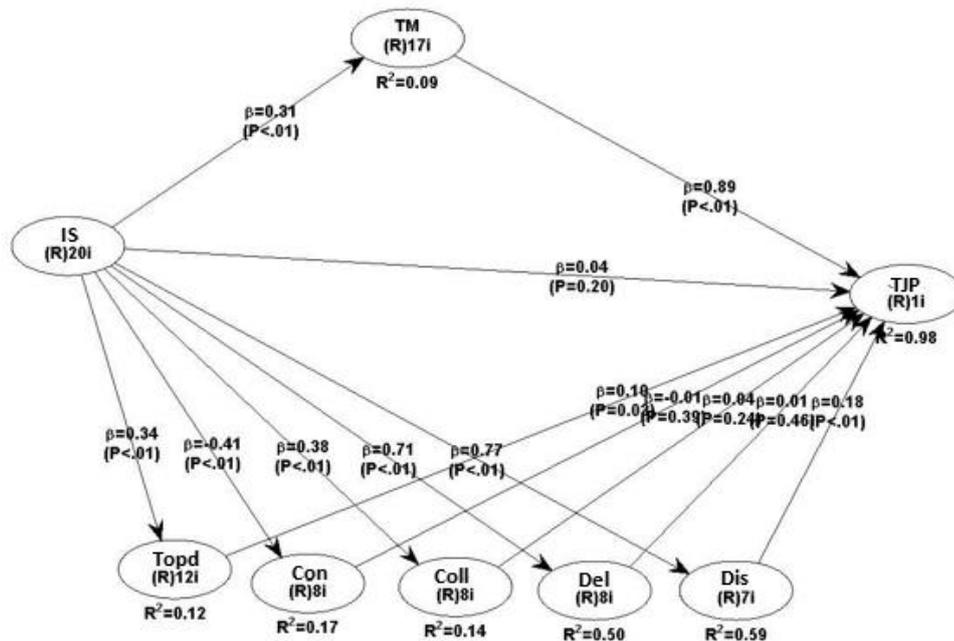
**Figure 1***The Estimated Hypothesized PLS-SEM Model*

Figure 1 represents the estimated hypothesized PLS-SEM causal model with beta coefficients, which provides an explanation of influence of instructional supervision (IS), teachers' motivation (TM) and principals' decision-making styles; Top-down (Topd), Consultative (Con), Collaborative (Coll), Delegative (Del) and Disturbed (Dis) on Mathematics teachers' job performance. Based on the results in the estimated hypothesized causal model, to answer research question one, both the measurement and structural models were assessed. To assess the measurement aspects of the hypothesized model, the convergent and discriminant validity index which indicates how well the latent variables are measured by their respective indicators were evaluated. The convergent validities obtained were evaluated by considering the loadings of the items and the Average Variance Extracted (AVEs) using the Fornell and Larcker (1981) criteria, which states that the values of the AVEs should be greater than or equal to 0.40 ( $AVE > 0.40$ ). The result of the convergent validity is presented on table 1.

**Table 1**  
*Convergent validity of the variables in the model*

Variables	Indicators	Loadings	Composite reliability	AVE	Variables	Indicators	Loadings	Composite reliability	AVE					
<b>IS</b>	IS1	0.313	0.730	0.263	<b>Topd</b>	PDMS1	0.847	0.799	0.305					
	IS2	0.499				PDMS2	0.831							
	IS3	0.498				PDMS3	0.849							
	IS4	0.453				PDMS4	0.847							
	IS5	0.624				PDMS5	0.053							
	IS6	0.624				PDMS6	0.196							
	IS7	0.426				PDMS 7	0.278							
	IS8	0.559				PDMS8	0.327							
	IS9	0.581				PDMS9	0.349							
	IS10	0.674				PDMS10	0.472							
	IS11	0.597			PDMS11	0.447	<b>Con</b>	PDMS12	0.458	0.522	0.235			
	IS12	0.584			PDMS13	0.59								
	IS13	0.191			PDMS14	0.607								
	IS14	0.563			PDMS 15	0.675								
	IS15	0.508			PDMS16	0.604								
	IS16	0.592			PDMS17	0.331								
	IS17	0.637			PDMS 8	0.308								
	IS18	0.553			PDMS19	0.488								
	IS19	0.408			PDMS20	0.511								
	IS20	0.181			PDMS21	0.316		<b>Coll</b>	PDMS22			0.559	0.559	0.236
<b>TM</b>	TM1	-0.046	0.874	0.272	PDMS23	0.536								
	TM2	0.58			PDMS24	0.514								
	TM3	-0.007			PDMS25	0.666								
	TM4	0.456			PDMS26	0.624								
	TM5	0.621			PDMS27	0.603								
	TM6	0.613			PDMS28	0.573	<b>Del</b>		PDMS29	0.718	0.524	0.247		
	TM7	0.701			PDMS30	0.596								
	TM8	0.509			PDMS31	0.43								
	TM9	0.148			PDMS32	0.561								
	TM10	0.726			PDMS33	0.598								
	TM11	0.608			PDMS34	0.52								
	TM12	0.707			PDMS35	0.077								
	TM13	0.613			PDMS36	0.231		<b>Dis</b>	PDMS37	0.274			0.776	0.332
	TM14	0.52			PDMS38	0.668								
	TM15	0.513			PDMS39	0.603								
	TM16	0.544			PDMS40	0.637								
	TM17	0.607			PDMS41	0.444								
		PDMS42	0.561											
		PDMS43	0.435											
		<b>TJP</b>	<b>TJP</b>	1.000	1.000	1.000								

Note: AVE = Average variance extracted

The results in Table 1 shows that some indicators (items) of the latent variables in the model had loadings that were less than the threshold value of 0.40 (that is indicator

loading  $< 0.40$ ) for a reliable and valid indicator. For instance, regarding the indicators of instructional supervision (IS), the loadings for IS1, IS13 and IS20 were less than 0.40, which implies that the indicators were not valid and reliable in measuring the variable. Likewise, the loadings for TM1, TM3 and TM9 were less than 0.40, which shows that the items were not valid and reliable in measuring teachers' motivation (TM). Concerning the dimensions of principals' decision-making styles (PDMS), the loadings for PDMS5, PDMS6, PDMS7 and PDMS9 were less than 0.40, which is also indicative that the items were not valid and reliable in measuring conscientiousness (Con). Similarly, the loadings for PDMS17 and PDMS18 were less than 0.40, which means that the items were not valid and reliable in measuring consultative (Con). In the same vein, the loading for PDMS21 was less than 0.40, which means that the items were not valid and reliable in measuring collaborative (Coll). Likewise, the loadings for PA35 and PA36 were less than 0.40, which means that the items were not valid and reliable in measuring delegative (Del). Lastly, the loading for PA37 was less than 0.40, which also implies that the item was not valid and reliable in measuring disturbed (Dis).

The result further shows that the composite reliability coefficients for few of the variables were less than the threshold of 0.60 (index  $< 0.60$ ), which implies that majority of the indicators associated with most of the variables are reliable. However, the Average Variance Extracted (AVE) for all the variables were less than the threshold value of 0.40 (AVE  $< 0.40$ ), which shows that the variables still lacked convergent validity. To improve the value of the AVE to achieve a more valid and reliable result, the indicators with lower factorial loads (correlations) values were deleted or eliminated from the model to meet the minimum threshold values as recommended in literature (Nunnally & Bernstein, 1994; Kock, 2020). Hence, all the items with loadings that were less than 0.40 (that is, indicator loading  $< 0.40$ ) were deleted or trimmed out from the model. The result of the trimmed model is presented in figure 2.

**Figure 2**  
*The Trimmed PLS-SEM Model*

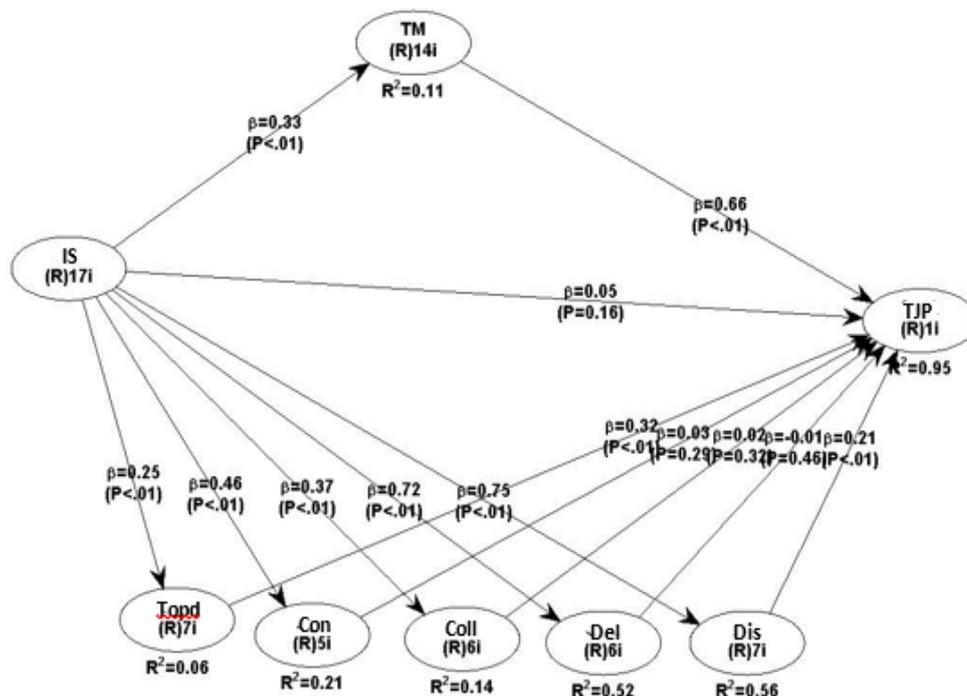


Figure 2 above shows the analysis of the fitness of the trimmed hypothetical model to the empirical data. The model indicates the strength of each of the variables and their indicators. This is used to describe the amount of causation in the model. The result of the convergent validity of the trimmed model is shown in the table 2 below.

**Table 2**  
*Convergent Validity of the Variables in the Trimmed Model*

Variables	Indicators	Loadings	Composite reliability	AVE	Variables	Indicators	Loadings	Composite reliability	AVE			
IS	IS2	0.491	0.883	0.411	Topd	PDMS1	0.703	0.849	0.496			
	IS3	0.493				PDMS2	0.840					
	IS4	0.443				PDMS3	0.808					
	IS5	0.621				PDMS4	0.845					
	IS6	0.623				PDMS10	0.465					
	IS7	0.422				PDMS11	0.443					
	IS8	0.569				PDMS 12	0.485					
	IS9	0.590				Con	PDMS13			0.412	0.817	0.453
	IS10	0.674					PDMS14			0.693		
	IS11	0.599					PDMS15			0.683		
	IS12	0.581					PDMS16			0.619		
	IS14	0.562					PDMS19			0.513		



The result in Table 3 shows the discriminant validity of the variables in the model. Following the Fornell and Larcker (1981) criteria, it is observed that all the values of the square roots of the AVEs which are placed in the diagonal (in bold) are greater in each of the columns representing the variables respectively than the correlation with other variables in the same column. This is indication that the discriminant validity of the variables was now satisfactory.

In assessing the structural model, the path coefficients obtained in the model were assessed and presented in Table 4.

**Table 4**

*Significance of the hypothesized Paths in the trimmed model*

S/N	Path	Path coefficient	Standard Error	Effect Size ( $f^2$ )	t-value	p-value	Decision	Remark
1.	IS > TM	0.327	0.049	0.107	6.649	0.001	S	Retain
2.	IS > Topd	0.247	0.050	0.061	4.955	0.001	S	Retain
3.	IS > Con	0.463	0.048	0.215	9.598	0.001	S	Retain
4.	IS > Coll	0.368	0.049	0.135	7.523	0.001	S	Retain
5.	IS > Del	0.721	0.047	0.520	15.491	0.001	S	Retain
6.	IS > Dis	0.748	0.046	0.560	16.137	0.001	S	Retain
7.	IS > TJP	0.052	0.051	0.008	1.009	0.157	NS	Delete
8.	TM > TJP	0.665	0.047	0.608	14.171	0.001	S	Retain
9.	Topd > TJP	0.320	0.049	0.284	6.504	0.001	S	Retain
10	Con > TJP	0.029	0.051	0.011	0.566	0.286	NS	Delete
11	Coll > TJP	0.024	0.051	0.009	0.459	0.323	NS	Delete
12	Del > TJP	-0.005	0.051	0.001	-0.105	0.458	NS	Delete
13	Dis > TJP	0.205	0.050	0.028	4.100	0.001	S	Retain

Note: S = Significant, NS = Not Significant

The result in Table 4 shows that out of the 13 paths that formed the structural model, nine (9) paths had large path coefficients which were considered significant. This is because the p-values associated with the t-values obtained for the paths were less than 0.05 level of significance ( $p < 0.05$ ). This means that the nine (9) paths significantly explain their direction of influence in the model. Conversely, four (4) paths were not statistically significant because the p-values associated with the t-values obtained for the paths were greater than 0.05 level of significance ( $p > 0.05$ ). This means that the four (4) did not significantly explain their direction of influence in the model. In essence, the paths were not important in explaining the direction of the influence in the model in relation to the endogenous variables. For instance, the paths from Instructional Supervision (IS),

Consultative (Con), Collaboration (Coll), and Delegative (Del), to the endogenous variable were insignificant; thus, paths were deleted from the model. Hence, the nine (9) with large path coefficients, indicating significant contribution to the model were retained accordingly. Furthermore, the stone Geisser indicator ( $Q^2$ ) for all the endogenous variables was evaluated. The results indicate that the  $Q^2$  values obtained for the endogenous variables; TM (.106), Topd (.061), (.215), Coll (.135), Del (.561), and TJP (.895) were greater than zero (0), which signifies that the variables have small and moderate predictive validity, which shows that the model is close to reality. Hence, the causal model has predictive validity. The model was thereafter modified, re-specified and re-estimated so as to achieve the most parsimonious (meaningful) causal model presented in figure 3.

**Figure 3**

The Empirically Validated (Parsimonious) PLS-SEM Model

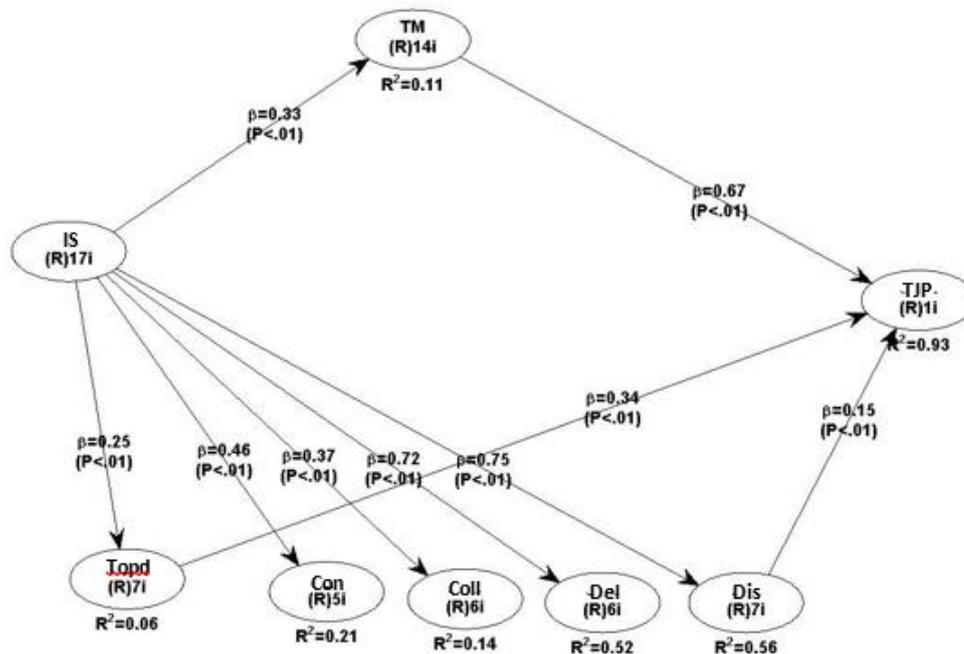


Figure 3 presents the parsimonious that explains influence of instructional supervision (IS), teachers' motivation (TM) and principals' decision-making styles; top-down (Topd), Consultative (Con), Collaborative (Coll), Delegative (Del) and Disturbed (Dis) on Mathematics teachers' job performance. This is because all the paths in the

model were significant ( $p < 0.05$ ). Therefore, figure 3 represents the most parsimonious causal model for providing an explanation of influence of instructional supervision, teachers' motivation and principals' decision-making styles on Mathematics teachers' job performance.

### 6.2 Hypothesis one

The fit and quality indices of the hypothesized causal model involving the influence of instructional supervision, teachers' motivation and principals' decision-making styles on Mathematics teachers' Job performance are not significantly supported by the empirically validated model.

**Table 5**

*Significance of the model fit and quality indices between the hypothesized and empirically validated model*

Model fit and Quality Indices	Estimated indices and threshold for the hypothesized model	Decision	Estimated indices and threshold for the parsimonious (empirically validated) model	Decision
Average path coefficient(APC)	= 0.321, $p = 0.00$	Significant	= 0.447, $p < 0.00$	Significant
Average R-squared (ARS)	= 0.364, $p < 0.00$	Significant	= 0.361, $p < 0.00$	Significant
Average adjusted R-squared (AARS)	= 0.362, $p < 0.00$	Significant	= 0.359, $p < 0.00$	Significant
Average block VIF (AVIF)	=2.719, acceptable if $\leq 5.00$ , ideally $\leq 3.30$	Significant	= 2.284, acceptable if $\leq 5.00$ , ideally $\leq 3.30$	Significant
Average full collinearity VIF (AFVIF)	=2.462, acceptable if $\leq 5.00$ , ideally $\leq 3.30$	Significant	2.462, acceptable if $\leq 5.00$ , ideally $\leq 3.30$	Significant
Tenenhaus GoF (GoF)	= 0.392, small $\geq 0.10$ , medium $\geq 0.25$ , large $\geq 0.36$	Significant	= 0.391, small $\geq 0.10$ , medium $\geq 0.25$ , large $\geq 0.36$	Significant
Sympson's paradox ratio (SPR)	= 0.923, acceptable if $\geq 0.70$ , ideally = 1.00	Significant	= 1.000, acceptable if $\geq 0.70$ , ideally = 1.00	Significant
R-squared contribution ratio (RSCR)	= 1.000, acceptable if $\geq 0.90$ , ideally = 1.00	Significant	= 1.000, acceptable if $\geq 0.90$ , ideally = 1.00	Significant
Statistical suppression ratio (SSR)	= 0.923, acceptable if $\geq 0.70$	Significant	= 1.000, acceptable if $\geq 0.70$	Significant
Nonlinear bivariate causality direction ratio (NLBCDR)	= 1.000, acceptable if $\geq 0.70$	Significant	= 1.000, acceptable if $\geq 0.70$	Significant
Standardized root mean squared residual (SRMR)	= 0.071, acceptable if $\leq 0.10$	Significant	= 0.070, acceptable if $\leq 0.10$	Significant

Result in Table 5 shows that the model fit and quality indices for both parsimonious and hypothesized causal models are statistically significant ( $p < 0.05$ ); hence, the null hypothesis was rejected. This implies that there is a significant model fit between the empirically observed data and theoretical model proposed for the study. This means that the data obtained for the study fits and supports the model developed. Therefore, the conclusion drawn is that the the fit and quality indices of the hypothesized causal model involving the influence of instructional supervision, teachers' motivation and principals' decision-making styles on Mathematics teachers' Job performance are significantly supported by the empirically validated model.

### 6.3 Research question two

What is the magnitude of direct influence of instructional supervision, teachers' motivation and principals' decision-making styles on Mathematics teachers' job performance?

**Table 6**

*Magnitude of direct influence of instructional supervision, teachers' motivation and principals' decision-making styles on Mathematics teachers' job performance*

S/N	Path	$\beta$	Standard Error	Effect Size ( $f^2$ )	Magnitude of influence	t-values	p-values	Decision
1.	IS > TM	0.327	0.049	0.107	Small	6.649	0.001	S
2.	IS > Topd	0.247	0.050	0.061	Small	4.955	0.001	S
3.	IS > Con	0.463	0.048	0.215	Moderate	9.598	0.001	S
4.	IS > Coll	0.368	0.049	0.135	Small	7.523	0.001	S
5.	IS > Del	0.721	0.047	0.520	Large	15.491	0.001	S
6.	IS > Dis	0.748	0.046	0.560	Large	16.137	0.001	S
7.	TM > TJP	0.669	0.047	0.611	Large	14.263	0.001	S
8.	Topd > TJP	0.336	0.049	0.299	Moderate	6.848	0.001	S
9.	Dis > TJP	0.147	0.050	0.020	Small	2.913	0.002	S

Note:  $\beta$  = Beta coefficient, S= Significant, NS = Not Significant;  $f^2 \geq 0.35$  implies Large effect,  $\geq 0.15$  implies Moderate effect, and  $\geq 0.02$  implies Small effect

The result in Table 6 shows the magnitude of direct influence of instructional supervision, teachers' motivation and principals' decision-making styles on Mathematics teachers' Job performance in the parsimonious model. The results showed that instructional supervision (IS) has small but considerable direct effect on teachers'

motivation (TM). The result also showed that instructional supervision has small, moderate and large direct effects on the various dimensions of principals' decision-making styles, respectively. Concerning mathematics teachers' job performance, the result showed that teachers' motivation had large direct effect ( $\beta = 0.669$ ,  $f^2 = 0.611$ ) on mathematics teachers' job performance. This means that 1 unit change in teachers' motivation will lead to a 0.611 (large) change in Mathematics teachers' job performance. Two dimensions of principals' decision-making styles, such as Top-down (Topd) with a path coefficient of 0.336 ( $f^2 = 0.299$ ) and Disturbed (Dis) with a path coefficient of 0.147 ( $f^2 = 0.020$ ) had moderate and small effects on Mathematics teachers' job performance, respectively. This means that 1 unit change in principals' top-down would account for 0.299 (moderate) changes in Mathematics teachers' job performance. While a unit change in principals' disturbed would account for 0.020 (small but considerable) changes in Mathematics teachers' job performance. On a whole, it can be noted that the direct influence of influence of instructional supervision, teachers' motivation and principals' decision-making styles on Mathematics teachers' Job performance in the parsimonious model ranged from small to large.

#### 6.4 Hypothesis two

The magnitude of all the estimated direct influence of the exogenous variables (instructional supervision, teachers' motivation and principals' decision-making styles) on Mathematics teachers' job performance in the parsimonious causal model developed are not significant.

The result as shown in Table 7 indicates that the magnitude of all the estimated direct influence of the exogenous variables (instructional supervision, teachers' motivation and principals' decision-making styles) on Mathematics teachers' job performance in the parsimonious causal model developed are significant. This is because, the p-values associated with the t-values obtained for the direct influence of each of the exogenous variables on the endogenous and criterion variable in the model are less than or equal to 0.05 ( $p < 0.05$ ) level of significance at which the hypothesis was tested. This implies that the various exogenous variables in the parsimonious model contributed meaningfully to the endogenous and criterion variable (Mathematics teachers' job

performance). Therefore, the null hypothesis two was rejected, and inference drawn was that the magnitude of all the estimated direct influence of the exogenous variables (instructional supervision, teachers' motivation and principals' decision-making styles) on Mathematics teachers' job performance in the parsimonious causal model developed is significant.

### 6.5 Research question three

What is the magnitude of indirect influence of instructional supervision, teachers' motivation and principals' decision-making styles on Mathematics teachers' job performance?

**Table 7**

*Magnitude of indirect influence of instructional supervision, teachers' motivation and principals' decision-making styles on Mathematics teachers' job performance*

S/N	Path	$\beta$	Standard Error	Effect Size ( $f^2$ )	Magnitude of influence	p-values	Decision
1.	IS > TM > TJP	0.412	0.049	0.056	Moderate	0.001	S

Note:  $\beta$  = Beta coefficient, NIE = No Indirect Influence, S= Significant, NS = Not Significant;  $f^2 \geq 0.35$  implies Large effect,  $\geq 0.15$  implies Moderate effect, and  $\geq 0.02$  implies Small effect

The result as shown in Table 7 indicates the indirect effect of exogenous variables on Mathematics teachers' job performance in the parsimonious model. The beta ( $\beta$ ) coefficients obtained showed that the path with considerable indirect effect was from instructional supervision (IS) through teachers' motivation (TM) to Mathematics teachers' job performance, with a path coefficient of 0.412 ( $f^2 = 0.056$ ). This signifies that a unit change in instructional supervision through the influence of teachers' motivation will result in a 0.056-unit change in Mathematics teachers' job performance. This implies that principals' instructional supervision through teachers' motivation has considerable effect on Mathematics teachers' job performance. This buttressed by the test of hypothesis three (3).

### 6.6 Hypothesis three

The magnitude of all the estimated indirect influence of the exogenous variables (instructional supervision, teachers' motivation and principals' decision-making styles) on Mathematics teachers' Job performance in the parsimonious causal model developed are not statistically significant.

The result as indicated in Table 7 revealed that instructional supervision through teachers' motivation has statistically significant indirect effect on Mathematics teachers' job performance, some were not statistically significant ( $p < 0.05$ ) based on the 95% bias-corrected and accelerated (BCa) bootstrap p-values. Hence, the null hypothesis three is rejected and inference drawn is that the magnitude of the estimated indirect influence of instructional supervision, teachers' motivation and principals' decision-making styles) on Mathematics teachers' Job performance in the parsimonious causal model developed are statistically significant.

### 6.7 Research question four

What is the magnitude of composite influence of instructional supervision, teachers' motivation and principals' decision-making styles on Mathematics teachers' Job performance?

**Table 8**

*Magnitude of the composite influence of instructional supervision, teachers' motivation and principals' decision-making styles on Mathematics teachers' Job performance*

Composite effect	R-Square	Adjusted R-Square	Average R-squared (ARS)	Bootstrapped p-value
Model	0.930	0.930	0.361	0.001

The result in Table 8 shows the magnitude of composite influence of instructional supervision, teachers' motivation and principals' decision-making styles on Mathematics teachers' Job performance. The result shows that the R-square value obtained was 0.930, which implies that 93.0% of the variance in mathematics teachers' job performance is

explained collectively by the exogenous variables; instructional supervision, teachers' motivation and principals' decision-making styles.

## **6.8 Hypothesis four**

The magnitude of composite influence of the exogenous variables (instructional supervision, teachers' motivation and principals' decision-making styles) on Mathematics teachers' Job performance in the parsimonious causal model developed is not statistically significant.

The result in Table 8 revealed that the magnitude of composite influence of the exogenous variables (instructional supervision, teachers' motivation and principals' decision-making styles) on Mathematics teachers' job performance in the parsimonious causal model developed is statistically significant ( $p < 0.05$ ). This is given the fact that the bootstrap  $p$ -values ( $p = 0.001$ ) associated with the Average R-Square for the exogenous variables in relation to the Mathematics teachers' job performance is less than 0.05 level of significance at which the hypothesis was being tested. Therefore, the null hypothesis was rejected, and the inference drawn was that the magnitude of composite influence of the exogenous variables (instructional supervision, teachers' motivation and principals' decision-making styles) on Mathematics teachers' job performance in the parsimonious causal model developed is statistically significant.

## **7 DISCUSSION OF THE FINDINGS**

### **7.1 Parsimonious causal model involving instructional supervision, teachers' motivation and principals' decision-making styles on Mathematics teachers' job performance**

The findings of this study revealed that the parsimonious causal model developed to explain the influence of instructional supervision, teachers' motivation and principals' decision-making styles on Mathematics teachers' job performance demonstrated a statistically significant and adequate model fit. This finding suggests that the hypothesised relationships among the variables were theoretically coherent and

empirically supported. The acceptable model-fit indices indicate a close correspondence between the empirically observed data and the proposed theoretical framework, implying that the selected exogenous variables meaningfully capture key determinants of Mathematics teachers' job performance in public secondary schools in Enugu State.

The implication of this result is that the structural relationships specified in the model accurately represent the dynamics among instructional supervision, teachers' motivation, principals' decision-making styles and teachers' job performance. In causal modelling, an adequate model fit indicates that the hypothesised theoretical structure is consistent with the empirical data and can therefore be considered a plausible explanation of the phenomenon under investigation (Kline, 2016). The adequacy of the model suggests that improvements in instructional supervision practices, effective motivational strategies for teachers and appropriate decision-making approaches by school principals are likely to contribute meaningfully to enhanced job performance among Mathematics teachers.

Furthermore, the significance of the model fit demonstrates that the integrated consideration of these administrative and motivational factors provides a more comprehensive explanation of teachers' job performance than examining each variable independently. Educational leadership and management literature have emphasized that teachers' effectiveness is influenced by multiple interrelated organizational factors such as leadership behaviour, supervision practices and motivational climate within the school system (Hoy & Miskel, 2013). The current finding therefore reinforces the view that school leadership practices operate as interconnected mechanisms that shape teachers' attitudes, commitment and productivity.

The finding also aligns with theoretical assumptions underlying leadership and organizational behaviour theories, particularly the leader-participation decision model and motivational theories which emphasize the role of supportive leadership and conducive working conditions in enhancing employee performance (Vroom & Yetton, 1973; Herzberg et al., 1959). When principals engage in effective instructional supervision, adopt participatory decision-making styles and provide motivational support, teachers are more likely to feel professionally supported and psychologically encouraged to perform their duties effectively. Such conditions often promote improved instructional delivery, better classroom management and greater commitment to students'

learning outcomes. Moreover, effective instructional supervision enables principals to monitor classroom practices, provide constructive feedback and support teachers' professional growth, which ultimately enhances teaching quality (Glickman et al., 2018). Similarly, motivated teachers tend to demonstrate greater enthusiasm, persistence and dedication to instructional tasks, which contributes positively to their job performance (Armstrong, 2014).

The finding is in agreement with the findings of Hoy and Miskel (2013) whose study revealed that school leadership practices, including supervision and participatory decision-making, significantly predict teacher effectiveness and overall school performance. Similarly, Leithwood and Jantzi (2006) found that leadership variables and teacher motivation collectively explain a substantial proportion of variance in teachers' professional performance. Also in agreement was the result of Nwachukwu (2015) who reported that principals' supervisory practices and motivational strategies significantly influence teachers' classroom effectiveness, while Akinfolarin (2017) reported that leadership decision-making styles and supervision practices jointly predict teachers' job performance in secondary schools. In a similar vein, Eze (2018) found that instructional supervision, teacher motivation, and administrative leadership variables significantly contributed to teachers' work commitment and productivity.

## **7.2 The magnitude of direct influence of instructional supervision, teachers' motivation and principals' decision-making styles on Mathematics teachers' job performance**

The findings revealed that teachers' motivation exerted a large and statistically significant direct effect on Mathematics teachers' job performance, while principals' decision-making styles such as top-down and disturbed, exerted moderate but statistically significant direct effects. This implies that motivated teachers are more likely to demonstrate greater commitment, diligence, and effectiveness in performing their instructional responsibilities, which ultimately improves their job performance in the classroom. Teachers who experience adequate motivation through incentives, recognition, professional development opportunities, and supportive working conditions tend to develop stronger dedication to their duties and are more willing to invest effort in

lesson preparation, classroom management, and students' academic improvement. The strong influence of motivation observed in this study may be attributed to the fact that motivation directly affects teachers' morale, job satisfaction, and willingness to perform assigned tasks effectively. In Nigerian secondary schools, where teachers often face challenges such as inadequate resources, heavy workload, and limited professional incentives, motivational factors become critical determinants of teachers' productivity and performance.

The finding that principals' decision-making styles such as top-down and disturbed demonstrated moderate but significant effects on teachers' job performance suggests that leadership behaviour also plays an important role in shaping teachers' work outcomes. The top-down decision-making style, where principals make decisions independently and communicate them to teachers for implementation, may contribute moderately to teachers' performance because it can promote clarity, quick decision-making, and strict adherence to institutional policies. In many Nigerian schools, the hierarchical administrative structure often encourages such directive leadership, which may sometimes facilitate order, discipline, and prompt execution of tasks. However, its effect may not be as strong as teacher motivation because teachers may feel less involved in the decision-making process, thereby limiting their sense of ownership and intrinsic commitment to school goals. Similarly, the disturbed decision-making style may exert moderate influence because inconsistency, uncertainty, or indecisiveness in leadership can create unstable work environments that affect teachers' morale and effectiveness, though not necessarily to the extent of completely undermining performance.

The strong influence of teachers' motivation on job performance found in this study is consistent with the views of several scholars. For instance, Herzberg (1959) posited in the Two-Factor Theory that motivation factors such as recognition, achievement, and responsibility significantly enhance employees' productivity and performance. In the educational context, Hoy and Miskel (2013) noted that motivated teachers tend to exhibit higher levels of commitment, instructional effectiveness, and professional engagement. Similarly, Akinfolarin (2017) reported that teachers' motivation significantly predicts job performance in secondary schools in Nigeria, emphasizing that incentives and supportive work environments enhance teachers' instructional delivery. In another study, Eze (2018) found that motivated teachers

demonstrate improved classroom management, lesson preparation, and dedication to teaching responsibilities.

Furthermore, the influence of principals' decision-making styles on teachers' job performance observed in this study aligns with previous empirical studies. Vroom and Yetton (1973) argued that leadership decision-making approaches significantly influence subordinates' performance and organizational effectiveness depending on the level of participation allowed in the decision process. Similarly, Leithwood and Jantzi (2006) found that leadership practices, including decision-making patterns, affect teachers' motivation, commitment, and instructional performance. Moreover, Okeke (2007) reported that principals' administrative styles, including the way decisions are made and communicated, significantly influence teachers' work attitudes and performance. Likewise, Nwachukwu (2015) reported that leadership practices that shape school climate and administrative direction have measurable effects on teachers' job performance in secondary schools.

### **7.3 The magnitude of indirect influence of instructional supervision, teachers' motivation and principals' decision-making styles on Mathematics teachers' job performance**

The finding of this study revealed that principals' instructional supervision exerted a statistically significant indirect influence on Mathematics teachers' job performance through teachers' motivation. This implies that the effect of instructional supervision on teachers' performance may not always occur directly but rather through its ability to enhance teachers' motivation, professional commitment, and enthusiasm toward their teaching responsibilities. When principals effectively supervise instruction through classroom observation, constructive feedback, mentoring, and professional guidance, teachers are likely to feel supported, valued, and encouraged to improve their instructional practices. Such supportive supervisory practices can strengthen teachers' intrinsic and extrinsic motivation, which in turn enhances their effectiveness in lesson delivery, classroom management, and assessment of students' learning outcomes. In this regard, instructional supervision acts as a catalyst that stimulates teachers' motivation, which subsequently translates into improved job performance.

The finding can also be explained through motivational theories which suggest that leadership behaviours influence employees' performance through motivational mechanisms. According to Maslow (1954), individuals tend to perform better when their psychological and professional needs such as recognition, belongingness, and self-actualization are satisfied. In the school environment, instructional supervision that recognizes teachers' efforts, provides constructive feedback, and encourages professional development can satisfy these needs and consequently stimulate higher motivation and improved job performance. The indirect relationship observed in this study may be attributed to the fact that supervision contributes to a positive work environment that enhances teachers' psychological readiness to perform their duties effectively. When supervision is developmental and supportive rather than punitive, teachers tend to perceive it as an opportunity for professional growth. This perception encourages them to improve their instructional delivery, adopt innovative teaching strategies, and invest greater effort in lesson preparation and students' learning activities. In many Nigerian secondary schools where teachers often encounter challenges such as limited instructional resources and high workload, supportive supervisory practices can play a crucial role in stimulating teachers' motivation and strengthening their commitment to teaching tasks.

This finding is consistent with several previous studies which have emphasized the motivational pathway through which supervision influences teachers' performance. For instance, Blase and Blase (2004) reported that principals' instructional supervision practices such as feedback, professional dialogue, and encouragement significantly enhance teachers' motivation and instructional improvement. Similarly, Glickman, Gordon, and Ross-Gordon (2014) observed that effective supervision promotes teachers' professional growth and commitment, which in turn improves their instructional performance in the classroom. In another study, Ingersoll (2001) noted that supportive administrative practices, including instructional supervision, contribute significantly to teachers' job satisfaction and motivation, which ultimately influence their effectiveness in performing their professional duties. Furthermore, Ofojebe and Ezugoh (2010) found that effective instructional supervision enhances teachers' morale and professional dedication in secondary schools in Nigeria. Similarly, Uche and Onyemerekeya (2019) reported that supervisory support from school principals positively influences teachers' motivation and instructional commitment. In another related study, Ekundayo (2010)

revealed that when principals provide guidance, recognition, and professional support through supervision, teachers tend to develop stronger motivation and improved teaching effectiveness.

#### **7.4 The magnitude of composite influence of instructional supervision, teachers' motivation and principals' decision-making styles on Mathematics teachers' job performance**

The finding of the study revealed that the exogenous variables; instructional supervision, teachers' motivation and principals' decision-making styles, collectively explained 93% of the variance in Mathematics teachers' job performance. This finding indicates a very high composite influence of the predictors and suggests that the causal model developed in this study possesses strong explanatory power in explaining variations in Mathematics teachers' job performance in public secondary schools in Enugu State. The high percentage of explained variance implies that these administrative and motivational factors play a crucial role in shaping how effectively teachers perform their instructional duties. In other words, when principals provide effective instructional supervision, adopt appropriate decision-making styles, and create conditions that enhance teachers' motivation, teachers are more likely to demonstrate improved commitment, instructional effectiveness, and professional productivity.

One possible reason for this high explanatory power may be that the three predictor variables represent key managerial and psychological factors that directly influence teachers' professional behaviour within the school system. Instructional supervision ensures that teachers receive professional guidance, monitoring, and feedback necessary for improving their classroom practices. At the same time, teachers' motivation influences their willingness to exert effort, remain committed to their responsibilities, and pursue instructional excellence. Principals' decision-making styles, on the other hand, shape the administrative climate of the school and determine the extent to which teachers feel involved, respected, and supported in school governance. When these factors operate together, they create a supportive organizational environment that strongly influences teachers' performance outcomes.

This finding is consistent with previous studies that have reported strong relationships between leadership practices, teacher motivation, and teachers' job performance. For instance, Leithwood and Jantzi (2006) found that school leadership practices significantly influence teachers' professional performance and student outcomes when combined with motivational factors within the school environment. Similarly, Hoy and Miskel (2013) observed that administrative leadership, supervision, and teacher motivation jointly contribute to the effectiveness of teachers and the overall functioning of schools. In another study, Blase and Blase (2004) reported that principals' instructional leadership practices, including supervision and participatory decision-making, have a strong impact on teachers' instructional behaviour and professional commitment. Also in agreement was the findings of Ekundayo (2010) who reported that effective school leadership practices significantly determine teachers' productivity and commitment in secondary schools. Similarly, Akinfolarin (2017) found that principals' leadership behaviour and motivational strategies significantly predict teachers' job performance in Nigerian secondary schools. In another related study, Ofojebe and Ezugoh (2010) observed that teachers' motivation and administrative support are major determinants of teachers' effectiveness and quality teaching in the Nigerian educational system.

## **8 CONCLUSION**

Based on these findings, the study concludes that improving the quality of instructional supervision, strengthening teacher motivation, and adopting appropriate decision-making practices among school principals are essential for enhancing Mathematics teachers' job performance in public secondary schools in Enugu State. Efforts aimed at improving teachers' working conditions, providing professional support, and promoting supportive leadership practices are therefore necessary for improving instructional effectiveness and overall educational outcomes in secondary schools.

Based on the findings of this study, the following recommendations are made: School principals should strengthen instructional supervision practices in secondary schools by conducting regular classroom observations, providing constructive feedback, and offering professional guidance to Mathematics teachers. Effective and supportive

supervision will help teachers improve their instructional strategies, classroom management, and overall teaching effectiveness.

Government and educational authorities such as the State Ministry of Education and Post Primary Schools Management Board should implement policies and programmes that enhance teachers' motivation. This may include prompt payment of salaries and allowances, provision of incentives, opportunities for professional development, recognition of outstanding performance, and improvement of working conditions in schools.

Principals should adopt more participatory and supportive decision-making styles that encourage teachers' involvement in school administration. Consultative, collaborative, and delegative decision-making approaches can foster a sense of belonging among teachers, improve staff morale, and enhance their commitment to achieving school goals.

Educational administrators and policymakers should organize regular leadership and management training programmes for school principals to improve their supervisory competencies and decision-making skills. Such training will enable principals to adopt leadership approaches that promote teacher motivation and enhance teachers' job performance.\

School authorities should create a supportive school climate that promotes teamwork, professional collaboration, and open communication among teachers and school administrators. A positive organizational climate can significantly improve teachers' motivation, job satisfaction, and instructional productivity.

## REFERENCES

- Adair, J. (2009). *Effective motivation: How to get extraordinary results from everyone*. Kogan Page.
- Adeyemi, T. O. (2010). Principals' leadership styles and teachers' job performance in senior secondary schools in Ondo State, Nigeria. *Current Research Journal of Economic Theory*, 2(3), 84–91.
- Akinfolarin, C. A. (2017). Principals' leadership styles and teachers' job performance in secondary schools in Ondo State, Nigeria. *International Journal of Educational Administration and Policy Studies*, 9(4), 45–51.

- Akinfolarin, C. A., & Ehinola, G. B. (2014). Motivation and effective performance of teachers in secondary schools in Nigeria. *International Journal of Academic Research in Progressive Education and Development*, 3(2), 157–163.
- Akinsola, M. K., & Tella, A. (2017). Correlates of academic achievement of secondary school students in mathematics. *Eurasia Journal of Mathematics, Science and Technology Education*, 13(7), 4189–4202. <https://doi.org/10.12973/eurasia.2017.00758a>
- Akinwumi, F. S., & Fadeyi, A. (2012). Supervision and teachers' productivity in secondary schools. *Journal of Education and Practice*, 3(5), 45–51.
- Armstrong, M. (2014). *Armstrong's handbook of human resource management practice* (13th ed.). Kogan Page.
- Blase, J., & Blase, J. (2004). *Handbook of instructional leadership: How successful principals promote teaching and learning* (2nd ed.). Corwin Press.
- Bush, T. (2011). *Theories of educational leadership and management* (4th ed.). Sage.
- Campbell, R. J., Kyriakides, L., Muijs, D., & Robinson, W. (2004). *Assessing teacher effectiveness: Developing a differentiated model*. RoutledgeFalmer.
- Ekundayo, H. T. (2010). Administering secondary schools in Nigeria for quality output in the 21st century: The principals' challenge. *European Journal of Educational Studies*, 2(3), 187–192.
- Evans, L. (2011). The 'shape' of teacher professionalism in England: Professional standards, performance management, professional development and the changes proposed in the 2010 white paper. *British Educational Research Journal*, 37(5), 851–870. <https://doi.org/10.1080/01411926.2011.607231>
- Eze, F. N. (2018). Instructional supervision and teachers' work performance in public secondary schools in South-East Nigeria. *Journal of Educational Management*, 6(2), 112–120.
- Federal Republic of Nigeria. (2014). *National policy on education* (6th ed.). Nigerian Educational Research and Development Council.
- Glickman, C. D., Gordon, S. P., & Ross-Gordon, J. M. (2014). *Supervision and instructional leadership: A developmental approach* (9th ed.). Pearson.
- Hallinger, P., & Heck, R. H. (2010). Collaborative leadership and school improvement: Understanding the impact on school capacity and student learning. *School Leadership & Management*, 30(2), 95–110. <https://doi.org/10.1080/13632431003663214>
- Herzberg, F. (1959). *The motivation to work* (2nd ed.). John Wiley & Sons.

- Herzberg, F., Mausner, B., & Snyderman, B. B. (1959). *The motivation to work* (2nd ed.). John Wiley & Sons.
- Hoy, W. K., & Miskel, C. G. (2013). *Educational administration: Theory, research, and practice* (9th ed.). McGraw-Hill.
- Hoy, W. K., & Tarter, C. J. (2007). *The road to open and healthy schools: A handbook for change*. Sage.
- Igwe, S. O. (2001). *Supervision, evaluation and quality control in education*. University of Port Harcourt Press.
- Ingersoll, R. M. (2001). Teacher turnover and teacher shortages: An organizational analysis. *American Educational Research Journal*, 38(3), 499–534.
- Kline, R. B. (2016). *Principles and practice of structural equation modeling* (4th ed.). Guilford Press.
- Leithwood, K., & Jantzi, D. (2005). A review of transformational school leadership research 1996–2005. *Leadership and Policy in Schools*, 4(3), 177–199. <https://doi.org/10.1080/15700760500244769>
- Leithwood, K., & Jantzi, D. (2006). Transformational school leadership for large-scale reform: Effects on students, teachers, and their classroom practices. *School Effectiveness and School Improvement*, 17(2), 201–227. <https://doi.org/10.1080/09243450600565829>
- Leithwood, K., Harris, A., & Hopkins, D. (2020). Seven strong claims about successful school leadership revisited. *School Leadership & Management*, 40(1), 5–22. <https://doi.org/10.1080/13632434.2019.1596077>
- Maslow, A. H. (1954). *Motivation and personality*. Harper & Row.
- Mullins, L. J. (2016). *Management and organisational behaviour* (11th ed.). Pearson.
- National Examinations Council. (2022). *Chief examiners' report*. NECO.
- Nguni, S., Slegers, P., & Denessen, E. (2006). Transformational and transactional leadership effects on teachers' job satisfaction, organizational commitment, and organizational citizenship behaviour in primary schools: The Tanzanian case. *School Effectiveness and School Improvement*, 17(2), 145–177. <https://doi.org/10.1080/09243450600565746>
- Nwachukwu, C. C. (2015). Principals' supervisory roles and teachers' effectiveness in secondary schools in Nigeria. *African Journal of Educational Research and Development*, 8(1), 86–94.
- Nworgu, B. G. (2015). *Educational research: Basic issues and methodology* (3rd ed.). University Trust Publishers.

- Odili, G. A. (2006). *Mathematics in Nigerian secondary schools: A teaching perspective*. Anachuna Educational Books.
- Ofojebe, W. N., & Ezugoh, T. C. (2010). Teachers' motivation and its influence on quality assurance in the Nigerian educational system. *African Research Review*, 4(2), 398–417.
- Okeke, B. S. (2007). *Teaching in Nigeria: The bureaucratic and professional challenges*. Africana First Publishers.
- Okorie, N. C. (2019). *Professional teaching in Nigeria*. University of Port Harcourt Press.
- Robbins, S. P., & Judge, T. A. (2017). *Organizational behavior* (17th ed.). Pearson Education.
- Sergiovanni, T. J., & Starratt, R. J. (2013). *Supervision: A redefinition* (9th ed.). McGraw-Hill.
- Somech, A. (2010). Participative decision making in schools: A mediating-moderating analytical framework for understanding school and teacher outcomes. *Educational Administration Quarterly*, 46(2), 174–209. <https://doi.org/10.1177/1094670510361745>
- Stronge, J. H. (2018). *Qualities of effective teachers* (3rd ed.). ASCD.
- Uche, C. M., & Onyemerekeya, C. C. (2019). Principals' supervisory practices and teachers' job performance in secondary schools. *International Journal of Educational Management and Development Studies*, 3(1), 45–55.
- Vroom, V. H., & Yetton, P. W. (1973). *Leadership and decision-making*. University of Pittsburgh Press.
- West African Examinations Council. (2023). *Chief examiners' report*. WAEC.
- Yukl, G. (2013). *Leadership in organizations* (8th ed.). Pearson Education.

### Authors' Contribution

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Francis Elochukwu Ikeh, Foluke Bosede Eze and Ebinga Smart Obem conceptualized the study, formulated the objectives, and designed the methodology. Onyekwelu Rapael Azubuiké, Adinna Patricia Ifeyinwa, Nonyem Ifediora Okeke coordinated the data collection process. Francis Elochukwu Ikeh and Onyekwelu Rapael Azubuiké performed data entry and preliminary cleaning. Francis Elochukwu Ikeh conducted the statistical

analysis. Francis Elochukwu Ikeh and Blessing C Anapua interpreted the results and drafted the discussion section. Edith Chika Edikpa, Patricia Uzoamaka Agu and Uche Calista Vita-Agundu contributed to the literature review and theoretical framework. Francis Elochukwu Ikeh, Patricia Uzoamaka Agu and Nneka Chinyere Ezeugo reviewed and edited the manuscript for clarity and coherence. Nneka Chinyere Ezeugo and Nonyem Ifediora Okeke ensured adherence to academic and ethical standards. All authors read and approved the final version of the paper.

### **Data availability**

All datasets relevant to this study's findings are fully available within the article.

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