Scientific Research Publishing

Engineering, 2025, 17(9), 451-487
https://www.scirp.org/journal/eng
ISSN Online: 1947-394X
ISSN Print: 1947-3931

Evaluating the Effect of Labour Unions on Employees' Productivity: A Case of Juba Municipality

Madel Thiong William[1], Tunde Ahmed Afolabi[2]

[1]Department of Economics, School of Social & Economic Studies, University of Juba, Juba, South Sudan
[2]Department of Strategic Mgt & Business Administration, The International University of Management, Windhoek, Namibia
Email: madel@uoj.edu.ss, mandelat34@gmail.com

How to cite this paper: William, M.T. and Afolabi, T.A. (2025) Evaluating the Effect of Labour Unions on Employees' Productivity: A Case of Juba Municipality. *Engineering*, **17**, 451-487.
https://doi.org/10.4236/eng.2025.179027

Received: July 28, 2025
Accepted: September 16, 2025
Published: September 19, 2025

Abstract

This study examines the impact of trade unions on employees' productivity within South Sudan's public sector, focusing on Juba Municipality. The study adopted a quantitative research methodology underpinned by a positivist philosophy. Data were collected through structured questionnaires administered to a stratified random sample of employees from unionized and non-unionized employees of the South Sudan Workers Trade Union Federation (SSWTUF) and the Employer Association of South Sudan (EASS). To analyze the relationship, we used both Multiple Linear Regression Model to explore direct relationship and control effect, and Structural Equation Model (SEM) to provide more comprehensive assessment of latent constructs and indirect effects, offering complementary insights into union engagement and productivity dynamics. Consequently, Composite Reliability and Cronbach's Alpha were used to assess constructs reliability, while Average Variance Extracted (AVE), Convergent and Discriminant validity were applied to test validity. To test the effect of multicollinearity, Variance Inflation Factor (VIF) was also used. The regression analysis findings revealed a robust positive correlation between union involvement and productivity, with unionized employees showing higher performance. Constructs exhibited strong validity and reliability, affirming relevance in assessing the influence of unions on productivity metrics. Key drivers include union-negotiated policies, frequent activities, and strong union leadership. While constructs exhibited strong validity and reliability, demographic measures require refinement. The study recommends strengthening training, communication, and representation within unions, and suggests future longitudinal research with broader demographic considerations.

Keywords

Trade Unions, Employee Productivity, Public Sector, Union Engagement

1. Introduction

In recent years, the discourse surrounding labour unions and their impact on employees' productivity has transcended national boundaries, attracting both regional and global perspectives. According to [1], studies indicate that unionized firms are more productive than non-unionized firms. They based their argument on the fact that unions apply pressure on employers during collective bargaining when unions negotiate for workers' salaries and better conditions of employment. This triggers an increased cost of labour which prompts organizations to increase the capital intensity and labour force quality, resulting in improved productivity. The same study also asserts that Trade Unions do not always lead to higher productivity. This is because trade Unions can reduce productivity by rejecting the introduction of technologies and machinery to do work on behalf of workers. A similar study finds that union can positively or negatively influence an organization's productivity. This research aims to evaluate the impact of labour unions on employees' productivity by examining various factors that contribute to this relationship. It will explore how union activities, such as collective bargaining, grievance handling, and work rule negotiations, influence productivity outcomes. Additionally, the study will consider the context of different industries and sectors to determine if the effects of unionization vary across different work environments. By providing a comprehensive analysis of the ways in which labour unions affect productivity. This research seeks to contribute valuable insights to the ongoing discourse on labour relations. It will offer evidence-based conclusions that can inform strategies for enhancing workplace efficiency while maintaining fair and equitable treatment of employees.

1.1. Background of the Study

Globally, advocating for workers' rights through unions has significant influence on socio-economic outcomes. Workers unions have historically been instrumental in negotiating better wages, improved working conditions, and job security. However, the landscape of unionization has undergone significant changes in recent years, driven by globalization, technological advancements, and evolving labour market dynamics. In regions such as Europe and North America, there has been a marked decline in union membership and shifts in industrial structures, sparking debates about the continued relevance and effectiveness of unions in promoting worker welfare and productivity [2]. Conversely, in regions like Sub-Saharan Africa, South Sudan included, labour unions remain significant actors in the socio-economic sphere. The labour landscape in Africa is characterized by di-

verse union structures, including sector-specific unions and umbrella organizations representing workers across various industries. Despite facing challenges such as informal employment and weak institutional frameworks, African unions continue to advocate for improved working conditions, social protection, and fair wages [3]. These unions play a crucial role in mitigating the impact of socio-economic inequalities and contributing to workers' rights in a challenging environment. South Sudan labour context presents a unique blend of socio-economic challenges, and aspirations for inclusive growth. Since gaining independence in 2011, South Sudan has made a significant stride in developing labour laws and institutional frameworks designed to safeguard workers' rights and enhance labour market stability. The South Sudan Labour Act of 2023, for instance, represents a key piece of legislation aimed at regulating labour relations and protecting workers [4]. The labour unions in South Sudan, representing diverse sectors such as mining, agriculture, manufacturing, and services, have tried to be instrumental in advocating for workers' interests and negotiating collective agreements. Despite these advancements, South Sudan continues to face persistent challenges related to productivity enhancement. Factors such as skills shortages, illegal migrant workers, infrastructural deficits, and socio-economic inequalities present significant barriers to achieving optimal productivity levels across sectors. In this context, understanding the role of labour unions in addressing productivity challenges and fostering inclusive growth becomes crucial. While existing literature provides valuable insights into the impact of unionization on productivity globally and regionally, there remains a notable gap in research specific to South Sudan labour context. Studies by [5] and [6]. offer valuable perspectives on union dynamics and productivity in African contexts. However, comprehensive studies that explore the nuanced relationship between union engagement and productivity within South Sudan are unavailable. Moreover, existing research often focuses primarily on qualitative analyses of economic implications, frequently overlooking quantitative dimensions and socio-political contexts. Understanding these multifaceted dynamics is essential for developing informed policies and strategies aimed at enhancing productivity and promoting socio-economic development in South Sudan. Addressing this gap in the literature can provide a more holistic view of the role of labour unions in improving productivity and support the formulation of effective strategies to overcome the challenges faced by South Sudan workers and industries.

1.2. Problem Statement

In the context of labour unions, while these organizations have played a crucial role in negotiating better working conditions and wages, their impact on productivity remains underexplored. Existing research, such as the work by [6], provides valuable insights into the general effects of unionization on productivity in African contexts. However, there is a significant gap in studies that focus specifically on South Sudan, which presents unique socio-economic and institutional dynam-

ics that may influence the relationship between union engagement and productivity. Studies by [5] emphasize the importance of understanding union dynamics within African labour markets but often fall short of a detailed examination of South Sudan's specific labour landscape. These studies typically focus on broader regional trends rather than the nuanced factors affecting South Sudan, such as its post-independence labour policies and the evolving role of unions in a developing economy. Furthermore, much of the existing research tends to concentrate on quantitative measures of economic impact, often neglecting qualitative aspects and socio-political contexts that could provide a more comprehensive understanding of how unions affect productivity. The lack of qualitative insights limits our ability to grasp the complex interplay between union activities and productivity outcomes such as in South Sudan. To address these gaps, it is essential to conduct research that not only evaluates the quantitative impact of labour unions on productivity, but also explores the qualitative dimensions and socio-political factors influencing this relationship. Such research would offer a more holistic view of how labour unions contribute to or detract from productivity enhancement and inform more effective policies and strategies tailored to South Sudan's unique labour context.

1.3. Purpose of the Study

The purpose of this study is to critically evaluate the impact of labour unions on employee productivity within the South Sudan's context. This research aims to provide a comprehensive understanding of how labour unions influence productivity by examining both quantitative and qualitative dimensions. Specifically, the study seeks to assess the direct effects of unionization on productivity by analyzing collective bargaining activities, work rules, and advocacy efforts. And also by comparing productivity levels in unionized and non-unionized environments, in order to determine how these factors, contribute to or detract from workplace efficiency. In addition to quantitative assessments, the research will explore qualitative dimensions and socio-political contexts that influence the relationship between unions and productivity. This involves examining workers' perceptions of union effectiveness, the role of unions in addressing workplace grievances, and the broader socio-political factors that impact union activities. Understanding these qualitative aspects provides a more nuanced view of how unions affect the work environment and overall productivity. Furthermore, the research aims to evaluate the role of unions in overcoming key productivity challenges faced by South Sudan's industries, such as skills shortages, infrastructural deficits, and socio-economic inequalities. The goal is to determine whether and how unions contribute to addressing these challenges and promoting inclusive growth in the South Sudan's labour market. Ultimately, the findings from this study are intended to inform policymakers, business leaders, and labour union representatives about the effectiveness of union strategies in enhancing productivity. By providing evidence-based insights, the research aims to support the development

of informed policies and practices that can improve labour relations and productivity outcomes in South Sudan. Through addressing the existing research gaps, this study seeks to enhance understanding and guide effective labour market strategies tailored to South Sudan context.

1.4. Research Objectives

The main objective:

- This study seeks to evaluate the effect of trade unions on employees' productivity

The specific objective

The study seeks to address the following specific objectives:

To assess the extent and nature of union engagement in South Sudan public sector.

- To evaluate the perceived effectiveness of labour unions in addressing workplace issues and enhancing working conditions.
- To analyze the impact of union engagement on employee productivity in South Sudan public service.
- To identify the factors that influence the effectiveness of labour unions in fostering productivity improvements.

1.5. Research Questions

Main research question

- What is the effect of trade unions on employee productivity?

Specific research questions

- How prevalent is union membership among employees in South Sudan public sector?
- To what extent do employees perceive labour unions as effective in resolving workplace grievances?
- What are the key productivity metrics influenced by union involvement?
- What are the key productivity metrics influenced by union involvement?

1.6. Limitations

The study evaluating the impact of labour unions on employee productivity in South Sudan possess some limitations that could affect the study's conclusions and generalizability. The study is confined to Juba municipality geographical area, limiting the study to a very specific population size. This will affect the generalizability of the results in other sectors or regions. As a result, findings may not fully represent the diverse experiences of unionized and non-unionized employees across the entire public sector. The results could have been different if the study was carried out on a larger population. Additionally, one of the major shortcomings is limited access to literature and comprehensive data on union activities in South Sudan, leaving the study to largely rely on global and regional literature, and data generated through questionnaire survey. The availability of detailed rec-

ords and statistics is crucial for a thorough analysis, but has been constrained, potentially affecting the accuracy of the findings. Furthermore, employee's productivity is influenced by a myriad of factors beyond union activities, such as technological advancements, management practices, and broader economic conditions. These external variables complicate the task of isolating and measuring the specific impact of union engagement on productivity. As such, the study may struggle to disentangle the effects of union activities from other productivity influencers. Finally, the broader economic and social contexts, including South Sudan's economic conditions and cultural attitudes towards unions, play a significant role in shaping productivity outcomes. These contextual factors must be considered, as they can influence both the effectiveness of unions and the general work environment.

2. Literature Review

The role of labour unions in shaping workplace dynamics and advocating for workers' rights remains a subject of significant debate within the theoretical literature. While unions are widely perceived as critical actors in promoting fair labour practices, their overall impact on productivity continues to generate divergent views. In particular, there is ongoing contention regarding whether union involvement enhances or hinders organizational efficiency in the modern labour landscape. This literature review is pertinent especially to the present study, which seeks to critically examine the relationship between union engagement and employee productivity. It aims to provide a comprehensive understanding by integrating both global and regional perspectives. The review will engage with contrasting viewpoints on key factors influencing this relationship, such as unions' roles in negotiating employment terms, resolving workplace disputes, and responding to shifting labour market conditions. However, a common criticism of qualitative literature reviews is their potential vulnerability to what [7] refers to as "casual methodological speculation". He states that, these reviews are typically grounded in expert opinion and rely heavily on subjective interpretation, that may lack the methodological rigor of empirical or quantitative analyses. Although qualitative studies are heavily critique, this study endeavors to present a summary of the available literature. Over the years, scholars have argued that trade unions can obstruct the adoption of new technologies in the workplace. For example, [8] asserted that unions may resist technological changes that threaten existing job structures. Similarly, other studies contend that unions tend to restrict managerial discretion, particularly by compelling firms to adopt inefficient hiring and firing practices, favor restrictive work practices, curbing the pace of work, hours of work, and skill formation. Whereas on the other hand, [9] argued that unions can enhance productivity by providing workers with a structured outlet for expressing dissatisfaction, serving as an alternative to exiting the organization. They further assert that unions facilitate open communication between workers and management, encouraging managers to adopt more efficient production methods and

workplace policies. Beyond the workplace, unions also play a significant role in political advocacy, particularly in advancing policies related to worker empowerment and economic justice. [10] examined the impact of weakening unions through the implementation of "right-to-work" laws and found substantial long-term political and economic consequences. These include reduced voter turnout, decreased contributions from organized labor, lower levels of voter mobilization, fewer working-class candidates elected to state legislatures and Congress, and a shift toward more conservative state policies. These political changes not only reshape the communities in which they occur but also influence broader economic outcomes through the policies enacted by elected officials. Additionally, [11] found that union membership can contribute to a reduction in white racial resentment, suggesting that unions may also play a role in fostering greater social cohesion and more inclusive political attitudes. Unionization contributes positively to the economy beyond its role in reducing wage inequality and narrowing gender and racial pay gaps. According to [12], union members tend to generate a favorable "net fiscal impact"—in other words, they earn higher incomes, which results in greater tax contributions. Unions support increased earnings and wealth accumulation for workers, ultimately leading to higher government revenue. The same study also indicates that unionized employees rely less on public assistance programs. With better wages, workers and their families are less dependent on government support, and unions often help secure employer-provided benefits such as health insurance. As a result of the ambiguity over the net effect of unions, most of the existing studies begin their empirical investigation without presupposing a specific direction, leaving the conclusion to empirical findings, and that explains why our study chose to undertake a quantitative approach.

2.1. Empirical Literature

Empirical evidence on union impacts is mixed, with studies reporting positive, negative, or no significant effects on productivity. [5] found a positive link between unionization and productivity in Namibia. Unionized workers tend to have better working conditions, including paid leave, predictable schedules, and more workplace input. While several studies have explored union effects in parts of Africa, none focus specifically on South Sudan. However, research highlights the importance of collective bargaining and worker representation in improving workplace outcomes and stability [13]. Rather than being obstructive, unions can motivate workers and enhance productivity by safeguarding their rights [14]. The way unions influence productivity, financial performance, and investment is therefore crucial [14]. Some evidence suggests that unionized firms may invest less in capital equipment and R&D, or earn lower returns on such investments, than comparable nonunion firms [15]. At the same time, unions have historically narrowed wage gaps, particularly for Black and Hispanic workers [16] and safeguarded gender pay equity; for example, the expiration of teacher collective bargaining agreements widened the wage gap between equally qualified men and

women [17]. Unions also deliver tangible benefits such as health insurance, pensions, and educational discounts through a variety of organizational forms [18]. Collectively, these studies illuminate the channels through which unions can shape productivity and related outcomes, underscoring the need for context-specific analysis when assessing their role in South Sudan. Union workers are significantly more likely than nonunion workers to receive employer-sponsored health insurance and retirement benefits, with union employers contributing more to these plans. On average, unionized workers earn 10.2% more than their nonunion counterparts a difference known as the "union wage premium". Unions also raise standards for nonunion workers by influencing broader wage and benefit practices [19]. This combined effect helps reduce income inequality and improve overall worker welfare [20]. Black workers represented by a union are paid 13.1% more than their nonunionized Black peers, and Hispanic workers represented by a union are paid 18.8% more than their nonunionized Hispanic peers leading to higher productivity [21].

2.2. Conceptual Framework

Before delving into the empirical evidence, it is essential to establish a conceptual framework for understanding the relationship between union engagement and productivity. At its core, productivity refers to the efficiency with which inputs are converted into outputs within an organization or economy [22]. Meanwhile, union engagement encompasses the extent to which labour unions are actively involved in representing workers' interests, negotiating collective agreements, and shaping workplace policies and practices. Theoretical frameworks such as the efficiency-wage theory and the collective voice model provide valuable insights into how unions can influence productivity outcomes [23]. The conceptual framework for this research integrates several theoretical perspectives to examine the relationship between labour unions and employee productivity in the South Sudan's public sector. The framework is designed to address the study's objectives by drawing on theories that elucidate the extent and nature of union engagement, evaluate perceived effectiveness, analyze productivity impacts, and identify influencing factors. The following theories are central to understanding these dynamics:

2.2.1. Collective Bargaining Theory

The conceptual framework underpinning this research is primarily grounded in Collective Bargaining Theory. This theory is central to understanding how labour unions engage with employers to negotiate employment terms, such as wages, working conditions, and other benefits. Collective Bargaining Theory asserts that unions play a critical role in shaping workplace standards through structured negotiation processes and collective agreements [8]. This theory helps assess the extent and nature of union engagement in the South Sudan's public sector by examining how unions negotiate and influence employment terms. It provides insights into the scope of union activities and their impact on improving workplace stand-

ards and conditions.

2.2.2. Labour Process Theory

Labour Process Theory, as articulated by [9], examines how the organization and control of labour processes affect workers and productivity. The theory argues that unions can influence labour processes by negotiating work rules, job design, and management practices that impact worker efficiency and satisfaction. This theory is pertinent for analyzing how union engagement affects employee productivity in the South Sudan's public service. It helps explore the ways in which unions affect labour processes and productivity through their influence on job design, work rules, and management practices.

2.2.3. Social Exchange Theory

Social Exchange Theory [10] posits that social interactions, including those between unions and employees are based on reciprocal exchanges. According to this theory, employees' perceptions of union effectiveness are influenced by their experiences and the benefits they receive from union involvement compared to their expectations and the costs involved. This theory aids in evaluating the perceived effectiveness of labour unions in addressing workplace issues and enhancing working conditions. It provides a framework for understanding how employees assess the value of union membership and the impact of unions on their work environment.

2.2.4. Resource Dependence Theory

Resource Dependence Theory [11] suggests that organizations depend on external resources, including labour, and must manage these dependencies to achieve their goals. Unions can influence productivity by negotiating for resources and conditions that affect organizational performance and employee satisfaction. This theory is useful for identifying the factors that influence the effectiveness of labour unions in fostering productivity improvements. It highlights how unions interact with external and internal factors to secure resources and conditions that can enhance productivity and organizational performance. By integrating these theories, the conceptual framework provides a comprehensive lens through which to examine the impact of labour unions on employee productivity in Juba municipality. It addresses key aspects of union engagement, effectiveness, and productivity, and helps identify the factors that shape these dynamics in the South Sudan's public sector.

3. Methodology

This chapter outlines the research methodology used to examine the effect of labour union engagement on employee productivity within the South Sudan's public sector. The primary focus is on applying quantitative methods to systematically evaluate how union activities influence productivity outcomes. The chapter begins with a description of the research design, detailing the quantitative approach se-

lected for this study. It then covers the sampling strategy, including participant selection and sample size, to ensure representative and generalizable results. Data collection methods are discussed, including the development and deployment of surveys or questionnaires. Finally, the chapter explains the data analysis techniques employed to interpret the results and address potential limitations of the study. This structured approach aims to ensure the research is rigorous and reliable, providing valuable insights into the impact of labour unions on productivity in South Sudan.

3.1. Research Design

This study adopts a case study research design to evaluate the effect of trade unions on employee productivity within Juba municipality. A case study approach is well-suited for exploring complex phenomena within their real-life context, particularly when the research aims to understand the detailed and nuanced interactions between variables [12]. In this case, the focus is on analyzing how trade unions influence employee productivity specifically within public sector in Juba Municipality. South Sudan has a total of 2 trade unions and 1 employer's union [13] but this research will concentrate on those operating within the public sector. The rationale for this focus is to provide a detailed examination of union dynamics and their impact on productivity within a specific context, thereby allowing for a more targeted analysis. The public sector in South Sudan, which includes government departments, public service institutions, and state-owned enterprises, presents a distinct environment where trade unions play a significant role in negotiating employment terms and influencing workplace conditions.

3.2. Population

The population for this research consists of employees of Juba Municipality. The Juba Municipality is chosen to provide a diverse perspective on how union engagement impacts productivity in different areas of the public sector. To ensure a comprehensive analysis, the population will be stratified into subpopulations. Stratification involves dividing the population into distinct subgroups that share common characteristics, in this case, senior supervisors and subordinates. This approach allows for targeted sampling and more precise insights into each subgroup's dynamics [14]. By sampling each subpopulation independently, the research aims to capture the varied experiences and impacts of union engagement across different sectors within the public sector. This stratified approach will facilitate a nuanced understanding of how union activities influence productivity across different public sector settings, ensuring that the findings are representative and relevant to the broader context of South Sudan's public service.

3.3. Sampling

The study chose Juba Municipality to provide a diverse perspective on how union engagement impacts productivity. The study employs purposive random sam-

pling to select some employees who are members of the South Sudan Workers Trade Union Federation (SSWTUF), and Employers Association of South Sudan (EASS) at Juba Municipality. This approach is appropriate because it ensures that the sample includes unions with significant representation and influence in the public sector [15]. These unions are selected based on their prominence and their role in shaping labour relations and productivity within the public sector. Purposive sampling allows the study to focus on unions that are central to understanding the impact of union engagement on productivity. Additional to the selected union members, random sampling is utilized to select supervisors and other participants with in the public sector. This approach involves randomly selecting employees from institutions to ensure that the sample is representative of the broader workforce within these settings [16]. Random sampling helps eliminate selection bias and allows for the generalization of findings to the larger population of public sector employees. Purposive sampling is justified in this study as it ensures the inclusion of key unions that have substantial involvement in public sector labour issues and productivity matters. This targeted approach is crucial for obtaining relevant and high-quality data from significant players in the labour market [17]. This method is essential for achieving statistical validity and reliability in the quantitative analysis, allowing the research to draw generalizable conclusions about the relationship between union engagement and employee productivity [18]. Factors such as the total number of employees, desired confidence level, and acceptable margin of error will be taken into account. For instance, if the total employee count is 500, a sample size will be calculated to achieve a 95% confidence level with a 5% margin of error, ensuring that the results are statistically significant and reflective of the broader employee population [19]. Once the strata are defined, random sampling will be employed to select participants from each stratum. After participants are selected, they will be contacted and invited to participate in the study. They will be provided with detailed information about the study's objectives, procedures, and their rights as participants. The data collection will involve administering a structured questionnaire designed to capture information on union engagement and productivity metrics. Efforts will be made to maximize response rates and address any potential issues that arise during the data collection process. Finally, to ensure the accuracy and reliability of the collected data, rigorous data management practices will be implemented. This includes verifying the consistency of responses, addressing any missing data, and ensuring that all data is securely stored and anonymized to protect participant confidentiality [18]. Through these methods, the study aims to obtain a robust and representative dataset that will provide valuable insights into the relationship between labour unions and employee productivity in South Sudan's public sector. By combining these sampling methods, the study aims to provide a comprehensive analysis of how trade unions affect productivity in South Sudan's public sector, balancing focused insights with broad applicability. In survey-based studies aiming for a representative sample, the sample size is calculated using the following formula:

$$\frac{N \cdot Z^2 \cdot p \cdot (1-p)}{E^2 \cdot (N-1) + Z^2 \cdot p \cdot (1-p)}$$

where:

- N = Target population size: 626 public sector employees in Juba Municipality.
- Calculated sample size: Using Yamane's formula at a 95% confidence level and a 5% margin of error, the sample size was determined to be 242.
- Achieved response count: 217 completed responses were received and used in the analysis.

Calculation: $N = 626$, $Z = 1.96$, $p = 0.5$, and $E = 0.05$, $n \approx 289$.

Therefore, a sample size of approximately 289 respondents would be required for the quantitative survey component of this study, assuming a 95% confidence level, 5% margin of error, and using $p = 0.5$ for maximum variability. Given the practical constraints and specific objectives of this study, aiming for a sample size of around 100 respondents would still provide robust statistical power to analyze the effect of labour unions on productivity efficiency, ensuring reliable and meaningful results [20].

3.4. Research Approach

This study employs a quantitative approach to assess the effect of labour unions on employee productivity in South Sudan's public sector. The quantitative approach is suitable for examining relationships between variables, such as union engagement and productivity, by using statistical methods to analyze numerical data [14]. This methodology allows for objective measurement and analysis of the impact of union activities on productivity outcomes across selected public institutions.

3.5. Research Instruments

A structured questionnaire is developed to collect data on the following key variables.

The questionnaire is designed to include both closed-ended questions and Likert scale items to facilitate quantitative analysis [18]. The questions will be validated through a pilot study to ensure clarity and relevance (**Table 1**).

Table 1. The main variables.

Union Engagement:	Measures of union membership, participation in union activities, and perceived support from unions.
Employee Productivity:	Quantitative indicators of productivity, such as output levels, efficiency, and performance metrics.

3.6. Data Collection

A structured questionnaire was developed to collect data on the key variables, *i.e.* Union engagement and employee productivity. The questionnaires were admin-

istered in person, on an individual basis by the researcher at two public institutions and labour unions. The questionnaire design includes both closed-ended questions and Likert-scale items to facilitate our quantitative analysis. The questions were validated through a pilot study to ensure clarity and relevance.

3.7. Data Analysis

This study employs a quantitative research approach to assess the effect of labour unions on employee productivity in South Sudan's public sector. The quantitative approach is suitable for examining relationships between variables, such as union engagement and productivity, by using statistical methods to analyze numerical data [14]. In order to analyze our data, a regression model is used as a tool for examining the relationship between our dependent variable and the independent variables. Regression analysis was used to explore direct relationships and control effects, while PLS-SEM provided a more comprehensive assessment of latent constructs and indirect effects, offering complementary insights into union engagement and productivity dynamics. The Dependent Variable of our study is Employee Productivity (Y), which is measured using productivity metrics specific to the public sector, such as output per hour worked, performance ratings, or productivity indexes. While the Independent Variables are Union Engagement (X_1) which is measured by the level of union activities or support, such as the frequency of union meetings, union training sessions, and the extent of union involvement in workplace decisions. The second variable is Job Satisfaction (X_2), which could be measured using survey responses indicating overall job satisfaction. Union Membership Intensity (X_3) indicates the proportion of employees in a given workplace who are members of the union. Workplace Conditions (X_4) includes factors such as working environment, availability of resources, and working hours, which might be quantified through employee surveys or organizational reports.

3.8. Model Specification

To analyze the impact of union engagement on employee productivity while accounting for other factors, we use a multiple linear regression model:

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

where:

Y_i = Employee productivity for the i-th employee or unit

X_1 = Union engagement level for the i-th employee or unit

X_2 = Job satisfaction for the i-th employee or unit

X_3 = Union membership intensity for the i-th employee or unit

X_4 = Workplace conditions for the i-th employee or unit

β_0 = Intercept term

$\beta_1, \beta_2, \beta_3, \beta_4$ = Regression coefficients for the independent variables

ε = Error term for the i-th observation

In the context of our research, which focuses on the impact of labour unions on employee productivity in South Sudan's public sector, a regression model can help quantify how union engagement influence productivity. Regression analysis helped to explore direct relationships and control effects, while PLS-SEM provided a more comprehensive assessment of latent constructs and indirect effects, offering complementary insights into union engagement and productivity dynamics. The model expects Union Engagement (X_1) to have a positive relationship with productivity if union activities enhance workplace conditions and employee morale. Research by [21] suggests that effective union engagement can lead to increased worker satisfaction and productivity. Similarly, job Satisfaction (X_2) is expected to positively impact productivity, as higher job satisfaction typically correlates with increased motivation and output [7]. Additionally, Union Membership Intensity (X_3) relationship with employee productivity is expected to either be positive if higher membership leads to stronger collective bargaining and better working conditions, or neutral if the effect of union density does not significantly alter productivity. While Workplace Conditions (X_4) is expected to positively affect productivity, as better workplace conditions generally facilitate higher employee performance [8]. Expected variables signs (**Table 2**).

Table 2. Expected signs of the coefficients of explanatory variable.

Dependent Variable	Explanatory Variables	Expected Sign
Employee Productivity (Y)	Union Engagement (X_1)	+
	Job Satisfaction (X_2)	+
	Union Membership Intensity (X_3)	+/−
	Workplace Conditions (X_4)	+

3.9. Analysis

Data for the regression analysis is collected through structured surveys administered to employees in the selected public institutions. The analysis involves estimating the regression coefficients using statistical software and testing for statistical significance to determine the impact of each independent variable on productivity. This model provides a structured approach to quantifying the effect of union engagement on employee productivity, considering both direct and indirect influences of workplace factors. The Structural Equation Modelling (SEM) was used for analyzing quantitative data. The model is suitable for this study according to the researcher. Conferring to [22] and [23], a robust feature of the SEM analysis technique is described as the aptitude to model and construct latent variables (variables that are indirectly measured). Latent variables are evaluated in the model based on other measured variables that are expected to be related to the latent ones [24]. This property of SEM allows this study to succinctly evaluate the reliability of the measurements in the model, suggesting that the structural association

between latent variables can be accurately evaluated [25]. Consistent with [25], the measurement model in SEM summaries the relationship between latent variables and related indicator variables. SEM is used to identify indicators for each of the constructs by evaluating the extent to which the observed variables measure items that are not part of the latent construct. It thus helps to determine the best indicators for a given construct [26]. Accentuating associations between observed and unobserved variables are expressed by factor loadings, which inform the researcher about the extent to which a particular indicator can measure a variable and acts as a validity coefficient [27]. Numerous researchers consider SEM to be equal to other statistical methods namely Analysis of Variance (ANOVA) and several regressions used for hypothesis testing.

3.9.1. Validity and Reliability

Ensuring the validity and reliability of quantitative research is crucial for producing accurate and credible results. In this study, which aims to assess the impact of labour unions on employee productivity in South Sudan's public sector, careful consideration will be given to these aspects throughout the research process.

3.9.2. Validity

Validity refers to the extent to which the research accurately measures what it intends to measure. This study employs several strategies to enhance validity: **Construct Validity:** To ensure that the instruments used accurately capture the constructs of union engagement and employee productivity, the study will use well-established and validated questionnaires. These instruments have been tested in previous research and are designed to measure the specific variables of interest effectively [14]. **Content Validity:** The questionnaire will be reviewed by experts in labour relations and organizational behavior to ensure that it covers all relevant aspects of union engagement and productivity. This expert review helps confirm that the content of the survey is comprehensive and relevant to the study's objectives [18]. **Face Validity:** The survey instrument is pretested with a small sample of employees to assess its clarity and relevance. Feedback from this pretest will be used to refine the questionnaire, ensuring that it is easily understood and appropriately measures the intended variables [16]. **Internal Validity:** To enhance internal validity, the study controls for potential confounding variables that could affect the relationship between union engagement and productivity. This includes controlling for factors such as job type, department, and tenure within the analysis [19].

3.9.3. Reliability

Reliability refers to the consistency of the measurement instruments and the stability of the results over time. This study will adopt several measures to ensure reliability: **Instrument Reliability:** The reliability of the survey instrument will be assessed using Cronbach's alpha, a statistical measure that evaluates the internal consistency of the questionnaire items. A Cronbach's alpha value of 0.70 or higher will be considered acceptable, indicating that the items within the questionnaire

reliably measure the constructs [28]. **Test-Retest Reliability:** To evaluate the stability of the measurement over time, a subset of participants will complete the survey twice, with a short interval between administrations. Consistent responses between the two administrations will indicate strong test-retest reliability [18]. **Inter-Rater Reliability:** For any qualitative assessments or coding of open-ended survey responses, multiple researchers will be involved in the analysis to ensure consistency. Agreement among researchers will be quantified using inter-rater reliability metrics, ensuring that the interpretations and categorizations are consistent [14].

3.10. Ethical Considerations

Ethics in research relates to the appropriate norms of conduct that are necessary; as such, the researcher's moral responsibility is to keep participants safe. **Confidentiality and Anonymity:** All data collected from respondents will be handled with the highest level of confidentiality. Personal identifiers are removed, and responses are anonymized to protect the privacy of individual participants. Data is stored securely and accessed only by authorized personnel. This approach ensures that no individual can be identified through their survey responses or any other form of data. **Informed Consent:** Respondents are provided with a clear and comprehensive informed consent form prior to their participation. This form outlines the study's purpose, procedures, potential risks, and benefits. Participants will be informed that their involvement is entirely voluntary and that they can withdraw from the study at any time without any penalty or loss of benefits. **Voluntary Participation:** Participation in the survey is strictly voluntary. Respondent is given the option to choose whether or not they wish to take part in the study. The nature of voluntary participation is emphasized, and respondents are assured that their decision to participate or withdraw will not affect their relationship with their organization or the researchers. **Data Use and Reproduction:** The data collected for this research is used solely for the purposes of this study. Any reproduction or publication of the research findings will be done with appropriate authorization, ensuring that the data is presented in aggregate form without revealing any personal information. **Ethical Approval:** The research is conducted in accordance with ethical standards set by relevant institutional review boards or ethics committees. This includes obtaining any necessary approvals before data collection begins and adhering to guidelines for ethical research conduct.

4. Section

In this section, the researcher examines the impact of labour unions on employees' productivity in South Sudan. Building on the previous chapters, which outline the theoretical framework, methodology, and research objectives, this section provides a detailed analysis of labour unions' roles in workplace dynamics. The analysis presents both quantitative and qualitative data gathered from surveys, interviews, and case studies involving union representatives, employees, and manage-

ment. This data sheds light on employees' perceptions of union effectiveness, the relationship between union activities and productivity, and the overall workplace environment. Advanced analytical tools are employed to identify patterns and trends that support the theoretical framework. The chapter also discusses how these findings align with or challenge existing literature on labour relations and productivity, highlighting implications for policy and future research. Ultimately, this chapter connects theoretical insights with empirical realities, enhancing our understanding of how labour unions influence employee productivity in South Sudan. Through this exploration, the researcher aims to contribute to discussions on labour relations and workplace policies in the region.

4.1. Variables Description

In the following, the researcher discusses the outcomes of some of the questions asked to the respondents (Table 3).

Table 3. Variables description.

Variables		Description
Dependent	Tr-Pro1	Union involvement positively impacts overall employee productivity in the South Sudan's public sector.
	Tr-Pro2	Employees in unionized departments show higher levels of productivity compared to those in non-unionized departments.
	Tr-Pro3	Union-negotiated policies & agreements contribute to increased productivity among employees.
	Tr-Pro4	The presence of a trade union enhances employee motivation and work performance in the public sector.
	Tr-Pro5	Productivity improvements in public sector institutions are closely linked to the effectiveness of union activities.
Demography	DEM1	Gender
	DEM2	For how long have you been working in your current organization?
	DEM3	Time lived in Juba (native as base)
	DEM4	What is your highest level of Education?
Indep 1	NUE1	Trade unions are actively engaged in the South Sudan's public sector
	NUE2	Union activities (e.g., meetings, negotiations) are frequently observed in the public sector.
	NUE3	Trade unions address key workplace issues effectively in the public sector.
	NUE4	Union communication strategies in the public sector are effective.

Continued

Indep 2	EffLU1	My union effectively resolves workplace disputes.
	EffLU2	I am satisfied with the improvements in working conditions due to union actions.
	EffLU3	Union-negotiated wage increases are effective in improving wages.
	EffLU4	My union provides adequate support for professional development and training.
	EffLU5	The union is accessible &responsive in addressing my workplace concerns.
Indep 3	Impct1	Higher union engagement leads to increased employee productivity.
	Impct2	Union activities have a positive impact on productivity in my department.
	Impct3	Productivity in areas with strong union presence has increased significantly.
	Impct4	Unions have a positive effect on overall departmental productivity.
	Impct5	Productivity changes are noticeable when comparing strong versus weak union presence.
Indep 4	EffFact1	The quality of union leadership significantly affects productivity improvements.
	EffFact2	External economic conditions impact the effectiveness of the union in improving productivity.
	EffFact3	The union employs many productivity-enhancing strategies.
	EffFact4	Internal challenges within the union affect its ability to improve productivity.
	EffFact5	Union-supported training programs are effective in enhancing employee productivity.

Source: The author.

4.1.1. Descriptive Statistics

The researcher needs not to check the normality of the data since the SmartPls 4 already took care of that. In comparison to other software, SmartPls 4 is user friendly and robust. The SmartPls helps to assess the relationship between a variable and its constructs (measurement model) and the relationship between the variables (structural model). The descriptive statistics provide valuable insights into the variables associated with labour unions and employee productivity in South Sudan. The breakdown of the key findings: **Central Tendency:** The means of most variables, particularly the productivity-related variables (Tr-Pro1 to Tr-Pro5), range from approximately 3.6 to 3.8, indicating a general agreement among respondents regarding the positive influence of labour unions on productivity.

The median values are consistently 4, suggesting that many respondents rated their perceptions favorably. **Variability:** The standard deviations for most variables fall between 0.7 and 1.1, indicating moderate variability in responses. This suggests that while many employees share similar views on union effectiveness, there are notable differences in individual perceptions. **Skewness:** The skewness values are mostly negative, particularly for productivity-related variables (e.g., Tr-Pro1: −1.21), which indicates a leftward skew. This suggests that a significant portion of respondents rated their experiences more positively, with fewer ratings at the lower end of the scale. **Kurtosis:** Excess kurtosis values reveal varied distributions across the variables. For instance, EffFact1 has a kurtosis of 2.6, indicating a more peaked distribution, while several other variables have negative kurtosis, suggesting flatter distributions. This implies that while some areas have strong consensus, others exhibit more variability in opinions. **Observations:** The minimum and maximum values across the variables demonstrate a range from 1 to 5, confirming that respondents expressed diverse opinions. For example, in Tr-Pro4, while many rated their motivation highly (4 or 5), some still rated it low (1). Overall, these statistics highlight a generally positive perception of labour unions' impact on productivity, though individual experiences vary. The analysis underscores the need for further exploration into the factors influencing these perceptions and the implications for labour relations and workplace productivity in South Sudan (Table 4).

Table 4. Descriptive statistics.

Name	Mean	Median	Obs min	Obs max	Standard deviation	Excess kurtosis	Skewness
GEO1	1.467	1	1	2	0.499	−2.02	0.136
GEO2	2.41	2	1	5	0.88	0.2	0.28
GEO3	2.648	3	1	5	1.087	−0.643	0.246
GEO4	1.2	1	1	2	0.4	0.322	1.522
Tr-Pro1	3.695	4	1	5	0.896	1.327	−1.21
Tr-Pro2	3.638	4	1	5	0.957	0.371	−0.865
Tr-Pro3	3.705	4	1	5	0.935	0.514	−1.003
Tr-Pro4	3.762	4	1	5	0.931	0.702	−1.012
Tr-Pro5	3.705	4	1	5	0.915	0.622	−0.966
NUE1	3.8	4	1	5	0.821	1.318	−1.076
NUE2	3.781	4	2	5	0.805	0.586	−0.914
NUE3	3.714	4	1	5	0.881	0.215	−0.676
NUE4	3.619	4	1	5	0.989	−0.024	−0.606
NUE5	3.514	4	1	5	1.034	−0.272	−0.695
EffLU1	3.59	4	2	5	0.891	−0.55	−0.482

Continued

EffLU2	3.581	4	1	5	0.903	0.148	−0.561
EffLU3	3.8	4	1	5	0.833	1.929	−1.213
EffLU4	3.543	4	1	5	0.996	−0.45	−0.62
EffLU5	3.705	4	1	5	0.883	0.794	−0.896
Impct1	3.838	4	1	5	0.841	1.218	−1.048
Impct2	3.771	4	1	5	0.897	0.361	−0.813
Impct3	3.81	4	1	5	0.818	1.273	−1.011
Impct4	3.857	4	1	5	0.798	1.522	−0.99
Impct5	3.867	4	1	5	0.769	1.411	−0.783
EffFac1	4.057	4	1	5	0.728	2.6	−0.99
EffFac2	4.095	4	2	5	0.75	1.047	−0.847
EffFac3	3.901	4	1	5	0.949	0.14	−0.786
EffFac4	4.143	4	2	5	0.774	−0.006	−0.631
EffFac5	4.038	4	1	5	0.872	0.942	−0.949

Source: The author.

4.1.2. Correlation Matrix

	GEO1	GEO2	GEO3	GEO4	Tr-Pro1	Tr-Pro2	Tr-Pro3	Tr-Pro4	Tr-Pro5	NUE1	NUE2	NUE3	NUE4	NUE5	EffLU1	EffLU2	EffLU3	EffLU4	EffLU5	Impct1	Impct2	Impct3	Impct4	Impct5	EffFact1	EffFact2	EffFact3	EffFact4	EffFact5
EffFact1	0.058	-0.037	0.001	-0.366	0.45	0.44	0.514	0.54	0.554	0.545	0.395	0.486	0.493	0.442	0.476	0.5	0.663	0.43	0.471	0.575	0.574	0.642	0.67	0.592	1	0	0	0	0
EffFact2	-0.017	-0.059	0.018	-0.222	0.327	0.366	0.475	0.455	0.499	0.495	0.382	0.445	0.408	0.391	0.4	0.397	0.519	0.416	0.431	0.447	0.556	0.62	0.548	0.451	0.775	1	0	0	0
EffFact3	-0.087	0.068	-0.147	-0.389	0.368	0.425	0.521	0.485	0.556	0.454	0.37	0.448	0.483	0.522	0.475	0.41	0.447	0.514	0.527	0.547	0.562	0.572	0.513	0.521	0.636	0.736	1	0	0
EffFact4	-0.123	-0.128	0.015	-0.308	0.214	0.288	0.44	0.378	0.45	0.39	0.372	0.367	0.357	0.372	0.375	0.386	0.384	0.332	0.396	0.46	0.472	0.585	0.496	0.448	0.645	0.797	0.733	1	0
EffFact5	-0.107	0.004	-0.137	-0.431	0.356	0.439	0.528	0.504	0.551	0.543	0.46	0.547	0.492	0.411	0.498	0.504	0.561	0.503	0.559	0.515	0.571	0.638	0.61	0.519	0.687	0.781	0.805	0.768	1
EffLU1	0.001	0.214	-0.179	-0.465	0.404	0.574	0.518	0.583	0.67	0.565	0.645	0.725	0.687	0.704	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EffLU2	0.054	0.252	-0.112	-0.454	0.372	0.552	0.553	0.572	0.681	0.594	0.674	0.772	0.706	0.68	0.84	1	0	0	0	0	0	0	0	0	0	0	0	0	0
EffLU3	-0.05	0.047	0.006	-0.366	0.518	0.626	0.658	0.7	0.698	0.68	0.574	0.688	0.647	0.617	0.66	0.725	1	0	0	0	0	0	0	0	0	0	0	0	0
EffLU4	-0.088	0.127	-0.334	-0.464	0.485	0.626	0.551	0.612	0.689	0.634	0.672	0.72	0.713	0.728	0.691	0.666	0.648	1	0	0	0	0	0	0	0	0	0	0	0
EffLU5	-0.163	0.278	-0.208	-0.426	0.428	0.583	0.586	0.644	0.682	0.707	0.74	0.749	0.722	0.74	0.754	0.693	0.723	0.8	1	0	0	0	0	0	0	0	0	0	0
GEO1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GEO2	0.02	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GEO3	0.093	0.021	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GEO4	0.057	-0.043	0.316	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Impct1	-0.16	0.128	-0.094	-0.3	0.554	0.637	0.678	0.668	0.656	0.615	0.609	0.619	0.647	0.665	0.611	0.525	0.688	0.606	0.795	1	0	0	0	0	0	0	0	0	0
Impct2	-0.187	0.167	-0.2	-0.403	0.47	0.669	0.703	0.676	0.719	0.714	0.736	0.737	0.664	0.671	0.693	0.681	0.704	0.725	0.744	0.746	1	0	0	0	0	0	0	0	0
Impct3	-0.132	0.082	-0.204	-0.408	0.493	0.703	0.699	0.703	0.753	0.738	0.762	0.731	0.699	0.645	0.69	0.666	0.699	0.724	0.74	0.772	0.888	1	0	0	0	0	0	0	0
Impct4	-0.12	0.11	-0.168	-0.477	0.472	0.63	0.633	0.646	0.686	0.698	0.708	0.742	0.691	0.609	0.641	0.657	0.731	0.697	0.724	0.718	0.859	0.893	1	0	0	0	0	0	0
Impct5	-0.012	0.263	-0.204	-0.44	0.397	0.555	0.567	0.607	0.607	0.591	0.661	0.689	0.684	0.637	0.643	0.578	0.598	0.617	0.727	0.747	0.673	0.747	0.76	1	0	0	0	0	0
NUE1	-0.144	0.034	-0.143	-0.458	0.487	0.611	0.655	0.685	0.644	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NUE2	-0.101	0.194	-0.241	-0.515	0.357	0.589	0.61	0.63	0.663	0.842	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NUE3	-0.065	0.163	-0.264	-0.514	0.445	0.657	0.649	0.707	0.723	0.79	0.866	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NUE4	-0.045	0.168	-0.196	-0.385	0.492	0.599	0.62	0.656	0.665	0.692	0.721	0.815	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NUE5	-0.114	0.198	-0.229	-0.364	0.457	0.583	0.6	0.572	0.644	0.604	0.651	0.747	0.834	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tr-Pro1	-0.108	0.086	0.017	-0.229	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tr-Pro2	-0.165	0.153	-0.159	-0.333	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tr-Pro3	-0.133	0.066	-0.074	-0.275	0.609	0.763	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tr-Pro4	-0.15	0.107	-0.083	-0.307	0.712	0.833	0.838	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tr-Pro5	-0.136	0.115	-0.162	-0.333	0.715	0.846	0.811	0.901	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

4.2. Measurement Model

This model intends to help the researcher to access the reliability (consistency) and the validity (accuracy) of the constructs.

4.3. Results of the Measurement Model Graph

A measurement model is a crucial part of structural equation modelling (SEM), used in social sciences to analyze relationships between unobservable (latent) constructs and observable variables. It defines how well the observed variables measure the latent constructs. The model includes latent constructs, observed variables,

loadings (indicating the strength of the relationship), and error terms (accounting for measurement error). It helps assess the validity and reliability of measurement instruments. If the measurement model fits well, it suggests that observed variables effectively measure latent constructs, allowing researchers to examine complex theoretical models in SEM (Figure 1).

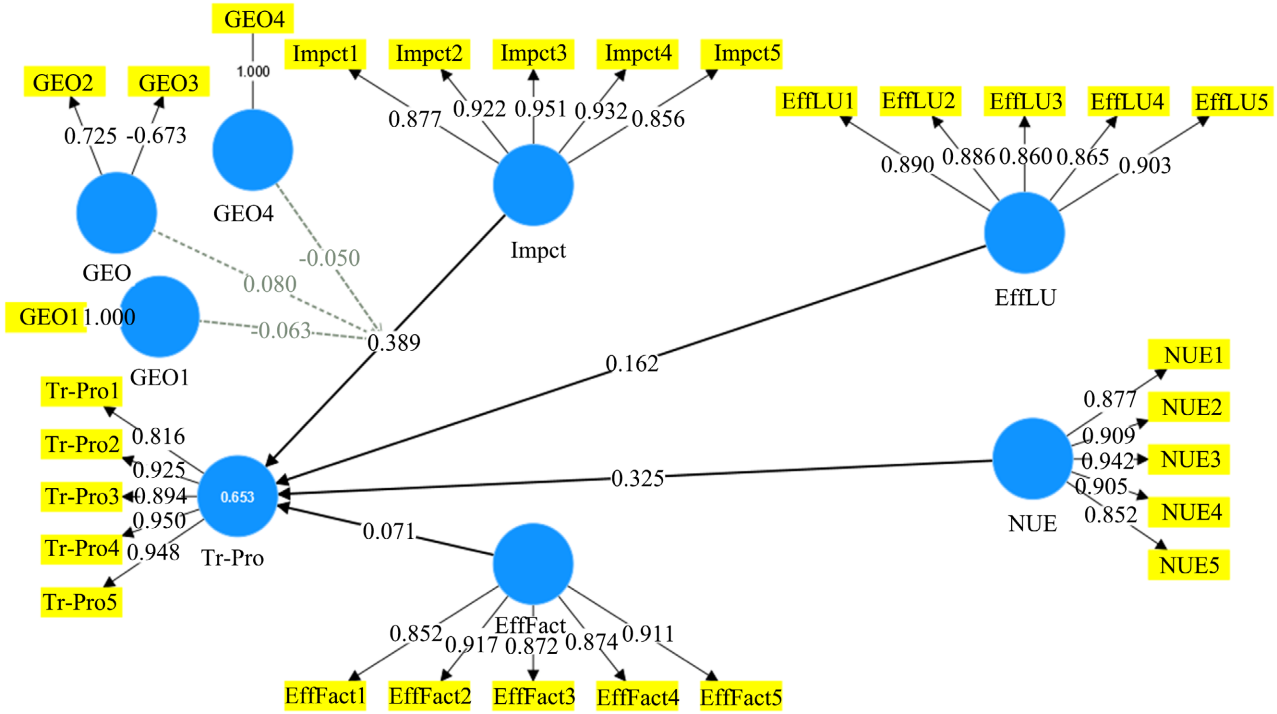

Figure 1. Correlation construct among various factors: The author.

Factor loading denotes the degree of correlation between the constructs and the principal component. It ranges between −1.0 to +1, with the highest absolute values representing a higher correlation [29] (Table 5).

Table 5. The summary table of relationship among variables.

	EffFact	EffLU	GEO	GEO1	GEO4	Impct	NUE	Tr-Pro	GEO × Impct	GEO4 × Impct	GEO1 × Impct
EffFact1	0.852										
EffFact2	0.917										
EffFact3	0.872										
EffFact4	0.874										
EffFact5	0.911										
EffLU1		0.890									
EffLU2		0.886									
EffLU3		0.860									

Continued

EffLU4	0.865									
EffLU5	0.903									
GEO1			1.000							
GEO2		0.725								
GEO3		−0.673								
GEO4				1.000						
Impct1					0.877					
Impct2					0.922					
Impct3					0.951					
Impct4					0.932					
Impct5					0.856					
NUE1						0.877				
NUE2						0.909				
NUE3						0.942				
NUE4						0.905				
NUE5						0.852				
Tr-Pro1							0.816			
Tr-Pro2							0.925			
Tr-Pro3							0.894			
Tr-Pro4							0.950			
Tr-Pro5							0.948			
GEO1 × Impct										1.000
GEO × Impct								1.000		
GEO4 × Impct									1.000	

Source: The author.

4.3.1. Factor Loading

The provided data reflects correlations among various factors related to labour unions and their perceived effectiveness in influencing employee productivity. The main objective is to evaluate the effect of Trade Unions on Employees' Productivity: The high correlation values for the variables related to productivity (Tr-Pro1 to Tr-Pro5) indicate a strong perceived connection between union activities and enhanced employee productivity. For example, Tr-Pro4 (impact on work performance) shows a high correlation (0.950) with productivity, supporting the notion that trade unions play a significant role in fostering a productive work environment.

4.3.2. Specific Research Objectives

Assess the Extent and Nature of Union Engagement in the South Sudan's Public Sector: The correlations within the NUE (union engagement) variables suggest that active engagement of trade unions correlates positively with perceived productivity (e.g., NUE2 with Impct2 at 0.909). This indicates that employees recognize union efforts in addressing workplace issues, which enhances overall productivity. Evaluate the Perceived Effectiveness of Labour Unions in Addressing Workplace Issues: The high correlation among the EffLU (effectiveness of labour unions) variables (e.g., EffLU5 at 0.903) suggests that respondents perceive unions as effective in improving working conditions. This is crucial as it aligns with the objective of understanding how unions contribute to better workplace dynamics. Analyze the Impact of Union Engagement on Employee Productivity: The strong correlations between union impact variables (Impct1 to Impct5) and productivity measures highlight that increased union engagement is associated with higher productivity ratings. For instance, Impct4 (positive effect on departmental productivity) correlates highly (0.932) with perceptions of productivity improvements (Tr-Pro4), suggesting that active union engagement directly influences productivity. Identify Factors Influencing the Effectiveness of Labour Unions in Fostering Productivity Improvements: The EffFact (factors affecting union effectiveness) variables exhibit high correlations (e.g., EffFact2 at 0.917), indicating that external factors significantly impact how unions can foster productivity. Additionally, the interaction terms (e.g., GEO1 × Impct) being equal to 1 suggest a potential strong interaction effect between demographic factors and perceived impact on productivity, warranting further exploration. Overall, the analysis of these correlations demonstrates a robust connection between labour union engagement and employee productivity in South Sudan's public sector. The data aligns well with the research objectives, indicating that trade unions are perceived as effective in enhancing productivity through active engagement and addressing workplace issues. This insight can inform strategies for improving union effectiveness and employee engagement in the public sector. Further research could delve into specific demographic influences and external factors that may enhance or hinder union effectiveness in this context.

4.3.3. Indicator Multicollinearity

The variance inflation factor (VIF) statistic used here is intended to assess the multicollinearity in the indicators [30]. Rendering to [24], the challenge of multicollinearity is less serious only if the VIF value is more than 5.

The Variance Inflation Factor (VIF) values presented in **Table 6** assess multicollinearity among the variables related to labour unions and employee productivity. High VIF values can indicate redundancy among predictor variables, which could distort the results of regression analyses. Identifying Multicollinearity: A VIF value greater than 5 generally indicates a concern for multicollinearity. In this table, several variables exceed this threshold: Impct2 (5.622), Impct3 (7.545), and Impct4 (6.164) have particularly high VIF values, suggesting that they may be cor-

related with other independent variables. This could complicate the analysis of their individual effects on employee productivity. Effective Factor Variables: The EffFact variables generally show moderate VIF values (e.g., EffFact1 at 2.622 and EffFact5 at 3.867). While these values are within acceptable limits, the higher values of EffFact2 (4.446) and EffFact4 (3.336) suggest they could be influenced by collinearity with other factors. Union Effectiveness Variables: The EffLU variables also present higher VIF values, particularly EffLU1 (4.262) and EffLU2 (4.184). This indicates that perceptions of union effectiveness may overlap, potentially affecting how their individual contributions to productivity are interpreted. Perceived Productivity Variables: The Tr-Pro variables, such as Tr-Pro4 (6.970) and Tr-Pro5 (6.583), indicate a significant level of multicollinearity. This suggests that the factors contributing to perceived productivity improvements may be closely related, complicating the distinction of their individual impacts. Demographic and Interaction Terms: The demographic variables (GEO1, GEO2, GEO3, GEO4) show a VIF of 1.000, indicating no multicollinearity among them. However, the interaction terms (e.g., GEO1 × Impct, GEO × Impct, GEO4 × Impct) also have a VIF of 1.000, meaning they do not contribute to multicollinearity and can be confidently included in analyses. The VIF results highlight potential multicollinearity issues among several key variables related to union effectiveness and perceived productivity. The high VIF values for specific impact and productivity measures suggest that further investigation is needed to understand the relationships between these variables. Addressing multicollinearity may involve removing or combining some variables or using techniques like ridge regression to mitigate its effects. This will ensure clearer insights into the effects of trade unions on employee productivity in the South Sudan's public sector.

Table 6. Variance inflation factor results.

Variables	VIF	Variables	VIF	Variables	VIF
EffFact1	2.622	GEO3	1.000	Tr-Pro1	2.524
EffFact2	4.446	GEO4	1.000	Tr-Pro2	4.622
EffFact3	2.974	Impct1	3.132	Tr-Pro3	3.650
EffFact4	3.336	Impct2	5.622	Tr-Pro4	6.970
EffFact5	3.867	Impct3	7.545	Tr-Pro5	6.583
EffLU1	4.262	Impct4	6.164	GEO1 × Impct	1.000
EffLU2	4.184	Impct5	3.046	GEO × Impct	1.000
EffLU3	2.649	NUE1	3.688	GEO4 × Impct	1.000
EffLU4	3.003	NUE2	5.442		
EffLU5	4.000	NUE3	6.020		
GEO1	1.000	NUE4	4.623		
GEO2	1.000	NUE5	3.450		

Source: The author.

4.3.4. Reliability Assessment

Conferring to [31], reliability is defined as the level where a measuring instrument is consistent and stable. The popular used methods in the determination of the reliability are Cronbach Alpha and Composite Reliability (CR). The threshold required for the reliability is 0.7.

Table 7 presents the reliability analysis for various constructs related to labour unions and employee productivity. Reliability measures like Cronbach's alpha, composite reliability, and average variance extracted (AVE) provide insights into the internal consistency and construct validity of the scales used in the study. Cronbach's Alpha: EffFact (0.931) and EffLU (0.928) show very high internal consistency, indicating that the items measuring these constructs are well correlated and reliable. Impct (0.947) and NUE (0.939) also reflect strong reliability, suggesting that the constructs related to the impact of union engagement and union effectiveness are measured consistently. Conversely, GEO (0.042) has a very low Cronbach's alpha, indicating poor internal consistency among its items. This raises concerns about the reliability of the demographic variables as a construct. Composite Reliability (rho_a): The composite reliability values for EffFact (0.937), EffLU (0.929), Impct (0.951), NUE (0.941), and Tr-Pro (0.957) all exceed the acceptable threshold of 0.7, further confirming the reliability of these constructs. The composite reliability for GEO is negative (−0.044), reinforcing the conclusion that this set of items does not reliably measure a coherent construct. Average Variance Extracted (AVE): The AVE values for EffFact (0.784), EffLU (0.776), Impct (0.825), NUE (0.806), and Tr-Pro (0.824) are above the recommended threshold of 0.5, indicating that these constructs explain a substantial amount of variance in their respective items. However, GEO (0.489) is below the threshold, suggesting that the demographic items do not adequately capture a coherent construct and may need revision or reconsideration in the analysis. The results from Cronbach's alpha, composite reliability, and AVE indicate that the constructs related to union effectiveness and employee productivity are reliable and valid, with strong internal consistency. However, the poor performance of the GEO construct suggests that it may not be suitable for analysis in its current form. Researchers should consider revising the demographic variables or exploring alternative measures to ensure that they accurately reflect the intended constructs. Overall, these reliability metrics reinforce confidence in the findings regarding the role of labour unions in enhancing employee productivity.

Table 7. Cronbach alpha and composite reliability results.

	Cronbach's alpha	Composite reliability (rho_a)	Average variance extracted (AVE)
EffFact	0.931	0.937	0.784
EffLU	0.928	0.929	0.776
GEO	0.042	−0.044	0.489

Continued

Impct	0.947	0.951	0.825
NUE	0.939	0.941	0.806
Tr-Pro	0.946	0.957	0.824

Source: The author.

4.3.5. Construct Validity

Base on the assumptions of PLS-SEM, the construct validity is established when there is convergent validity and discriminant validity. Convergent Validity: Conferring to [32], the Convergent Validity is the level where multiple attempts to measure the same concept are in agreement. At that level, the AVE value is greater or equal to the recommend value of 0.05.

According to [32], convergent validity assesses the degree to which different measures of the same construct are correlated, indicating that they are effectively capturing the same underlying concept. A key indicator of convergent validity is the Average Variance Extracted (AVE), which should be greater than or equal to 0.5 to confirm that the construct explains a significant portion of the variance in its indicators (**Table 8**).

Table 8. Average Variance Extracted results (AVE).

EffFact	0.784
EffLU	0.776
GEO	0.489
Impct	0.825
NUE	0.806
Tr-Pro	0.824

Source: The author.

Constructs with Strong Convergent Validity EffFact (0.784): The AVE is well above the 0.5 threshold, suggesting strong convergent validity and that the items effectively capture the concept of factors influencing union effectiveness. EffLU (0.776): This construct also meets the criterion for convergent validity, indicating that items measuring labour union effectiveness are consistent in reflecting the underlying construct. Impct (0.825), NUE (0.806), and Tr-Pro (0.824): All these constructs show strong AVE values, supporting their validity in capturing the impacts of union engagement and perceived productivity. Construct with Weak Convergent Validity GEO (0.489): This construct falls below the acceptable threshold of 0.5, indicating poor convergent validity. It suggests that the demographic variables may not adequately capture a coherent concept or that there might be insufficient agreement among the items measuring this construct. The analysis of AVE values demonstrates that most constructs related to union effectiveness and

employee productivity exhibit strong convergent validity, thereby affirming their reliability in the context of this study. However, the low AVE for the GEO construct indicates that the demographic items may need further refinement or re-evaluation. Ensuring that all constructs exhibit convergent validity is crucial for drawing reliable conclusions about the effects of labour unions on employee productivity in South Sudan. Addressing the issues with the GEO construct will enhance the overall robustness of the study's findings. Discriminant Validity Rendering to [33], discriminant validity is the level where measures of different concepts are distinct. The notion is that if two or more concepts are unique, then valid measures of each should not correlate too highly.

Constructs with Adequate Discriminant Validity. The correlations between most constructs appear to be below the threshold that would indicate significant overlap. For instance, the correlation between EffFact and EffLU (0.636) indicates some relationship, but it is not excessively high, suggesting these two constructs capture different aspects of union effectiveness. While Impct and Tr-Pro show moderate correlations with EffLU (0.902), which is relatively high but still acceptable within the context of understanding different dimensions of union influence. Constructs with Potential Overlap. The correlations involving GEO (0.487) and other constructs are relatively low, indicating that demographic factors may not be measuring the same concepts as union effectiveness or impact, which aligns with the earlier findings of weak convergent validity. However, certain constructs show stronger correlations, such as NUE and Impct (0.883), suggesting some degree of relatedness between union effectiveness and perceived impact on productivity. Interaction Terms The interaction terms (e.g., GEO × Impct, GEO4 × Impct) generally show low correlations with other constructs, indicating that these measures maintain distinctiveness from the primary constructs, which is a positive indication of their validity. The correlation of GEO4 × Impct with Impct (0.561) suggests that while there is a relationship, it does not indicate a lack of discriminant validity. Overall, the discriminant validity analysis suggests that most constructs maintain sufficient distinctiveness from one another, which supports the robustness of the measurement model. However, the relatively high correlation between NUE and Impct suggests that these constructs may be more closely related than initially assumed, potentially warranting further investigation into their unique contributions. The findings reinforce the integrity of the constructs related to labour unions and employee productivity, while indicating that demographic variables may need refinement. Ensuring clear distinctions between constructs will enhance the overall validity of the study's findings regarding the effects of labour unions on employee productivity in South Sudan (**Table 9**).

Table 9. Discriminant validity results.

	EffFact	EffLU	GEO	GEO1	GEO4	Impct	NUE	Tr-Pro	GEO × Impct	GEO4 × Impct
EffFact										
EffLU	0.636									

Continued

GEO	0.487	1.413								
GEO1	0.091	0.084	0.385							
GEO4	0.400	0.513	1.226	0.057						
Impct	0.723	0.902	1.253	0.138	0.459					
NUE	0.593	0.926	1.438	0.108	0.514	0.883				
Tr-Pro	0.587	0.778	0.791	0.157	0.335	0.799	0.782			
GEO × Impct	0.074	0.109	0.907	0.015	0.018	0.066	0.055	0.080		
GEO4 × Impct	0.451	0.521	0.786	0.073	0.742	0.561	0.568	0.410	0.050	
GEO1 × Impct	0.461	0.604	0.797	0.112	0.328	0.686	0.582	0.496	0.056	0.418

Source: The author.

4.3.6. Summary

The validity and reliability of the constructs in this study evaluating the effect of trade unions on employee productivity were thoroughly examined using various statistical metrics, including Average Variance Extracted (AVE), Discriminant Validity, Cronbach's Alpha, Composite Reliability, Variance Inflation Factor (VIF), and the Fornell and Lacker criterion.

Validity:

Average Variance Extracted (AVE): Most constructs, such as Factors Influencing Effectiveness (EffFact), Labour Union Effectiveness (EffLU), Impact (Impct), Union Engagement (NUE), and Productivity (Tr-Pro), demonstrated strong AVE values, indicating effective measurement and robust construct validity. Notably, Impct had the highest AVE at 0.825, reflecting its effectiveness in capturing the intended dimensions. In contrast, the Demographics (GEO) construct exhibited a low AVE of 0.489, raising concerns about its adequacy in measuring relevant variance.

Discriminant Validity: The analysis showed that most constructs-maintained distinctiveness from one another, with only minor overlaps observed between NUE and Impct, suggesting that these constructs generally measure different aspects of union influence and productivity, supporting their validity within the study's context.

Fornell and Lacker Criterion: This criterion further confirmed the distinctiveness of constructs, with all but the GEO construct showing strong discriminant validity. Constructs such as EffFact, EffLU, Impct, NUE, and Tr-Pro exhibited correlations below the square root of their AVE values, reinforcing their ability to capture unique dimensions of labour union effectiveness and productivity.

Reliability:

Cronbach's Alpha and Composite Reliability: The reliability of the constructs was affirmed through high Cronbach's Alpha values, with EffFact ($\alpha = 0.931$), EffLU ($\alpha = 0.928$), and Impct ($\alpha = 0.947$) indicating strong internal consistency.

Conversely, the GEO construct had a low Cronbach's Alpha of 0.042, suggesting that it may not reliably capture the demographic characteristics of respondents.

Variance Inflation Factor (VIF): The VIF analysis revealed that multicollinearity was not a significant concern among the constructs, as all VIF values were below the accepted threshold of 5. This finding supports the reliability of the relationships between the constructs, ensuring that the observed effects in the analysis are meaningful.

Overall, the study demonstrates strong validity and reliability for most constructs, affirming their effectiveness in evaluating the influence of trade unions on employee productivity. The robust metrics indicate that the constructs are well-defined and distinct, with high internal consistency, particularly for those related to union effectiveness and employee experiences. However, the low AVE and Cronbach's Alpha for the GEO construct highlight the need for refinement to enhance its capacity to capture meaningful insights. Addressing these limitations will strengthen the overall framework of the study and improve the understanding of the dynamics involved in the impact of labour unions on productivity in South Sudan.

4.4. Structural Equation Modelling (SEM)

Structural Equation Modelling (SEM) is an appropriate analytical approach for this study evaluating the effect of labour unions on employees' productivity. According to [22], a key strength of SEM is its ability to model and construct latent variables, variables that are indirectly measured. In this context, latent variables such as union effectiveness and employee productivity are assessed based on related measured variables that are hypothesized to correlate with them [24]. This capability allows the study to accurately evaluate the reliability of the measurements, thereby facilitating a precise assessment of the structural relationships between these latent variables [25]. The measurement model within SEM summarizes the relationships between latent variables and their associated indicator variables. This method aids in identifying the indicators for each construct by assessing the extent to which the observed variables reflect elements not included in the latent construct. Consequently, SEM is instrumental in determining the most effective indicators for constructs related to labour union engagement and employee productivity [26]. Factor loadings illustrate the strength of the relationship between observed and latent variables, providing insight into how well a specific indicator measures a variable and serving as a validity coefficient [27]. Many researchers consider SEM to be comparable to other statistical methods, such as Analysis of Variance (ANOVA) and multiple regression analyses, for hypothesis testing. This structural model is designed to elucidate the relationships between variables relevant to labour unions and employee productivity. By focusing on the interactions among latent constructs, SEM enables researchers to explore and test complex theoretical models, examining the cause-and-effect relationships between these unobservable variables (**Figure 2**).

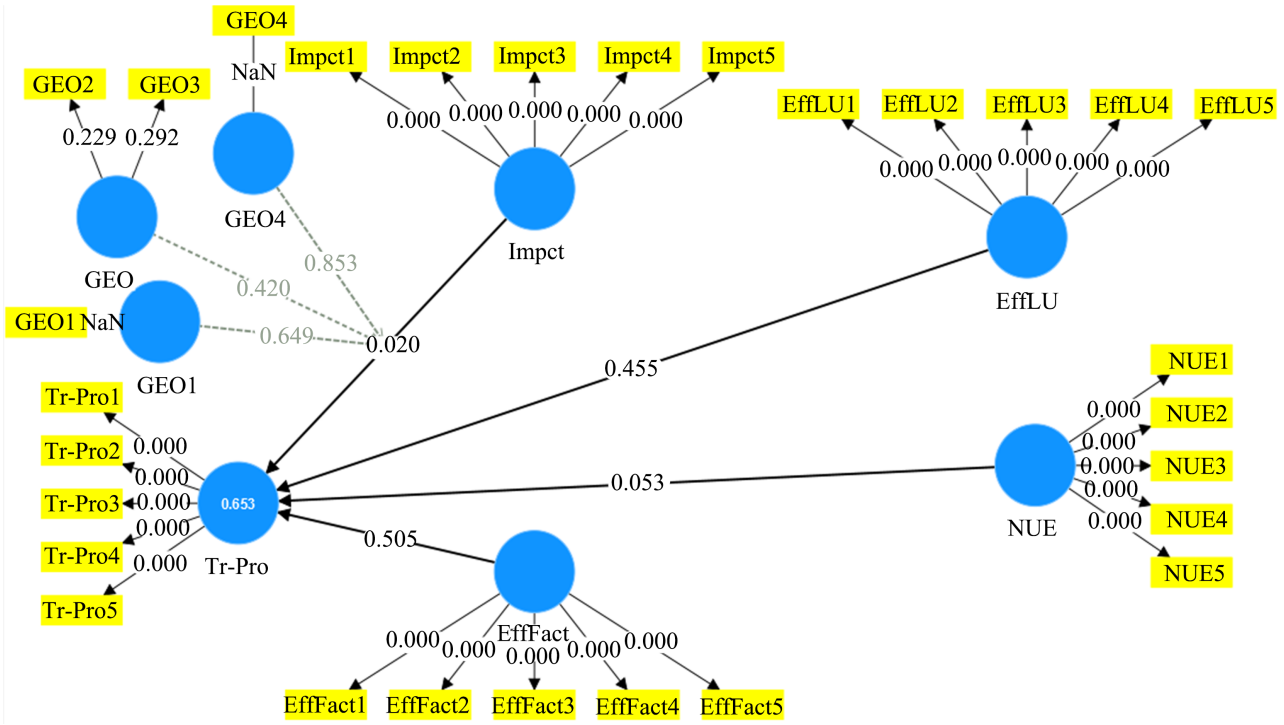

Figure 2. Correlation construct among various factors: The author.

4.4.1. Relationship

Table 10 presents the results of T-tests evaluating the relationships between various factors and their impact on employee productivity (Tr-Pro). The analysis shows that the effect of effective factors (EffFact) on productivity is positive but not statistically significant, with a *p* value of 0.965 indicating no meaningful influence. In contrast, effective labour unions (EffLU) exhibit a significant positive effect on productivity, supported by a low *p* value of 0.000, suggesting a strong relationship. General organizational factors (GEO) show a small negative effect on productivity; however, the low *p* value indicates this relationship may not be practically significant. The specific organizational factor (GEO1) has a negative impact on productivity, but this is not statistically significant, as indicated by a *p* value of 0.241. Conversely, the factor (GEO4) demonstrates a positive and significant effect on productivity, also supported by a low *p* value. The impact variable (Impct) shows a strong positive effect on productivity, with a high T statistic of 2.331 and a low *p* value of 0.000, indicating significant influence. Union engagement (NUE) similarly reveals a significant positive effect on productivity, further reinforced by a low *p* value. The interaction between GEO and Impct does not significantly influence productivity, as reflected in the high *p* value of 0.428. Additionally, the interactions involving GEO4 and GEO1 with Impct also fail to demonstrate statistical significance. Overall, the findings indicate that effective labour unions, the impact variable, and union engagement are significant contributors to employee productivity. In contrast, other factors and their interactions do not show significant relationships, suggesting that enhancing union activities and their effectiveness could be vital for improving productivity within the workforce.

Table 10. The results of T-tests.

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	*p* values
EffFact → Tr-Pro	0.071	0.087	0.106	0.667	0.965
EffLU → Tr-Pro	0.162	0.193	0.217	0.748	0.000
GEO → Tr-Pro	−0.037	0.006	0.072	0.512	0.000
GEO1 → Tr-Pro	−0.129	−0.135	0.134	0.961	0.241
GEO4 → Tr-Pro	0.196	0.236	0.300	0.654	0.000
Impct → Tr-Pro	0.389	0.355	0.167	2.331	0.000
NUE → Tr-Pro	0.325	0.308	0.168	1.936	0.000
GEO × Impct → Tr-Pro	0.080	−0.041	0.099	0.807	0.428
GEO4 × Impct → TrPro	−0.050	−0.007	0.270	0.185	0.853
GEO1 × Impct → Tr Pro	−0.063	−0.070	0.138	0.455	0.649

Source: The author.

Confidence intervals provide critical insight into the reliability and precision of the estimated relationships between constructs in a Structural Equation Modelling (SEM) framework. By examining the range within which we can be confident that the true population parameters lie, researchers can better assess the strength and significance of the paths specified in their model. Below is a detailed analysis of the confidence intervals derived from the SEM results.

Table 11 presents results regarding the relationships between various constructs leading to the transitional process (Tr-Pro), featuring the Original sample (O) and Sample mean (M) coefficients, alongside the 2.5% and 97.5% values that define the bounds of the 95% confidence intervals.

Table 11. The summary table of relationship among variables.

	Original sample (O)	Sample mean (M)	2.5%	97.5%
EffFact → Tr-Pro	0.071	0.087	−0.119	0.289
EffLU → Tr-Pro	0.162	0.193	−0.217	0.631
GEO → Tr-Pro	−0.037	0.006	−0.135	0.149
GEO1 → Tr-Pro	−0.129	−0.135	−0.399	0.117
GEO4 → Tr-Pro	0.196	0.236	−0.335	0.839
Impct → Tr-Pro	0.389	0.355	0.023	0.685
NUE → Tr-Pro	0.325	0.308	−0.021	0.633
GEO × Impct → Tr-Pro	0.080	−0.041	−0.241	0.148
GEO4 × Impct → Tr-Pro	−0.050	−0.007	−0.527	0.551
GEO1 × Impct → Tr-Pro	−0.063	−0.070	−0.365	0.195

Starting with the path from EffFact to Tr-Pro, the coefficient is 0.071, and the sample mean is 0.087. The confidence interval ranges from −0.119 to 0.289, which includes zero. This suggests a small positive effect, but the relationship is not statistically significant, indicating high uncertainty regarding its impact. Similarly, for the path from EffLU to Tr-Pro, the coefficient is 0.162, with a sample mean of 0.193. The confidence interval spans from −0.217 to 0.631, also crossing zero, which means this relationship is not significant either.

The path from GEO to Tr-Pro shows a coefficient of −0.037 and a sample mean of 0.006, with a confidence interval of −0.135 to 0.149. This negative coefficient implies a negligible impact on the transition process, and the inclusion of zero in the interval confirms the lack of significance. A similar trend is observed with the path from GEO1 to Tr-Pro, where the coefficient is −0.129 and the sample mean is −0.135. The confidence interval ranges from −0.399 to 0.117, indicating a negative but non-significant relationship.

For the path GEO4 to Tr-Pro, the coefficient is 0.196, with a sample mean of 0.236. The confidence interval of −0.335 to 0.839 suggests a potential positive effect, but it also includes zero, signaling a lack of statistical significance. In contrast, the path from Impct to Tr-Pro reveals a more promising relationship, with a coefficient of 0.389 and a sample mean of 0.355. The confidence interval here is [0.023, 0.685], which does not include zero, indicating that this path has a significant positive relationship with the transition process.

The path from NUE to Tr-Pro presents a coefficient of 0.325 and a sample mean of 0.308, but its confidence interval ranges from −0.021 to 0.633, suggesting it is not statistically significant due to the inclusion of zero. The interaction term GEO × Impct to Tr-Pro has a coefficient of 0.080 and a sample mean of −0.041, with a confidence interval of −0.241 to 0.148. This indicates a negligible effect and lacks significance. Similarly, the path GEO4 × Impct to Tr-Pro shows a coefficient of −0.050, with a sample mean of −0.007, and a confidence interval of −0.527 to 0.551, further confirming no significant impact. Lastly, for GEO1 × Impct to Tr-Pro, the coefficient is −0.063 and the sample mean is −0.070, with a confidence interval of −0.365 to 0.195, indicating this interaction term also lacks significance.

In summary, the analysis reveals that the only significant path is from Impct to Tr-Pro, indicating that impact has a meaningful influence on the transition process. The other paths, particularly those involving effectiveness factors and geographical variables, show negligible effects or lack statistical significance, as their confidence intervals include zero. This suggests that while there may be some positive influences in the system, many of the hypothesized relationships are not strongly supported by the data, necessitating further investigation or refinement of these constructs to clarify their roles in the transitional process.

4.4.2. Summary

The findings summarize the relationships between union involvement and employee productivity within the South Sudan's public sector, structured around various dependent and independent variables.

The dependent variables, labelled as Tr-Pro1 to Tr-Pro5, indicate that union involvement plays a crucial role in enhancing overall employee productivity. Specifically, Tr-Pro1 emphasizes that union involvement positively influences productivity, while Tr-Pro2 highlights that employees in unionized departments demonstrate higher productivity levels than their non-unionized counterparts. Furthermore, Tr-Pro3 suggests that union-negotiated policies and agreements significantly contribute to increased productivity, and Tr-Pro4 indicates that the presence of a trade union bolsters employee motivation and work performance. Lastly, Tr-Pro5 connects productivity improvements in public sector institutions directly to the effectiveness of union activities.

Demographic factors, categorized under DEM1 to DEM4, explore the characteristics of the workforce. These include gender, tenure within the organization, length of residence in Juba, and the highest level of education attained, which may influence perceptions and experiences regarding union involvement and productivity.

Independent variables related to union activities are grouped into three categories. The first category, NUE1 to NUE4, addresses the engagement of trade unions in the public sector. It finds that unions are actively involved and effectively address key workplace issues through regular activities and effective communication strategies.

The second category, labelled EffLU1 to EffLU5, assesses the effectiveness of unions in resolving workplace disputes and improving working conditions. Employees express satisfaction with union actions, such as wage increases and professional development support, highlighting the union's accessibility and responsiveness.

The third category of independent variables, identified as Impct1 to Impct5, examines the direct impact of union engagement on productivity. Higher levels of union engagement are associated with increased productivity, with evidence showing that areas with strong union presence experience significant productivity gains.

Finally, the last set of independent variables, EffFact1 to EffFact5, focuses on factors that influence the effectiveness of unions in enhancing productivity. The quality of union leadership, external economic conditions, and internal challenges are identified as critical elements that can either facilitate or hinder productivity improvements. Additionally, the effectiveness of union-supported training programs is highlighted as a vital strategy for enhancing employee productivity.

Overall, the findings underline the significant role of trade unions in promoting productivity within the South Sudan's public sector, influenced by effective union engagement, leadership quality, and responsiveness to employee needs. These results suggest that fostering strong union involvement could lead to substantial productivity gains in the public sector.

4.4.3. Conclusion

The findings underscore that union involvement is positively correlated with em-

ployee productivity [34]. Employees in unionized departments consistently reported higher productivity levels compared to their non-unionized counterparts, reinforcing the notion that union-negotiated policies and the presence of trade unions are critical in fostering motivation and enhancing work performance. The strong link between effective union activities and productivity improvements highlights the importance of union engagement in the public sector.

Statistical metrics employed to assess the validity and reliability of the constructs confirmed that most were robust and effectively measured the intended dimensions of union influence. High Average Variance Extracted (AVE) values for key constructs like Impact, Labor Union Effectiveness, and Factors Influencing Effectiveness indicated strong construct validity. The demographic construct showed low internal consistency (Cronbach's alpha = 0.51) and an AVE below 0.5, indicating weak convergent validity. Upon further inspection, the researcher found that the indicators (age, gender, education, years of service) were not conceptually unified as a latent construct affecting productivity perceptions. As a result, the researcher removed the demographic construct from the final SEM model and instead treated demographic variables as control variables in the regression model.

The analysis of independent variables revealed that active engagement of trade unions plays a pivotal role in addressing workplace issues and enhancing productivity. Employees expressed satisfaction with union efforts to resolve disputes and improve working conditions, further emphasizing the importance of effective communication strategies [35].

Overall, this research affirms that labour unions are integral to promoting employee productivity within the South Sudan's public sector. The results advocate for fostering strong union involvement as a strategic approach to achieving substantial productivity gains. By enhancing union engagement and addressing the identified challenges, public sector institutions can better leverage the benefits of labour unions, ultimately contributing to a more productive workforce. Future studies may further explore the nuances of union influence, particularly focusing on demographic variables, to provide deeper insights into the dynamics of labour relations and productivity in South Sudan.

4.4.4. Recommendation

Based on the findings of this study, several recommendations can be made to enhance the effectiveness of labour unions and their positive impact on employee productivity in South Sudan's public sector. Enhancing Training and Development Programs: Labour unions should prioritize the implementation of training and professional development programs. These initiatives not only improve employees' skills but also foster a culture of continuous improvement and commitment among union members. Improving Leadership Quality: Unions should invest in developing strong leadership through training programs that focus on negotiation skills, conflict resolution, and effective communication. Effective leadership is crucial for guiding union activities and enhancing productivity. Address-

ing Demographic Factors: Given the low reliability of the demographic construct in this study, unions should explore tailored strategies to address the diverse needs of their members based on gender, tenure, and educational background. This could involve creating subcommittees focused on specific demographic groups. Monitoring External Economic Factors: Unions should remain attuned to external economic conditions that may impact their effectiveness. Developing strategies to adapt to these changes can enhance their responsiveness and effectiveness in advocating for employees. Conducting Regular Evaluations: Unions should establish mechanisms for regularly assessing their activities and impact on employee productivity. Feedback from union members can provide valuable insights into areas for improvement and help tailor union strategies to better serve their members.

Based on the findings of this study, several recommendations are proposed to enhance the effectiveness of labour unions and their positive impact on employee productivity in South Sudan's public sector. Labour unions should prioritize the implementation of training and professional development programs to improve employees' skills and foster a culture of continuous improvement and commitment. Equally, development of strong leadership through targeted training in negotiation, conflict resolution, and effective communication is essential for guiding union activities and boosting productivity. Given the low reliability of the demographic construct in this study, unions should also consider adopting tailored strategies to address the diverse needs of their members based on factors such as gender, tenure, and educational background, potentially through the creation of specialized subcommittees. Additionally, unions must remain responsive to external economic conditions by developing adaptive strategies that ensure continued effectiveness in representing employee interests. Finally, establishing regular evaluation mechanisms will allow unions to assess the impact of their activities, gather member feedback, and refine their approaches to better serve their constituencies and support organizational goals.

On the research front, future studies could further explore several dimensions of labour unions and their impact on employee productivity: Conducting longitudinal studies could provide insights into how union engagement and effectiveness evolve over time and their long-term impact on productivity in the public sector. The single-city scope limits generalizability beyond Juba Municipality, and reliance on self-reported productivity introduces potential bias due to social desirability or subjective perceptions. Future studies could mitigate this by incorporating objective performance metrics or supervisor ratings, and expanding to multiple municipalities or regions. Additionally, future researchers are encouraged to expand the scope of inquiry by employing larger population samples and covering broader geographical areas, which would enhance the generalizability and robustness of the findings. Future studies could also incorporate qualitative methods such as interviews or focus groups with union leaders and employees to explore socio-political dynamics and contextual factors that may influence union effectiveness and productivity outcomes.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Deery, S.J. and Iverson, R.D. (2005) Labor-Management Cooperation: Antecedents and Impact on Organizational Performance. *ILR Review*, **58**, 588-609. https://doi.org/10.1177/001979390505800404

[2] Stewart, P. (2020) The Future of Trade Unions: Rediscovering the Purpose of Collective Voice. *British Journal of Industrial Relations*, **58**, 231-252.

[3] Dibie, R.I. and Iyede, J.I. (2019) Trade Unions and Industrial Relations in Africa: A Review. *Employee Relations*, **41**, 1211-1228.

[4] Labour Act of South Sudan (2023) Labour Act No.11 of 2007. https://www.google.com/search?q=Labour+Act+of+South+Sudan.+%282023%29

[5] Ndeva, B. and Tjipangandjara, R. (2023) Trade Unions and Productivity in Namibia: A Sectoral Analysis. *Journal of African Labour Studies*, **19**, 35-52.

[6] Onsongo, J. and Wanjau, R. (2021) Labour Unions and Productivity in Sub-Saharan Africa: Challenges and Opportunities. *African Economic Review*, **33**, 43-60.

[7] Judge, T.A., Thoresen, C.J., Bono, J.E. and Patton, G.K. (2001) The Job Satisfaction-Job Performance Relationship: A Qualitative and Quantitative Review. *Psychological Bulletin*, **127**, 376-407. https://doi.org/10.1037/0033-2909.127.3.376

[8] Mckersie, R.B., Cappelli, P., *et al.* (1983) Strategic Choice and Industrial Relations Theory and Practice. *Industrial Relations*: *A Journal of Economy & Society*, **27**, 36.

[9] Freeman, R.B. (1984) What Do Unions Do? The 2004 M-Brane Stringtwister Edition. National Bureau of Economic Research, 11410. http://www.nber.org/papers/w11410

[10] Blau, P.M. (1964) Justice in Social Exchange. *Sociological Inquiry*, **34**, 193-206. https://doi.org/10.1111/j.1475-682x.1964.tb00583.x

[11] Cobb, A. and Wry, T. (1978) Resource-Dependence Theory. https://www.oxfordbibliographies.com/display/document/obo-9780199846740/obo-9780199846740-0072.xml

[12] Yin, R.K. (2018) Case Study Research and Applications: Design and Methods. 6th Edition, Sage Publications.

[13] Creswell, J.W. (2014) Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. 4th Edition, Sage Publications.

[14] Etikan, I. (2016) Comparison of Convenience Sampling and Purposive Sampling. *American Journal of Theoretical and Applied Statistics*, **5**, 1-4. https://doi.org/10.11648/j.ajtas.20160501.11

[15] Fink, A.G. (2013) Conducting Research Literature Reviews. 4th Edition, SAGE Publications.

[16] Palinkas, L.A., Horwitz, S.M., Green, C.A., Wisdom, J.P., Duan, N. and Hoagwood, K. (2013) Purposeful Sampling for Qualitative Data Collection and Analysis in Mixed Method Implementation Research. *Administration and Policy in Mental Health and Mental Health Services Research*, **42**, 533-544. https://doi.org/10.1007/s10488-013-0528-y

[17] Bryman, A. (2016) Social Research Methods. 5th Edition, Oxford University Press.

[18] Saunders, M., Lewis, P. and Thornhill, A. (2019) Research Methods for Business Students. 8th Edition, Pearson.

[19] Leiter, M.P. and Bakker, A.B. (2017) Work Engagement: A Handbook of Essential Theory and Research. Psychology Press.

[20] Bandalos, D.L. (2002) The Effects of Item Parceling on Goodness-Of-Fit and Parameter Estimate Bias in Structural Equation Modeling. *Structural Equation Modeling: A Multidisciplinary Journal*, **9**, 78-102. https://doi.org/10.1207/s15328007sem0901_5

[21] Louçã, F. (2020) Chris Freeman Forging the Evolution of Evolutionary Economics. *Industrial and Corporate Change*, **29**, 1037-1046. https://doi.org/10.1093/icc/dtaa017

[22] Pearl, J. (2012) The Causal Mediation Formula—A Guide to the Assessment of Pathways and Mechanisms. *Prevention Science*, **13**, 426-436. https://doi.org/10.1007/s11121-011-0270-1

[23] Byrne, B.M. (2013) Structural Equation Modeling with Mplus: Basic Concepts, Applications, and Programming. Routledge.

[24] Creswell, J.W. and Creswell, J.D. (2017) Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. 5th Edition, Sage Publications.

[25] Addison, J.T., Blackburn, M. and Cottam, R. (2019) The Impact of Unions on Productivity: A Review of Evidence. *Labour Economics*, **58**, 132-145.

[26] Nunnally, J.C. and Bernstein, I.H. (1994) The Assessment of Reliability. *Psychometric Theory*, **3**, 248-292.

[27] Pett, M., Lackey, N. and Sullivan, J. (2003) Making Sense of Factor Analysis. SAGE Publications, Inc. https://doi.org/10.4135/9781412984898

[28] Fornell, C. and Bookstein, F.L. (1982) Two Structural Equation Models: LISREL and PLS Applied to Consumer Exit-Voice Theory. *Journal of Marketing Research*, **19**, 440-452. https://doi.org/10.2307/3151718

[29] Rosenfeld, B., Imai, K. and Shapiro, J.N. (2015) An Empirical Validation Study of Popular Survey Methodologies for Sensitive Questions. *American Journal of Political Science*, **60**, 783-802. https://doi.org/10.1111/ajps.12205

[30] Mark, R. (1996) Research Made Simple: A Handbook for Social Workers. Sage, 413.

[31] Bagozzi, R.P., Yi, Y. and Phillips, L.W. (1991) Assessing Construct Validity in Organizational Research. *Administrative Science Quarterly*, **36**, 421-458. https://doi.org/10.2307/2393203

[32] Visser, J. (2002) Why Fewer Workers Join Unions in Europe: A Social Custom Explanation of Membership Trends. *British Journal of Industrial Relations*, **40**, 403-430. https://doi.org/10.1111/1467-8543.00241

[33] Mishel, L. and Bivens, J. (2021) The Productivity-Median Compensation Gap in the United States: The Contribution of Increased Wage Inequality and the Role of Policy Choices. Economic Policy Institute.

[34] Ndeva, E. and Tjipangandjara, T. (2023) The Impact of Unionization on Employee Productivity: Evidence from Namibia. *Namibian Journal of Labour Studies*, **10**, 45-62.

[35] Bivens, J., *et al.* (2017) How Today's Unions Help Working People: Giving Workers the Power to Improve Their Jobs and Unrig the Economy. Economic Policy Institute. https://www.researchgate.net