

## **LOGISTICS RISK ACCEPTANCE AND OPERATIONAL EFFECTIVENESS OF OIL AND GAS SERVICING FIRMS IN RIVERS STATE**

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### **Abstract**

This study examined the impact of logistics risk acceptance on operational effectiveness of oil and gas servicing companies in Rivers State. The study adopted a causal research design and collected primary data in a cross-sectional survey. 87 oil and gas servicing companies operating at the Onne oil and gas free zone of Rivers State comprised the population of the study. The study took a census, and sampled 2 managers (Logistics Manager and Operations Manager) from each company. A structured questionnaire was used to collect primary data. The validity of the instrument was determined via exploratory factors analysis; while its reliability was confirmed using Cronbach's alpha test. The linear regression statistic was used to test the impact of logistics risk mitigation risk acceptance on metrics of operational effectiveness (delivery performance, cost minimization and operational flexibility). The Statistical Package for Social Sciences version 24.0 facilitated the data analyses. The study found that logistics risk acceptance impacts operational effectiveness of oil and gas servicing companies. Importantly, the study found that risk acceptance impacts delivery performance more than other measures of operational effectiveness. The study concludes that logistics risk acceptance predicts operational effectiveness; and that operational effectiveness of oil and gas servicing companies in Rivers State depends on logistics risk acceptance. Hence, the study recommends that oil and gas servicing companies in Rivers State that seek improved operational effectiveness in terms of delivery performance, cost minimization and operational flexibility should adopt logistics risk acceptance as a risk mitigation initiative.

**Keywords:** Cost minimization, delivery performance, logistics risk acceptance, operational flexibility, operational effectiveness

### **Introduction**

Firms often encounter supply chain disruptions that affect their performance (Koskei & Wanjala, 2023). Bode et al. (2011) states that supply chain disruption is a common phenomenon in today's business world due to the complexity associated with the value networks companies enter into, and in which, disruption in a node easily affects the entire supply. Hence, Ritchie and Brindley (2007) aver that supply chains risk mitigation is critical to effective supply chain management. Ellegaard (2008) argue that businesses encounter risks, including natural disasters, regional conflicts, political instability, civil unrest and labour conflicts that truncate flow of essential resources through the supply chain.

In addition, Zsidisin et al. (2000) contend that logistics risk mitigation is a common supply chain management concern because firms frequently experience uncertainties arising from unpremeditated supply chain occurrences. Some companies respond to these uncertainties by

focusing on “low-likelihood-high-impact risks;” while others develop practices to curb recurrent low-impact risks (Sodhi & Tang, 2012).

Across the globe, enterprises are making efforts to enter new markets and establish alliances with vendors, engage with public agencies, as well as adjust to prevailing conditions in the environment. The complex logistics system that results from these activities mask a wide range of risks that pose threats in terms of price volatility, financial problems, and natural and man-made disasters, to business operations. These threats according to Sodhi and Tang (2012), quickly spread through the logistics system and results to loss in sales and revenue.

Thus, logistics risk exists due to the fact firms and their managers cannot foresee the outcome of future events. In the view of Dittmann (2014), even firms that possess and utilize the most sophisticated analytical tools, still operate with uncertainty and risks that disrupt material flows and planned operations, and result in late deliveries, missed targets or customer dissatisfaction. Thus, firms must be equipped to handle risks by improving the understanding and ability of managers to handle real situations and reward astute risk management initiatives of managers (Dittmann, 2014).

The need to identify and properly situate logistics risk mitigation strategies that predict operational effectiveness of firms is an ongoing one. This is in lieu of the heightened complexity and volatility of today’s logistics operations. Logistics risk mitigation initiatives enable firms to lower the effect of potential risks by instituting plans to handle, eliminate or limit setbacks (Wagner & Bode, 2006). Logistics risk mitigation is a multidimensional construct (Wagner & Bode, 2006), and usually encompass risk acceptance, risk transference and risk avoidance.

Risk acceptance represents a firm’s acknowledgement of the presence of risk and decision not to take actions to prevent, mitigate, or transfer it; probably due to considerations the cost of mitigating the risk surpasses the potential loss or because the risk is within acceptable levels of tolerance (Hopkin, 2018). Risk acceptance involves recognizing a potential risk, understanding its implications, and deciding to operate without altering its likelihood or impact (ISO, 2018).

Prior studies on logistics chain risk management exist. But literature is relatively silent on studies on logistics risk mitigation initiatives, like risk acceptance, risk transference and risk avoidance; as well as their individual correlation with operational effectiveness of companies. Johnson et al. (2021) analysed the impact of risk mitigation strategies on operational effectiveness with a view to synthesizing findings from recent studies, and to identify effective risk mitigation approaches for enhanced operational effectiveness. Chen et al. (2020) studied supply chain risk mitigation strategies and operational effectiveness of manufacturing firms in China. Gupta et al. (2022) examined impact of technology adoption on operational risk management and performance in the Canadian energy sector.

These studies provide valuable insights, but are of little help to service providers in the oil and gas sector in Rivers State that have challenges associated upping their operational effectiveness. This is because these studies neither examined risk mitigation from a logistics perspective nor look specifically at risk acceptance, risk transference and risk avoidance as their focus. Also, none of

them used delivery performance, cost minimization and operational flexibility to represent operational effectiveness in their study.

Furthermore, none of the identified studies used service providers in the oil and gas sector as their data base or conducted their study in Rivers State. This study therefore, addressed this gap by investigating the impact of risk acceptance (a logistics risk mitigation initiative) on operational effectiveness of service providers in the oil and gas sector in Rivers State. The study is conceptualized in fig. 1.

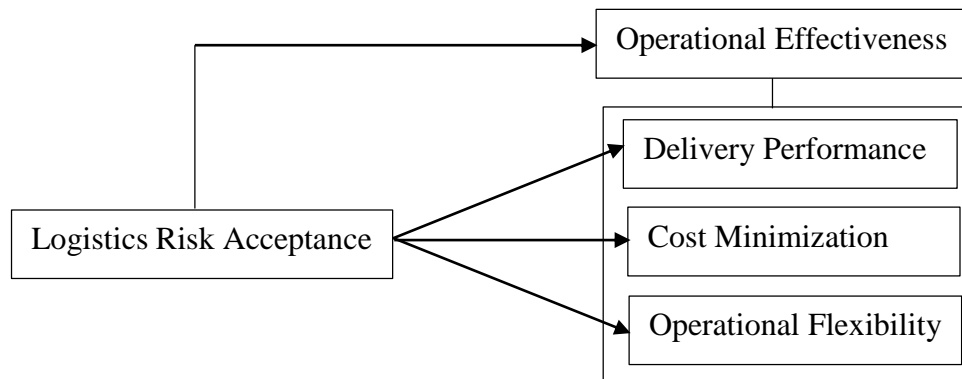


Fig. 1: Conceptual framework of impact of logistics risk acceptance on operational effectiveness of service providers in the oil and gas sector.

## Literature Review and Hypotheses Formulation

### Concept of Logistics Risk Acceptance

Logistics risk acceptance is a strategic decision in risk management where an organization decides to acknowledge a particular risk and take no action to mitigate it. It is the decision to acknowledge the presence of a risk and intentionally choose not to take any action to prevent, mitigate, or transfer it, often because the cost of mitigation exceeds the potential loss or because the risk falls within acceptable levels of tolerance (Hopkin, 2018).

ISO (2018) states that logistics risk acceptance involve recognizing a potential risk, understanding its implications, and deciding to retain it without altering its likelihood or impact, especially when the risk is manageable or when the firm lack the resources required to mitigate it. Risk acceptance is also the choice when risks are unavoidable or when the cost of mitigation is prohibitive.

Logistics risk acceptance is an informed decision to retain the risk. It is a conscious decision when it is not feasible or cost-effective to address the risk through other means (ISO, 2018). This approach aligns with the principle of cost-benefit analysis, where expected cost of risk response actions is compared to expected benefits (Vaughn & Vaughn, 2014).

Logistics risk acceptance allow organizations to allocate resources more effectively by focusing on mitigating high-impact risks. This strategic focus enhance overall risk management efficiency (Aven, 2016). Accepting a risk does not mean ignoring it. Organizations still monitor accepted risks and prepare to respond if the risk materializes. This requires robust risk assessment and monitoring processes (Hillson, 2009).

The decision to accept a risk must align with a firm's risk culture and strategic objectives. A strong risk culture supports informed decision-making and ensures that accepted risks are consistent with the organization's risk appetite (Frigo & Anderson, 2011). Transparent communication with stakeholders about risk acceptance decisions is crucial. This includes explaining the rationale behind accepting certain risks and how they will be managed if they occur (Merna & Al-Thani, 2011).

Risk acceptance plays a significant role in the oil and gas sector. It enables companies make strategic decisions regarding which risks to mitigate and which to accept, based on their potential impact and cost-effectiveness. In the oil and gas exploration and production sector, where projects involve substantial investments and uncertainties, risk acceptance allows companies to prioritize resources effectively (Hopkin, 2018).

Again, in the oil and gas industry, risk acceptance is often a crucial factor in determining project feasibility. Some risks, such as geological uncertainties or market volatility, may be inherent to the nature of the industry. By accepting these risks, companies can move forward with projects that might otherwise be deemed unviable if all risks were required to be mitigated (Brealey et al., 2011).

The significance of logistics risk acceptance in the oil and gas industry is evident in its ability to facilitate strategic decision-making (Hopkin, 2018). Accepting certain logistics risks can be a cost-effective strategy (Aven, 2016). Logistics risk acceptance also influence project feasibility; it allow firms to undertake with projects that might otherwise be deemed unviable (Brealey et al., 2011). Additionally, logistics risk acceptance facilitates efficient resource allocation (Merna & Al-Thani, 2011) and confer operational flexibility in a dynamic industry (Vaughn & Vaughn, 2014).

### **Concept of Operational Effectiveness**

Operational effectiveness is a measure of a firm's effective efficiency in defect-free production, order delivery, waste reduction and inventory management (Shahbaz et al., 2018). Cost of operations sales, return on asset and return on investment are other financial indicators of operational effectiveness (Anand & Grover, 2015).

However, operational effectiveness cannot be assessed by financial indicators alone. So, a balance scorecard approach that accommodate operational indicators to the measurement of effectiveness is popular today (Shahbaz et al., 2018). Omoush (2022) argue that operational effectiveness touch all aspects of firms' operations that can be quantified, including production reliability and defect rates, order cycle time, cost of quality and scrap reduction.

Operational effectiveness is a critical determinant of business success, where efficiency, safety, and reliability are paramount. Oil and gas servicing firms operate in a complex and dynamic environment characterized by remote locations, harsh weather conditions, and stringent regulatory requirements (Zhang et al., 2020). These factors pose significant challenges to operational effectiveness, requiring firms to implement robust management systems to ensure safe and reliable operations (Khan & Abbasi, 2021).

Operational effectiveness can be assessed in quantitative and qualitative; as well as financial and non-financial terms (Shahbaz et al., 2018). Quality, flexibility, customer service, delivery and cost reduction as indicators of operational effectiveness; order fill rate, order lead time, flexibility, inventory turnover and logistics cost are also indicators of operational effectiveness. In addition, Shahbaz et al. (2018) identify return on investment and sales volume as measures of operational effectiveness. This study however, adopts delivery performance, cost minimization and operational flexibility as proxies of operational effectiveness.

### **Delivery performance**

Delivery performance is the degree to which customers' demand are met at appropriate date, time, quality and place. It shows the capacity of a firm to provide products to customer timeously. This conceptualization suggests that speed, measured by lead time, is essential to delivery performance. Consumers increasingly want "shorter lead times such that online retailers face a last mile challenge with increasing delivery costs" (Collier & Bienstock 2006).

Garver et al. (2012) showed that "delivery speed is the second most important attribute when consumers shop online, after delivery fee." In order to improve consumer satisfaction and gain competitive advantage firms must have the capacity to deliver goods and services speedily (Barclays, 2014). Wilson-Jeanselme and Reynolds (2006) reports that delivery speed ranks third in consumers' preference structures, after product quality and ordering time.

Companies must operate flexible and efficient supply networks to enable efficient logistics. Flexibility of production and delivery is relevant to adaptability and responsiveness to customer requirements; and impacts performance outcomes including delivery capacity and order cycle time. Thus, firms benefit from flexibility that inform rapid response to supply disruptions. To bridge supply lead time, anticipate demand, deliver customers' orders and face uncertain demand-supply challenges, Muckstadt and Sapra (2010) canvass flexible logistics and supply operations.

### **Cost minimization**

Cost minimization is a fundamental objective for businesses aiming to optimize efficiency and maximize profits. In today's competitive landscape, companies employ various strategies to minimize costs across different operational domains. Logistics costs often represent a considerable percentage of the sales price of products. Cost minimization involves reducing expenses while maintaining quality. It encompasses various aspects such as production, procurement, distribution, and administration (Womack et al., 2020).

However, cost cannot be reduced in isolation. Even if a supply chain is broken down into its components to see where cost saving opportunities lie, cost minimization and its impact must be assessed for the supply chain as a whole. Otherwise, cuts for one part can end up increasing costs elsewhere.

Cost minimization often affects customer service. However, a firm's focus on cost minimization does not have to be opposed to good customer service. In some instances, cost minimization can improve service and satisfaction (Brynjolfsson & McAfee, 2017). Product packaging is a case in point. Particularly in the sector of consumer packaged goods, wasteful packaging exists in many

different product lines. This inefficiency costs retail shelf space for the seller and gives the consumer the headache of disposing of voluminous packaging after the purchase.

### **Operational flexibility**

The concept of operational flexibility is not new, but it has become increasingly important as global competition intensifies. The ability to “quickly and efficiently adjust to changes in customer demand, regulatory requirements and economic conditions has become essential for businesses to remain competitive and profitable (Saraev, 2024).

Operational flexibility is the “ability of a company to make swift changes with little difficulty in order to accommodate the needs of clients” (Nasreen et al., 2013). In broader view, “flexibility is the degree to which an organization has a variety of managerial capabilities and the speed with which they can be activated (Sharma & Jain, 2010).

Operational flexibility in logistics describes the ability to expand or reduce warehouse resources to adapt to changes such as increased orders or higher production line output. To boost flexibility in logistics and thus minimize the impact of disruptions on warehouse throughput, it is vital to guarantee seamless communication with the value chain (Carrillo, 2024).

A flexible logistics model brings advantages such as: better adaptability to market changes which enables the organization adapt its resources in an agile way to deal with market changes, i.e., product seasonality and unexpected variations in demand. Additionally, flexible logistics brings about efficient picking and production. With flexible production and logistics planning, a firm can maximize its throughput on the production lines and in order picking.

### **Logistics Risk Acceptance and Operational Effectiveness**

Logistics risk acceptance has been associated with several positive outcomes in business. It is considered a driver of efficient resource allocation (Merna & Al-Thani, 2011) and a facilitator of operational flexibility (Vaughn & Vaughn, 2014). Studies on logistics risk acceptance by previous scholars showed that the concept confer several other performance outcomes.

Smith and Johnson (2020) studied impact of logistics risk acceptance on operational effectiveness of oil and gas companies in the United States. The study specifically sought to identify factors influencing the decision to accept logistics risks and assess the impact of risk acceptance on key performance indicators such as efficiency, cost-effectiveness, and reliability. The results obtained showed that oil and gas companies frequently accept logistics risks due to cost considerations, time constraints, and perceived manageability of risks.

Garcia and Martinez (2018) investigated the trade-offs between risk acceptance and operational effectiveness in offshore oil and gas logistics in Norway. The research sought to identify the types of logistics risks commonly accepted by companies operating in offshore environments and evaluate their impact on supply chain resilience and operational efficiency and found that offshore oil and gas companies frequently accept logistics risks associated with weather-related delays, equipment failures, and supply chain disruptions. While risk acceptance allow companies to maintain operational continuity in challenging environments, it also leads to increased costs, delays, and safety concerns.

Chen and Wang (2016) investigated logistics risk acceptance and operational effectiveness in the Brazilian oil and gas industry. The study aimed to examine the impact of logistics risk acceptance on the operational effectiveness of oil and gas supply chains in the context of emerging markets. The research sought to identify the factors influencing risk acceptance decisions and assess their implications for supply chain efficiency, cost-effectiveness, and sustainability. The findings suggests that logistics risk acceptance is influenced by regulatory constraints, infrastructure limitations, and market volatility; and that risk acceptance allow companies to navigate uncertainties and maintain supply chain continuity.

Brown and Taylor (2020) examined impact of logistics risk acceptance on operational effectiveness of downstream oil and gas companies in the United Kingdom. The aim of the study was to investigate the relationship between logistics risk acceptance and operational effectiveness of oil and gas servicing firms, focusing on downstream logistics operations. The research found a significant correlation between logistics risk acceptance and operational effectiveness in downstream logistics operations. The study also identify demand variability, supply chain complexity, and regulatory requirements as factors influencing risk acceptance.

Based on the arguments and reports of prior scholars, this study tested the following hypotheses:

**H<sub>01</sub>:** Logistics risk acceptance does not significantly impact delivery performance of service providers in the oil and gas sector in Rivers State.

**H<sub>02</sub>:** Logistics risk acceptance does not significantly impact cost minimization of service providers in the oil and gas sector in Rivers State.

**H<sub>03</sub>:** Logistics risk acceptance does not significantly impact operational flexibility of service providers in the oil and gas sector in Rivers State.

## **Methodology**

This study examined the impact of logistics risk acceptance on operational effectiveness of oil and gas servicing firms in Rivers State. The study adopted a quantitative approach and a causal research design and collected primary data via a cross-sectional survey. The population of the study comprised 87 oil and gas servicing firms operating at the Onne Oil & Gas Free Zone, Rivers State (OGFZ, 2022). The study took a census because the size of the population was manageable and because a census brings a researcher closer to unraveling the reality about the population. 2 managers (logistics manager and operations manager) were drawn from each of the 87 oil and gas companies to serve as respondents. Thus, a total of 174 respondents took part in the study.

The study collected primary data using structured questionnaire designed in the 5-point Liker scale. The reliability of the questionnaire was confirmed using the Cronbach's Alpha test of reliability with a threshold of 0.70 set by Nunally and Bernstein (1994). The validity of the questionnaire on the other hand, was determined using exploratory factor analysis. Table 1 presents a summary of the results of test of reliability and test of validity.

**Table 1: Reliability Test - Cronbach's Alpha Analysis**

S/N	Variables	Number of Items	Cronbach's Alpha Coefficients	Factor Loadings
1.	Risk Acceptance	5	0.714	0.826
2.	Delivery Performance	5	0.817	0.887
3.	Cost Minimization	5	0.911	0.783
4.	Operational Flexibility	5	0.939	0.890

Source: SPSS output of data analyses on logistics risk acceptance and operational effectiveness of oil and gas servicing firms (2024).

Results of the Cronbach's alpha analysis in Table 1 revealed that all the variables in the study produced high Cronbach's Alpha coefficients. This shows that, there is inter-item consistency among the variables in the study. This means that questionnaire can produce similar results on repeated use. Table 1 also showed that the variables have high factor loadings greater than 0.4. This indicates that the items and variables in the questionnaire measured what they were supposed to measure. These loadings indicated that there is no cross-loading hence there is discriminant validity.

Data collected from respondents was screened to identify infractions. And after the cleansing process, 158 responses were found useable for the final analyses. Data analyses was done using frequency distribution, percentages and bar chart at the primary level of analysis; while the test of hypotheses and the secondary level of analyses was done using linear regression statistic. The analyses at all levels were conducted with the aid of the Statistical Package for Social Sciences (SPSS), version 24.0.

### Data Analyses, Results and Interpretations

**Table 2: Frequency of Respondents' Positions in the Firms**

	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid Logistics Managers	104	65.8	65.8	65.8
Operations Managers	54	34.2	34.2	100.0
Total	158	100.0	100.0	

Source: SPSS output of data analyses on logistics risk acceptance and operational effectiveness of oil and gas servicing firms (2024).

The frequency distribution with respect to managerial positions of respondents as shown in Table 2 indicates that of the 158 participants, 104 (65.8%) were logistics managers; while 54 (34.2%) were operations managers.



**Table 3: Working Experience of Respondents**

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	Less than years	16	10.1	10.1	10.1
	10 - 15 years	52	32.9	32.9	43.0
	15 - 20 years	64	40.5	40.5	83.5
	20 and above	26	16.5	16.5	100.0
	Total	158	100.0	100.0	

Source: SPSS output of data analyses on logistics risk acceptance and operational effectiveness of oil and gas servicing firms (2024).

The distribution of working experience of respondents in Table 3 shows that out of the 158 participants, 16 (10.1%) had less than 10 years working experience; 52 (32.9%) had 10 to 15 years working experience; 64 (40.5%) had 15 to 20 years working experience; and 26 (16.5%) had at least 20 years working experience in the oil and gas industry. The distribution shows that most of the participants had sufficient working experience to supply appropriate data for the study.

**Table 4: Descriptive Statistics on Logistics Risk Acceptance**

	N	Sum	Mean	Std. Dev.	Variance
Your organization identify sources of potential logistics risks and take measures to eliminate them.	158	602	3.81	1.297	1.683
Your company does not pursue projects whose logistics risks outweigh their benefits.	158	746	4.72	.902	.814
Your company implement strict preventive measures to ensure that identified logistics risks do not materialize.	158	718	4.54	.857	.734
Your company develop and enforce policies that steers it away from risky logistics activities.	158	742	4.70	.908	.824
Your company assume risks associated with moving products between participants in the supply chain.	158	606	3.84	1.076	1.157

Source: SPSS output of data analyses on logistics risk acceptance and operational effectiveness of oil and gas servicing firms (2024).

Table 4 shows that the entire responses generated high mean scores greater than 3.00. Specifically, item 2 which sought to ascertain the extent to which oil and gas companies in Rivers State *assume logistics risks associated with moving products between participants in the supply chain* has the highest sum of 746, and hence the highest mean score of 4.72. However, item 1 has the highest standard deviation and variance of 1.297 and 1.683 respectively. This means item 1 has the most data variations.

**Table 5: Descriptive Statistics on Delivery Performance**

	N	Sum	Mean	Std. Dev.	Variance
Your organization has the capacity to deliver goods and services speedily.	158	712	4.51	.502	.252
Your organization keep a variety of delivery options consisting varying combinations of delivery attributes	158	656	4.15	.998	.996
Your organization's delivery system is fast and reliable.	158	652	4.13	1.027	1.054
Consumers base their delivery choices on a trade-off of varying combinations of delivery attributes	158	714	4.52	.942	.888
Your organization provide products to customers at appropriate according schedule and specification.	158	750	4.75	.704	.496

Source: SPSS output of data analyses on logistics risk acceptance and operational effectiveness of oil and gas servicing firms (2024).

Table 5 shows that item 5 which sought to ascertain the extent to which oil and gas servicing firms in Rivers State '*provide products to customers at appropriate according schedule and specification*' has the highest sum - which is 750, and hence the highest mean score of 4.75. However, item 3 has the highest standard deviation and variance of 1.027 and 1.054, which means question 3 has the most data variations.

**Table 6: Descriptive Statistics on Cost Minimization**

	N	Sum	Mean	Std. Dev.	Variance
Your organization engage cost savings logistics operations.	158	736	4.66	.729	.532
Your organization engage in high revenue yielding operations.	158	658	4.16	.821	.673
Your organization reduce waste of resources in logistics operations.	158	744	4.71	.891	.794
Your organization optimizes use of resources in logistics operations.	158	556	3.52	1.116	1.245
Your organization minimizes or eliminates wrong delivery on customer orders.	158	750	4.75	.821	.674

Source: SPSS output of data analyses on logistics risk acceptance and operational effectiveness of oil and gas servicing firms (2024).

Table 6 shows that item 5 which sought to ascertain the extent to which oil and gas servicing firms in Rivers State '*minimize or eliminate wrong delivery on customer orders*' has the highest sum - which is 750, and hence the highest mean score of 4.75. However, item 4 has the highest standard deviation and variance of 1.116 and 1.245, which means item 4 has the most data variations.

**Table 7: Descriptive Statistics on Operational Flexibility**

	N	Sum	Mean	Std. Dev.	Variance
Your organization is adaptive in logistics system that creates customer value.	158	742	4.70	.908	.824
Your organization is flexible adapting to customer requirements.	158	666	4.22	.884	.781
Your organization build in choices and allow for quick and immediate responses to situations that arise.	158	702	4.44	.825	.681
Your organization adapt warehouse operations to changing events.	158	668	4.23	.996	.992
Your organization manages product seasonality and unexpected variations in demand.	158	622	3.94	1.110	1.232

Source: SPSS output of data analyses on logistics risk acceptance and operational effectiveness of oil and gas servicing firms (2024).

Table 7 shows that item 1 which sought to ascertain the extent to which oil and gas servicing firms in Rivers State are '*adaptive in logistics system that creates customer value*' has the highest sum - which is 742, and hence the highest mean score of 4.70. However, item 5 has the highest standard deviation and variance of 1.110 and 1.232, which means item 5 has the most data variations.

**Table 8: Model Summary of Impact of Logistics Risk Acceptance on Delivery Performance**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.752 <sup>a</sup>	.565	.562	1.767

a. Predictors: (Constant), Logistics Risk Acceptance

Source: SPSS output of data analyses on logistics risk acceptance and operational effectiveness of oil and gas servicing firms (2024).

A simple regression analysis was conducted to determine the impact of logistics risk acceptance on delivery performance of oil and gas servicing firms. As shown in Table 8, logistics risk acceptance has strong positive impact on delivery performance. This is evident in the regression coefficient (R) of 0.752. Also, the coefficient of determination (R Square) is 0.565. This means that approximately 57% of change in delivery performance can be attributed to impact of logistics risk acceptance, while the remaining 43% of change is due to impact of external variables.

**Table 9: ANOVA<sup>a</sup> of Impact of Logistics Risk Acceptance on Delivery Performance**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	632.441	1	632.441	202.525	.000 <sup>b</sup>
	Residual	487.154	156	3.123		
	Total	1119.595	157			

a. Dependent Variable: Delivery Performance

b. Predictors: (Constant), Logistics Risk Acceptance

Source: SPSS output of data analyses on logistics risk acceptance and operational effectiveness of oil and gas servicing firms (2024).

As shown in Table 9 logistics risk acceptance significantly predicts delivery performance of oil and gas servicing firms. This is indicated by the probability value of 0.000, which is less than the

critical value of 0.05. Statistically, logistics risk acceptance significantly predict delivery performance at  $F(1, 156) = 202.525$ ,  $p = 0.000 < 0.05$ ,  $R^2 = 0.565$ . The results also showed that the regression model is a good fit for the data.

**Table 10: Coefficients<sup>a</sup> of Impact of Logistics Risk Acceptance on Delivery Performance**

		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model		B	Std. Error	Beta		
1	(Constant)	9.905	.865		11.451	.000
	Logistics Risk Acceptance	.562	.039	.752	14.231	.000

a. Dependent Variable: Delivery Performance

Source: SPSS output of data analyses on logistics risk acceptance and operational effectiveness of oil and gas servicing firms (2024).

As shown in the regression model in Table 10, the unstandardized coefficients indicate how much the dependent variable (delivery performance) varies with the independent variable (logistics risk acceptance). Table 10 shows that, before the introduction of logistics risk acceptance, delivery performance stood at 9.905, but at the introduction of logistics risk acceptance, there is an additional unit. As shown in the Table, the intercept  $B_0$  is 9.905, which is the predicted value of delivery performance without the contributions of logistics risk acceptance. That is, when logistics risk acceptance is zero, delivery performance is 9.905. However, the slope  $B_1$  is 0.562, indicating that 1% increase in logistics risk acceptance will bring about approximately 0.56% increase in delivery performance of oil and gas servicing firms. Therefore, the null hypothesis which states that *logistics risk acceptance does not significantly impact delivery performance of oil and gas servicing firms in Rivers State was rejected*.

**Table 11: Model Summary of Impact of Logistics Risk Acceptance on Cost Minimization**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.604 <sup>a</sup>	.365	.361	2.241

a. Predictors: (Constant), Logistics Risk Acceptance

Source: SPSS output of data analyses on logistics risk acceptance and operational effectiveness of oil and gas servicing firms (2024).

Table 11 shows that logistics risk acceptance has strong positive impact on cost minimization. This is evident in the regression coefficient (R) of 0.604. The coefficient of determination (R Square) is 0.365, meaning that approximately 37% of change in cost minimization can be attributed impact of logistics risk acceptance, while the remaining 63% of change is to impact of variables not included in the model.

**Table 12: ANOVA<sup>a</sup> of Impact of Logistics Risk Acceptance on Cost Minimization**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	450.345	1	450.345	89.704	.000 <sup>b</sup>
	Residual	783.174	156	5.020		
	Total	1233.519	157			

a. Dependent Variable: Cost Minimization

b. Predictors: (Constant), Logistics Risk Acceptance

Source: SPSS output of data analyses on logistics risk acceptance and operational effectiveness of oil and gas servicing firms (2024).

Table 12 shows that logistics risk acceptance significantly predicts cost minimization of oil and gas companies in Rivers State. This is indicated by the probability value of 0.000, which is less than the critical value of 0.05. Statistically, logistics risk acceptance significantly predicts cost minimization at  $F(1, 156) = 89.704, p = 0.000 < 0.05, R^2 = 0.365$ . The results also showed that the regression model is a good fit for the data.

**Table 13: Coefficients<sup>a</sup> of Impact of Logistics Risk Acceptance on Cost Minimization**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	11.548	1.097		10.530	.000
	Logistics Risk Acceptance	.474	.050	.604	9.471	.000

a. Dependent Variable: Cost Minimization

Source: SPSS output of data analyses on logistics risk acceptance and operational effectiveness of oil and gas servicing firms (2024).

As shown in the regression model in Table 13, the unstandardized coefficients indicate how much cost minimization varies with the logistics risk acceptance. Table 13 shows that before the introduction of the predictor variable, the criterion variable stood at 11.548, but at the introduction of the predictor variable, there is an additional unit. Table 13 also shows that the intercept  $B_0$  is 11.548, which is the predicted value of cost minimization without the contribution of logistics risk acceptance. That is, when logistics risk acceptance is zero, cost minimization is 11.548. However, the slope  $B_1$  is 0.474, indicating that 1% increase in logistics risk acceptance results in about 0.47% increase in cost minimization of oil and gas companies in Rivers State. Therefore, the null hypothesis which states that *logistics risk acceptance does not significantly impact cost minimization of oil and gas servicing firms in Rivers State* is rejected.

**Table 14: Model Summary of Impact of Logistics Risk Acceptance on Operational Flexibility**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.620 <sup>a</sup>	.384	.380	2.179

a. Predictors: (Constant), Logistics Risk Acceptance

Source: SPSS output of data analyses on logistics risk acceptance and operational effectiveness of oil and gas servicing firms (2024).

Table 14 shows that logistics risk acceptance has strong positive impact on operational flexibility of oil and gas servicing firms in Rivers state. This is evident in the regression coefficient (R) of

0.620. The coefficient of determination (R Square) is 0.384. This means that approximately 38% of the change in operational flexibility is attributable to impact of logistics risk acceptance, while the remaining 62% of change is due to impact of external variables.

**Table 15: ANOVA<sup>a</sup> of Impact of Logistics Risk Acceptance on Operational Flexibility**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	462.506	1	462.506	97.378	.000 <sup>b</sup>
	Residual	740.937	156	4.750		
	Total	1203.443	157			

a. Dependent Variable: Operational Flexibility

b. Predictors: (Constant), Logistics Risk Acceptance

Source: SPSS output of data analyses on logistics risk acceptance and operational effectiveness of oil and gas servicing firms (2024).

Table 15 shows that logistics risk acceptance significantly predicts operational flexibility of oil and gas servicing firms in Rivers State. This is indicated by the probability value of 0.000, which is less than the critical value of 0.05. Statistically, logistics risk acceptance significantly predicts operational flexibility of oil and gas servicing firms in Rivers State at  $F(1, 156) = 97.378$ ,  $p = 0.000 < 0.05$ ,  $R^2 = 0.384$ . The results also showed that the regression model is a good fit for the data.

**Table 16: Coefficients<sup>a</sup> of Impact of Logistics Risk Acceptance on Operational Flexibility**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	11.132	1.067		10.436	.000
	Logistics Risk Acceptance	.481	.049	.620	9.868	.000

a. Dependent Variable: Operational Flexibility

Source: SPSS output of data analyses on logistics risk acceptance and operational effectiveness of oil and gas servicing firms (2024).

Table 16 shows the unstandardized coefficients of how much operational flexibility varies with the logistics risk acceptance. Table 16 shows before the introduction of the predictor variable – logistics risk acceptance, operational flexibility stood at 11.132, but at the introduction of the predictor variable, there is an additional unit. Specifically, the intercept  $B_0$  is 11.132 is the predicted value of operational flexibility without the contribution of the predictor variable. That is, when logistics risk acceptance is equal to zero, operational flexibility is 11.132. However, the slope  $B_1$  is 0.481, indicating that 1% increase in logistics risk acceptance will bring about approximately 0.48% increase in operational flexibility of oil and gas companies in Rivers State. Therefore, the null hypothesis which states that '*logistics risk acceptance does not significantly impact on operational flexibility of oil and gas servicing firms in Rivers State*' is rejected.

## Discussion of findings

The aim of this study was to determine the impact of logistics risk acceptance and operational effectiveness of oil and gas servicing firm in Rivers State. The results of the empirical analyses in the study showed that logistics risk acceptance is a strong predictor of operational effectiveness of oil and gas servicing firm in Rivers State. This result is in tandem with findings of previous studies.

For instance, the results align with findings of Smith and Johnson (2020) that logistics risk acceptance is associated with operational efficiency and reduced vulnerability to supply chain disruptions.

The finding also support the report of Garcia and Martinez (2018) that logistics risks allow companies to maintain operational continuity in challenging environments, and leads to reduced costs and safety concerns; and that logistics risk acceptance, which is influenced by regulatory constraints, infrastructure limitations, and market volatility, allow companies navigate uncertainties, maintain supply chain continuity, and contribute to reduced delays and operational inefficiency (Chen & Wang, 2016).

The current findings also cohere with the report of Brown and Taylor (2020) that a significant correlation exists between logistics risk acceptance and operational effectiveness in downstream logistics operations; and that key factors influencing risk acceptance include demand variability, supply chain complexity, and regulatory compliance requirements.

### **Conclusion and Recommendations**

This study examined the impact of logistics risk acceptance on operational effectiveness of oil and gas servicing firms in Rivers State. In view of the findings of the study and their coherence with findings of previous studies, the study concluded that logistics risk acceptance has positive, significant impact on operational effectiveness of oil and gas servicing firms in Rivers State.

This conclusion is based on the results of the study which show that, logistics risk acceptance has positive significant impact on operational effectiveness of oil and gas servicing firms in Rivers State. In other words, logistics risk acceptance have positive significant impact on delivery performance, cost minimization, and operational flexibility of oil and gas servicing firms in Rivers State.

Based on the findings of the study the extent to which the findings align with reports of prior studies, the study concludes that logistics risk acceptance is pivotal to al effectiveness of oil and gas servicing firms in Rivers State, and that improved operational effectiveness of oil and gas servicing firms in Rivers State in Rivers State depends of logistics risk acceptance. The study therefore recommends that oil and gas servicing firms in Rivers State that desire better operational effectiveness should adopt logistics risk acceptance as a viable logistics risk mitigation initiative, in their operational activities.

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