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IMPACT OF PROCUREMENT LEAD-TIME AND SUPPLY CHAIN DISRUPTION ON DELIVERY OF GOVERNMENT INFRASTRUCTURE PROJECTS IN ANAMBRA STATE

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ABSTRACT

The study sought to investigate the impact of procurement lead-time and supply chain disruption on delivery of Government infrastructure projects in Anambra State. Lead time is the time from the moment the client places an order to moment it is ready for delivery in manufacturing company, lead time include the time required to ship the materials to the supplier. The study *w*as hinged on the supply chain disruption, constraints theory and queuing theory. Specially, the study equally sought to establish the impact of pre-processing lead time, processing lead time and post processing lead time on procurement delivery of Government infrastructure in Anambra State. The government infrastructure project supply chains encompass the flows of materials (cements, sand, gravel, stones etc), cash, labour, information, plant, equipment and temporary works that originate from variety of different parties. In Anambra State, several construction projects such as roads, bridges, airport, public water supply system and amongst others have had time disruption before completion. The study was thus centered on establishing the impact of procurement lead –time supply chain disruption on delivery of government infrastructure. Preliminary investigations was carried out by visiting three road construction projects over a period of one week to have an eye witness account and to understand the ways in which material flow impacted on lead-time and supply chain disruption. This was followed by the main cross sectional survey designed to collect the required data. Stratified purposive sampling was used to select the sample size. The study comprised of a target population of 100 and a sample size of 55 respondents while 100 questionnaires were distributed and 53 retrieved. Data were collected using structured questionnaires and interview guides. Data were analyzed by using multiple regression analysis. The findings reveal a significant impact of procurement lead-time and supply chain disruption more especially in road construction projects in the study area.

Keywords: Procurement, Lead Time, Disruption, Materials, Projects, Infrastructure and Supply chain

1.1 INTRODUCTION

Procurement is a critical function that directly affects the performance of every project. It involves the acquisition of materials, goods, services and works, encompassing activities such as supplier selection, contract management and negotiation. Effective procurement practices can yield numerous benefits including cost savings, improved quality and delivery, enhanced supplier relationships, and increased innovation. The ability to optimize procurement processes and strategies has become a focal point for organizations especially government agencies seeking to maximize their overall performance (Cao & Wang, 2022, Mohamud et al, 2023). The economic significance of procurement in public sector activities, coupled with the substantial allocation of public funds to these functions, underscores the utmost importance of ensuring their effective organizational and national economic performance (Changalima et al, 2021, Ahmed & Mohamed,2023). However, the presence of mismanagement and malpractices has led to a less than satisfactory delivery of procurement activities in numerous projects, thereby raising concerns amongst stakeholders, government agencies and the general public alike. In addition, within the public sector, inadequate procurement quality delivery can often be attributed to corrupt practices (Balaeva et al 2021), which underscore the necessity and promotion of procurement audits.(Ibrahim et al, 2017, Sabet, 2020). To attain the desired level of procurement delivery ensuring the efficient and effective execution of procurement functions while upholding principles of good governance and professional ethics (Mchopa, 2020). Government efforts should focus on equipping procurement practitioners with the requisite skills to execute procurement activities at a high standard (Lacity & Willcocks, 2017). This aligns with the human capital theory, which recognizes skills as essential assets possessed by individuals (Prier et al, 2021). Insufficient procurement skills have been linked to late delivery, malpractices, unethical behaviour and numerous challenges encountered in public sector procurement practices. Procurement practitioners require a range of essential skills, including technical proficiencies such as cost analysis, product knowledge, and computer literacy, effective communication skills, marketing capabilities, customer care management skills and risk management competencies are also crucial for procurement professionals. Notably studies have focused on assessing staff competencies to measure procurement skills. Establishing a competent workforce within

procurement organizations is vital to improving procurement operations and enhancing overall project delivery (Odongo & Kazungu, 2022).

1.2 SIGNIFICANCE OF THE STUDY

Supply-chain procurement activities are inseparable in today's project delivery. Wherever procurement activity is practiced, the project activities which include acquisition of materials ensure that the materials moved to the project site, significantly reducing delivery spatial gaps and make materials available for the project construction. The study will be a valuable source of reference for emerging procurement and project management. Governments at different level: Federal, State and Local and all organizations will have another source of references to consult to enhance in-depth supply-chain understanding of procurement in projects.

1.3 AIM AND OBJECTIVES

The study purposely undertaken to determines the impact of procurement lead time and supply chain disruption on delivery of government infrastructure project. It was thus centered on establishing these impacts and further evaluates the effectiveness of lead time management strategies influencing the operational efficiency of manufacturing companies and investigates the factors influencing procurement process.

1.4 METHODOLOGY

Stratified purposive sampling was used to select the sample size. The study comprised of a target population of 100 and a sample size of 55 respondents while 100 questionnaires were distributed and 53 retrieved. Data were collected using structured questionnaires and interview guides. Data were analyzed by using multiple regression analysis. The selected areas within Anambra State include: some communities from the 21 Local Government Areas of the State. The findings indicate that advanced demand forecasting and more resilient supplier relationships can significantly reduce the negative impact of lead time disruptions.

2.1 PROCUREMENT LEAD TIME AND SUPPLY CHAIN

Arnold J.R.T (1996) described lead time as the total time elapsed from when a purchase order is placed until the requested materials, goods or services are delivered and received. Lead time is the latency between the initiation and execution of a process. Lead time is one of the most important numbers supply chain planning. It determines when materials arrive, how production schedules are built and whether client orders ship on time. It includes internal approvals, supplier preparation or production, shipping, receiving, inspection and administrative close-out. It is broader than manufacturing or shipping lead time. Manufacturing counts only production

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time, shipping counts transit. Lead time is a critical factor in procurement that directly impacts cost efficiency and supplier relationships. When lead times are unpredictable, projects risks disruption, delayed work schedules and higher operational costs. Stronger lead times enable project to improve procurement efficiency from mitigating unnecessary costs to enhancing supplier collaboration which contributes to a steady flow of materials. This gives the client or project owner a competitive advantage by minimizing downtime, improving forecasting accuracy and keeping the project supply chain running smoothly. Shorter lead times help project respond more quickly to shifting demand or unexpected disruptions and keep work schedules on track and reduce the risk of costly delays. The steps of procurement lead time are as stated below;

- The client issues a purchase order
- The supplier confirm the order
- Production begins
- The materials ship
- The shipment arrives at the receiving facility
- Receiving and inspection

2.1.1 TYPES OF LEAD TIME

There are three main types of lead time that must be considered together to set expectations in project delivery:

1. **Customer Lead Time:** Customer lead time is the period when customer places an order to when they receive the material, encompassing order confirmation, production, shipping and delivery and fulfillment by suppliers.
2. **Production Lead Time:** Once the materials orders have been received, the production lead time kick-off. This amount of time between when a company has all necessary resources on hand to manufacture a product and when it completes the manufacturing process.
3. **Material Lead Time:** The material lead time is the amount of time between when a company becomes aware of a need for raw materials and when the materials are physically obtained.

2.2 LEAD TIME CALCULATION

Organizations typically calculate by measuring each stage of the procurement process;

1. **Measure order processing Time;** This includes the time required to create and approve a purchase order.
2. **Measure supplier confirmation Time;** Supplier review the order and confirm delivery dates
3. **Measure production Time;** The time taken for the supplier to manufacture or prepare the product.
4. **Measure Transit Time;** The product is transported from the supplier to the client.
5. **Measure Receiving Time;** The receiving team inspects and processes the shipment.

Formula

The basic formula is;

Lead Time = processing Time + Production Time + Shipping Time + Receiving Time

Stage	**Time**
Order processing	1 day
Supplier Production	19 days
Shipping	10 days
Receiving and Inspection	2 days
Total	32 days

The lead time is 32 days. However, breaking it into individual components makes it easier to identify where disruption occur.

2.3 STAGES OF PROCUREMENT LEAD TIME

Procurement lead time consists of three critical stages, each affecting the overall efficiency of sourcing and supply chain operations. Understanding these phases helps to identify bottlenecks, disruption and improve the procurement process life cycle;.

1. **Pre-processing: Sourcing and Approval:** This phase begins before an order is even placed. It include;
    - **Supplier selection and vetting:** evaluating vendors based on quality, cost, and delivery capabilities.

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- **Negotiation and contract approval;** Ensuring payment term. Pricing structures and compliance requirements are in place.
- **Internal purchase approval;** Gaining authorization from procurement teams or finance departments

Delays at this stage often stem from slow internal approval processes, supplier availability issues or extended vendor contract negotiations and compliance.

2. **Processing: Order placement and Fulfillment**

Once a supplier has approved, the order is placed and processed. This includes;

- **Order confirmation from the supplier;** Ensuring accuracy in pricing, quantity and delivery timelines.
- **Manufacturing or order fulfillment;** The production time is factored into the lead time.

Any inefficiency in order processing such as miscommunication, delays in supplier response or fulfillment issues can extend lead times. A well-structured procurement process helps mitigate these risks.

3. **Post-processing; Shipping and Receiving;** The final; stage involves transportation and delivery;
    - **Shipping and logistics coordination;** Managing transit times, carrier reliability and customs clearance for international shipments. The local transit involves local charges clearance.
    - **Receiving and Inspection;** Ensuring the delivered goods match order specifications before adding them to inventory.

Unpredictable supply chain disruptions, customs delays or inaccurate deliveries can slow down this stage. It can be mitigated or reduced by working with reliable logistics companies and diversifying the project suppliers but it can helps to maintain or implement automated, real time tracking systems.

2.4 MEANING OF PROCUREMENT, PURCHASE AND SOURCING

Lyson K., Farrington B. (2016) opined that organizations lay great efforts to acquire raw materials, components, products, services, and other resources from suppliers for their operations. In a supply chain, each organization buys materials from upstream suppliers, adds value, and sells them to downstream customers. As each organization, in turn, buys and sells, the

materials move through the whole supply chain. The trigger that initiates each move is a purchase which is a message that an organization sends to a supplier, saying, 'we have agreed on terms, so send us materials and we will pay you'. In this process, procurement, purchasing, and sourcing are interchanging tasks having separate functions as follows:

2.4.1 PROCUREMENT

Guth S. (2008) defined procurement as the process of identifying and obtaining goods and services. It includes sourcing, purchasing and covers all activities from identifying potential suppliers through to delivery from supplier to the users or

beneficiary.

2.4.2 PURCHASE

Leeders M.R, Fearon H.E, (1996) described purchase as the specific function associated with the actual buying of goods and services from suppliers.

2.4.3 SOURCING

Ballou R.H (1998) stated that sourcing is simply identifying and working with appropriate suppliers.

It is the process of acquiring goods, works and services.

2.4.4 DIFFERENCE BETWEEN PROCUREMENT AND PURCHASE

Procurement and purchasing are two processes that are done during the process of acquiring goods and services for an organization.

2.5 PROCUREMENT PROCESS

According to Guth S. (2008) Procurement is a strategic process of product or service sourcing, for example researching, negotiation and planning. It comprises the following activities:

- Identifying needs and requirements
- Sourcing and evaluating local, national, or international suppliers
- Negotiating terms, conditions, and contracts
- Building and managing supplier relationships
- Performing cost savings and profit margin analysis
- Receiving goods/services and warehouse management Processing and organizing payment with supplier

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2.5.1 ROLE OF PROCUREMENT

Guth S. (2008) argued that Procurement has a vital role in an organization involving a process of identifying, short listing, selecting, and acquiring suitable goods or services or works from a third-party vendor through a direct purchase, competitive bidding, or tendering process while ensuring timely delivery in the right quality and quantity. Proper procurement is essential to:

- Control spending as organizations can spend more than two thirds of revenue on procurement, so even small cost reductions can have a big impact.
- Prevent corruption as it is believed to add up to 25% of the cost of procurement contracts.
- Protect the brand of the product or service as accountability is ensured due to information relating to inadequate supply chains now go right to the higher levels of organization, with the company keeping a significant control on it.

The role of procurement in an organization is to:

a) Ensure uninterrupted flow of raw materials at the lowest total cost.

b) Improve the quality of finished goods produced; and

c) Optimize customer satisfaction.

2.5.2 SEVEN (7) R's OF PROCUREMENT

Arnold J.R.T (1996) stated that the goal of procurement is to carry out its activities in such a way that the goods and services, so procured are of the:

1) Right Price
2) Right Quantity
3) Right Quality
4) Right Time
5) Right Place
6) Right Source
7) Right Service

2.5.3 AIM OF PROCUREMENT

Lyson K. , Farrington B. (2016) emphasized that the aim of procurement is to primarily have a reliable supply of materials. Other more immediate goals being:

- Organizing a reliable and uninterrupted flow of materials into an organization.

- Working closely with user departments, developing relationships, and understanding their needs.
- Identifying good suppliers, working closely with them, and developing beneficial relationships.
- Buying the right materials and making sure that they have acceptable quality, arrive at the time and place needed, and meet any other requirements.
- Negotiating good prices and conditions.
- Keeping stocks low, considering inventory policies, investment, standard and readily available materials.
- Moving materials quickly through the supply chain, expediting deliveries when necessary.
- Keeping abreast of conditions, including pending price increases, scarcities, new products, etc.

2.5.4 PURCHASING

According to Bhardawi M.K (2002) stated that purchasing includes the processes concerned with acquiring goods and services, including payment of invoices being a part of the wider procurement process. Purchasing is a function that focuses on how products and services are acquired and ordered, such as raising purchase orders and arranging payment. It has the following activities:

2.5.5 PROCUREMENT PROCESS

Guth S. (2008) stated that the procurement process includes identifying a specific product or service requirement and the various steps on how a business finds new or existing suppliers, builds supplier relationships, measures cost savings, minimizes risk and is predominately focused on value and return on investment .

A typical procurement process can involve the following steps:

a) Identifying potential suppliers

b) Creating an approved list of vendors

c) Assessing internal needs

d) Preparing a purchase order

e) Requesting proposals and evaluating quotations

f) Selecting the right supplier and negotiating

g) Receiving goods and performing quality checks

h) Developing and managing contracts

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i) Obtaining invoice approvals and fulfilling payment terms

j) Establishing a good supplier relationship

The purchasing process has the following steps:

a) Obtaining a purchase requisition

b) Requesting proposals and evaluating quotations

c) Dispatching official purchase orders

d) Receiving products and services

e) Checking the quality of delivered items

f) Providing payment to vendors

2.5.6 TYPES OF PROCUREMENT

a) Merchant buyers: These include wholesalers and retailers who purchase for resale.

b) Industrial buyers: These include those who purchase raw materials, capital equipment, or maintenance, repair, and operating (MRO) supplies.

2.5.7 CATEGORIES OF PROCURMENT ACTIVITIES

Procurement activities are often split into two distinct categories:

a) Direct spend: It is production-related procurement that encompasses all items that are part of finished products, such as raw material, components, and parts. It focuses on supply chain management that directly affects the production process of manufacturing firms.

b) Indirect procurement: It is non-production-related acquisition by obtaining "operating resources" which a company purchases to enable its operations; comprises a wide variety of goods and services, from standardized items like office supplies and machine lubricants to complex and costly products and services such as heavy equipment, consulting services, and outsourcing services.

2.5.8 PROCUREMENT CYCLE

A general approach to procurement has a series of common steps, which start with a user identifying a need for materials and end with its delivery. Procurement cycle may be considered as a process to include:

a) Identification of need and requirements: Based on business objectives, establish a short-term strategy of three to five years followed by defining the technical direction and requirements.

b) **External macro-level market analysis:** Based on its requirements, an organization assesses the overall marketplace by understanding the competitiveness of the marketplace and trends that are likely to impact the organization.

c) **Cost analysis:** Accumulation, examination, and manipulation of cost data for comparisons and projections to help in plan.

d) **Supplier identification:** Identifying suppliers who can provide the required product or services from different sources.

e) **Entering into Non-disclosure agreement (NDA):** Request vendors to sign an NDA prior to engaging with them to protect the organization where sensitive information is shared with multiple potential vendors.

f) **Supplier communication:** Typically conduct competitive bidding processes using a variety of competitive bidding methods such as requests for quotation, proposals, information, tender, solution or partnership; making direct contact with the suppliers; samples examined or trials undertaken; and doing best value assessment.

g) **Negotiations and contracting:** To include price, availability, customization, and delivery schedules which are outlined in purchase order or formal contract.

h) **Logistics and performance management:** To complete supply process based on contract terms, review their experience for reorder to consider continuing with same suppliers or continue with other suppliers.

i) **Supplier management and liaison:** Using supplier relationship management process for more strategic supplies within a formal governance process.

There are several stakeholders involved in procurement processes, from internal members such as employees in different departments to external parties like vendors and contract negotiators, all demanding meticulous documentation comprising a complex web of procedures. A single purchasing cycle might last for weeks, whereas a whole procurement cycle can last for months or even repeated. If performed manually, these activities will be detrimental for efficiency, as the process of revising every document, evaluating every bid, and reviewing every invoice will cause too much delay. A comprehensive digital procure-to pay solution, on the other hand, allows organizations to store all purchasing and procurement related files in one centralized database. While a shared network drive can fulfill this purpose, cloud-based procurement software can automate tasks at a level of convenience and efficiency that a manual system simply cannot match.

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2.6 IMPACT OF PROCUREMENT LEAD TIME AND SUPPLY CHAIN DISRUPTION

The impact of procurement lead time and supply chain disruption is to streamline the process of acquisition by removing repetitive activities that causes disruptions, improving the workflow process, and enhancing report generation. Lead time directly impact cost, efficiency, inventory management and supplier relationships. Building all parts of material onsite might take longer than completing some components offsite. Transportation issues can cause disruption and delay in delivery of necessary materials. The acquisition of materials needed for government infrastructure projects is a huge task as it involves several decision makers, departments, and a high level of paperwork: causing process disruption and bottlenecks, slowing decision making and complicating the procurement process. Strategies to reduce lead time supply chain disruptions can be through;

- **Long Term Agreements (LTAs);** Establishing contracts with core vendors to eliminate redundant bidding steps.
- **Eliminate Unnecessary Processes:** The easiest way to trim lead time is to eliminate steps or processes that are not needed to facilitate a sale. This may be sacrificing multiple reviews of quality control or assessing the efficiency of the manufacturing process.
- **Monitor Transportation Method:** Not all transportation methods are created equally and some may simply be better options. This relationship is not static, what may be ideal this month must change due to extenuating circumstances occasioned by labour shortages, natural disasters or government legislations.
- **Procure Differently:** Some suppliers act more promptly than others, some suppliers may be local and require shorter shipping expectations.
- **Supply Relationship Management (SRM);** Improving communication and collaboration to enhance delivery reliability.
- **Digital Integration:** Using Enterprise Resource Planning (ERP) systems, automated workflows and real time tracking to minimize administrative bottlenecks and disruptions. Automating key activities that can help in increasing the transparency of important information and aid decision making. Automated procurement systems also enable employees to concentrate on core activities to add further value within the business such as procurement strategy and improve supplier relationships.

Typical procurement automation scenarios can include:

- Procurement software integration with accounting, Enterprise Resource Planning (ERP) and Warehouse Management System (WMS)
- Automating Request for Quotations (RFQs) when stock levels reach reorder points

- Automated stock reorders notifications through email or SMS
- Automatic creation and distribution of purchase orders
- Automated order confirmation emails

Electronic Data Interchange (EDI) integration

Developments in technology shape the way the procurement teams interact with stakeholders and it benefits the organization in the following manner:

- Integrating a digital transformation strategy
- Adopting artificial intelligence systems
- Installing cyber security systems and protection
- Making use of robotics for smart inventory management using big data to drive decisions

Making organization adapt to changing procurement trends can help in digital transformation, enhance supplier synergies and bring about cost savings.

Most organizations use some form of automated e-procurement, advantages being:

a) Allowing instant access to suppliers anywhere in the world.

b) Creating a transparent market where products are readily available.

c) Automating procurement with standard procedures.

d) Reducing the time needed for transactions.

e) Lessening costs

f) Outsourcing some procurement activities to suppliers or third parties.

g) Integrating seamlessly with suppliers' information systems.

2.6.1 FACTORS AFFECTING LEAD TIME SUPPLY CHAIN DISRUPTION

The factors that affect lead time can be divided into three categories:

1. **Procurement Lead Time Factor:** This relate to the sourcing of raw materials for production. Well-established companies with strong relationships with suppliers may be less impacted by these factors, still when relying to external companies, there is always the risk in lead time due to external failures to deliver.
2. **Manufacturing Lead Time Factor:** This factor is relatively all controllable for a company. This internal only stage of the sale process means a company may change processes, personnel or equipment to improve or worsen lead time. The company has almost full discretion over the manufacturing lead time factor.

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3. **Shipping Lead Time Factor:** The factor involved the transit of the material from one location to another that often causes disruption of activities in infrastructure projects.

2.6.2 PROCUREMENT MATERIALS FOR INFRASTRUCTURE PROJECTS.

- Stones
- Marbles
- Sandstones
- Laterites
- Gneiss
- Quartzite
- Bricks
- Tiles
- Glazing
- Cements
- Sand
- Gravel
- Morrum
- Flyash
- Timber
- Paints
- Varnishes
- Distempers
- Cast iron
- Bituminous materials
- Plastic heat roofing
- Acoustic materials

2.6.3 CONSTRAINTS AND QUEUING THEORIES

A queuing theory is the study of queues as a technique for managing processes and objects in a manufacturing. A queue can be studied in terms of the source of each item, how frequently items arrive in the queue, how long they can or should wait, whether some items should jump ahead in the enqueued and dequeued. In queuing theory, a discipline within the mathematical theory of probability, this theory often applied in procurement lead time due to sometimes material ordered encountered delay that is how long it can wait or should wait during processing time. In the other hand, theory of constraints (TOC) is a management paradigm that views any manageable system as being limited in achieving more of its goals by a very small number of constraints. There is always at least one constraint, and it uses a focusing process to identify the constraint and restructure the rest of the organization around it. Theory of constraints adopts the common idiom ‘a chain is not stronger than its weakest link’. This means that organizations and processes are vulnerable because the weakest person can always damage or break them or at least adversely affect the outcome. However, the theory have been applied to manufacturing, project management, supply chain distribution to provide solution for supply chains and to create flow

of inventory so as to ensure greater availability and to eliminate surpluses. The theory of constraints (TOC) distribution solution is effective when used to address a single link in the supply chain and more so access the entire systems, even if that system comprises many different companies. The purpose of the TOC distribution solution is to establish a competitive advantage based on extraordinary availability by reducing the damages caused when the flow of materials or goods is disrupted by shortages and surpluses. This approach uses several new rules to protect availability with fewer inventories than is conventionally required;

1. Inventory is held at an aggregation point as close as possible to the source. This approach ensures smoothed demand at the aggregation point, requiring proportionally less inventory. The distribution centers holding the aggregated materials or stocks are able to ship goods downstream to the next link in the supply chain much more quickly.
2. Following this rule may result in a make- to-order manufacturer converting to make-to-stock. The inventory added at the aggregation point is significantly less than the inventory reduction downstream.
3. In all stocking locations, initial inventory buffers are set which effectively create an upper limit of the inventory at that location. The buffer size is equal to the maximum expected consumption within the average Replenishment Time (RT) plus additional stock to protect in case a delivery is late. Typically the sum of the on hand value of such buffers is 25-75% less than currently observed average inventory levels. Replenishment Time (RT) is the sum of the delay, after the first consumption following a delivery, before an order is placed until the ordered goods arrive at the ordering location.
4. Once buffers have been established, no replenishment order are placed as long as the quantity inbound (already ordered but not yet received) plus the quantity on hand are equal to or greater than the buffer size. Following this rule causes surplus inventory to be bled off as it is consumed.
5. For any reason, when on hand plus inbound inventory is less than the buffer, orders are placed as soon as practical to increase the inbound inventory so that the relationship on hand + inbound = Buffer is maintained.
6. To ensure buffers remain correctly sized even with changes in the rates of demand and replenishment, simple recursive algorithm called Buffer Management is used.

Once inventory is managed as described above, continuous efforts should be undertaken to reduce RT, late deliveries, supplier minimum order quantities and customer order batching. Any improvements in these areas will automatically improve both availability and inventory turns.

2.6.4 PRELIMINARY INVESTIGATION

The researchers inspected three road infrastructure projects variously located at Agulu, Obosi and Ekwuluobia in Anambra State where the project managers enumerated several supply chain disruptions in delivery of procurement materials. From their viewpoints, we realized that the disruptions are occasioned by none released of project funds, delays from manufacturing company and suppliers. The road projects visited are at various levels of completion as at time of inspection. The investigation further revealed that weak communication network, lack of access to quality material, difficulty in tracking shipment, late order of materials and inadequate skilled procurement personnel severely disrupt the delivery and have serious impact on the supply chain.

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3.1 RESEARCH METHODOLOGY

This chapter deals with the research methods adopted for the design, collection and subsequently analysis of the data collected from the diverse respondents and from the diverse sources to complete this research project. The chapter is therefore a detailed descriptive of the various methods used for data collection including the instruments used to collect data, the study population, sample size, procedures for data collection and the data analysis plan.

3.2 RESEARCH PHILOSOPHY

The philosophy underpinning any research determines the direction and outcome of every research such as this. A wrong philosophy provides a wrong direction and materials collected for a result such as this and end up with wrong answer. On the other hand, a well thought-out philosophy produces the right results. Philosophies cease to be philosophy when they create problems that solve man's problems (Sorhoon Tan, 2016). Research philosophy, therefore must not be seen to be solving the problems of philosophers but dealing with the problems and devising solutions through effective methodology which help man overcome their challenges. This is to ensure that data is collected from identified but relevant respondents with the best instruments including analytical instruments to come up with solutions for the impact of procurement lead time and supply chain disruption on delivery of government infrastructure in Anambra State. The findings indicate that advanced demand forecasting and more resilient supplier relationships can significantly reduce the negative impact of lead time disruptions.

3.3 GROUP DESIGN

Research design is the specific data analysis techniques or methods that the researcher intends to use. This gives the individual researcher an opportunity for one aspect of a problem to be studied in-depth within a limited time scale. In this research, the group design was used as it can provide evidence to conclude what works, for whom and under what conditions (Toste, J.R.2023). The design involves the collection and analysis of data and finding out the answers concerning the current status of the subject. This comprised observation of facts, formulation of hypotheses, collection and collection and classification of data, interpretation of data, formulation of theories, application of facts and predictions.

3.4 RESEARCH METHODS

Stratified purposive sampling was used to select the sample size. The study comprised of a target population of 100 and a sample size of 55 respondents and 100 questionnaires were distributed while 53 were retrieved. Data were collected using structured questionnaires and interview guides. Data were analyzed by using multiple regression analysis. The selected areas within Anambra State include: some communities from the 21 Local Government Areas of the State.

3.5 POPULATION

The data for the study were obtained from mostly the Anambra State Miinistry of Works and Physical Infrastructure Development. Their management staff, senior and junior staff. Interviews were conducted from the people of Anambra State in different districts of the State according to standards limits and also used simple random sampling techniques for the selection of the respondents and projects. These methods of sampling were adopted for the study because the procedure involved allowed all the staff in the defined population to have an equal and independent chance of being selected as a member of the population.

Table 1; Distribution of Questionnaires

Area of Research	Number of respondents	Questionnaires for Managers	Senior staff questionnaires	Retrievals
Anambra state Ministry of Works	40	10	30	15
Anambra Central Zone (Awka)	20	8	12	11
Anambra South Zone (Aguata)	20	8	12	15
Anambra North (Onitsha)	20	8	12	12
Total	100	34	66	53

Source: Field Survey, 2026

Table 1: indicates the questionnaires distributed to the respondents. An average of 40 questionnaires were administered to forty staff of Anambra state Ministry of Works: 10 questionnaires to Managers, 30 to senior staff whilst 15 were retrieved. Anambra Central Zone (Awka) had 20 questionnaires to Managers, 8 to senior staff in the zone whilst 11 were retrieved. Anambra South Zone (Aguata) had 20 questionnaires to Managers, 8 to senior staff in the zone whilst 15 were retrieved. Anambra North Zone (Onitsha) had 20 questionnaires to the Managers, 8 to senior staff in the zone whilst 12 were retrieved. The total number questionnaires administered are 100, a total 34 to the Managers, 66 to the Senior staff whilst a total of 53 were retrieved.

3.6 SAMPLING TECHNIQUES/SAMPLING METHOD

The sampling techniques in research are methods of selecting representative group participants from a larger population (Shah, 2018). It includes purposive, maximum variation, stratified random and snowball sampling. Since selecting an effective technique helps with the sampling size, it was important that factors such as availability of resources, the nature of the population being studied and the research objectives are of paramount consideration, the technique when chosen can be dependable to achieve goal of the research. For this reason, the purposive

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sampling technique with the consideration of stratified random sampling methods were thought to be suitable and used for this research.

3.7 DATA ANALYSIS

Data analysis is critical to this research because it is meant to help draw meaningful conclusion from the collected data (Mertens, D.M, 2015). For this reason, the research involved the process of collecting data, organizing and analyzing data to answer the research questions. These activities as far as this research is concerned were conducted using the techniques of quantitative and qualitative methods and statistical and graphical analysis.

3.8 LIMITATIONS

It is not unusual to encounter some unavoidable challenges in research such as this quest to look for data so complete and produce a credible research outcome for the use of management decision- making and public consumption including accessibility as source of reference. The collection of primary data encountered enormous challenges because of the choice of supply chain disruption as the research was limited to Anambra State. The State Ministry of Works is mostly comprised of few professionals in built environment and procurement functions/departments. This means that the Ministry involved was relatively new with information being a major challenge. For example, Works Ministry in Anambra State had the procurement department under the Finance/Accounting departments merged their activities thus, making it difficult for specific information on procurement to be easily available to access. Another challenging limitation is the accessibility to information. The unwillingness of the Ministry of Works to release information was an issue. The lack of interest by many potential respondents was a big limitation in collecting data.

4.1 DATA PRESENTATION

Table 2: Procurement and Lead time supply chain concepts

Concept of procurement lead time supply chain	**Not at all (%)**	**Indifferent (%)**	**Well familiar (%)**	**Quite well familiar (%)**	**Very well Expert familiar (%)**
How well do you understand the concept of procurement lead time supply chain	0	1(2%)	17(32%)	18(34%)	17(32%)
What is your	0	3(6%)	17(32%)	15(28%)	18(34%)

level of knowledge related to the concept of procurement lead time supply chain					
How confident are you in your ability to manage procurement lead time and supply chain	0	3(6%)	20(38%)	16(30%)	14(26%)
How familiar are you with the different components of procurement lead time supply chain	1(2%)	3(6%)	1(2%)	21(52%)	17(41%)
How familiar are you with the different tools and technologies used in procurement	1(2%)	3(6%)	1(2%)	21(39%)	28(53%)

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lead time supply chain					
To what extent do you feel comfortable discussing the concept of procurement lead time supply chain	1(2%)	3(6%)	21(39%)	14(19)	14(19)

Source: Field Survey, 2026.

From the above table 2 shows that concerning the question "How well do you understand the concept of procurement lead time supply chain" none of the respondent answered "Not at all" meaning all of them are aware of the subject matter. One (1) representing 2% answered indifferent with (17) representing 32% of respondents indicating they were quite well familiar while seventeen (18) representing 34% were very and expertly familiar. The analysis indicates that out of the bulk of the respondents, (34%) had quite good knowledge about the supply chain concepts which thus suggests that the implications of the supply chain could not be an issue and could be comfortable with its application. Therefore, the impact of non-response can be insignificant to the knowledge expected to forge ahead to the rest of the questions as the answering the remaining questions related to the preceding answers.

Concerning the question "What is your level related to the concept of procurement lead time supply chain" none of the respondent answered "Not at all" meaning that all the respondents had knowledge about the concept of procurement and supply chain except that three (3) representing 6% answered indifferent with (17) representing 32% of respondents indicating they were well familiar, (15) representing 28% were quite well familiar while twenty-one (18) representing 34% were very and expertly familiar. The analysis indicates that the zero responses suggest all of the respondents knew the supply chain.

On the question "How confident are you in your ability to manage procurement lead time supply chain processes" none of the respondent answered "Not at all" meaning that the respondents were not sure or did not have confidence in their ability to manage the procurement and supply chain except that three (3) representing 6% answered indifferent with (20) representing 38% of respondents indicating they were well familiar, (16) representing 30% were quite well familiar while fourteen (14) representing 26% were very and expertly familiar. The analysis indicates that the zero responses suggests all of the respondents knew the supply chain.

On the question "How familiar are you with the different tools and technologies used in procurement lead time supply chain processes" none of the respondent answered "Not at all" meaning that the respondents did not know the different tools and technologies used in the procurement and supply chain or they did not understand the question. The two scenarios are all possible since it is impossible not to use any procurement tools to achieve any procurement goals, hence the conclusion was drawn. Consequently, three (3) representing 6% answered indifferent with twenty (1) representing 2% of respondents indicating they were well familiar, (21) representing 52% were quite well familiar while (17) representing 41% were very and expertly familiar. The analysis indicates that the zero responses suggests all of the respondents knew the supply chain.

Regarding the question "How familiar are with the components of the procurement lead time supply chain processes" none of the respondent answered "Not at all" meaning that the respondents were not familiar with any components of the procurement and supply chain at all except that three (3) representing 6% answered indifferent with one (1) representing 2% of respondents indicating they were well familiar, (21) representing 52% were quite well familiar while (21) representing 52% were very and expertly familiar.

Also, with the question "To what extent do you feel comfortable discussing the concept of the procurement lead time supply chain processes" one (1) representing 2% of the respondent answered "Not at all" meaning that the respondents did not have any readiness to discuss the concepts of procurement and supply chain at all except that three (3) representing 6% answered indifferent with one (1) representing 2% of respondents indicating they were well familiar, (21) representing 52% were quite well familiar while (17) representing 41% were very and expertly

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familiar. In conclusion, a critical picture portrayed by the data analyzed as summarized below indicates that with a breakdown of individual responses as shown below the sentiments of the majority of the respondents are stronger from quite well or familiar and very well or expertly familiar making selections by respondents quite impressive.

Table 3: Procurement lead time supply chain disruption impacts

Impact of procurement lead time supply chain disruption	**Strongly Disagree**	**Disagree**	**Neither Agree nor Disagree**	**Agree**	**Moderately Agree**	**Strongly Agree**
The procurement lead time supply chain has a positive impact on the projects disruption	0	0	1(2%)	13(25%)	20(38%)	19(36%)
The procurement lead time supply chain harms the infrastructure projects	17(32%)	15(28%)	0	14(26%)	6(11%)	1(2%)
Procurement lead time supply chain has a significant impact on infrastructure	0	0	3(6%)	11(21%)	20(38%)	19(36%)

projects						
Procurement lead time supply chain harms the sustainability of infrastructure projects	19(36%)	16(30%)	3(6%)	7(13%)	7(13%)	1(2%)
Procurement lead time supply chain has a significant impact on the competiveness of project bidding	0	0	4(8%)	15(28%)	18(34%)	16(30%)

Source: Field Survey, 2026

Table 3 show the impact of procurement and supply chain impact. The statement on whether "the procurement lead time supply chain has a positive impact on project disruption" this answer shows that one (1) strongly disagreed with the statement that the procurement lead time supply chain has positive impact on project disruption and that all the respondents agreed that procurement and supply chain matters have a strong correlation with global economy with none (0) disagreeing. One (1) representing 2% responded to neither agree nor disagree, thirteen (13) representing 25% responded to agree and twenty (20) representing 38% responded to strongly agree.

The statement on whether "the procurement lead time supply chain harms infrastructure project " also (17) representing 32% responded to strongly disagreed with (15) representing 28% agreed. None (0) responded to neither agree nor disagree, (14) representing 26% responded to agree and (6) responded to strongly agree. The data suggests that the majority opined that

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effective procurement lead time supply chains have a positive bearing on the performance of infrastructure projects.

On whether "the procurement lead time supply chain has a significant impact infrastructure project" also (0) responded to strongly disagreed with (3) representing 6% responded to neither agree nor disagree, (11) representing 21% responded to agree and (20) responded to strongly agree indicates it is dawning on that the success of today's activities in a significant measure also relies on the procurement lead time supply chains functions .

On "the procurement lead time supply chain has a positive impact on the profitability of infrastructure project" the results shows (19) responded to strongly disagreed with (16) responded to neither agree nor disagree, (3) representing 6% responded to agree and (7) responded to strongly agree.

On "the procurement lead time supply chain harms the sustainability of infrastructure project" the results shows (4) representing 31% responded to strongly disagreed with (10) representing 24% disagreed, three (3) representing 8% responded to neither agree nor disagree, (15) representing 28% responded to agree and (18) responded to strongly agree. Putting together the responses for strongly disagree and disagree representing just above fifty-three (53) response threshold indicates a supportive position to the fact that procurement functions add value to the project infrastructure.

Table 4: Procurement lead time supply chain challenges

Challenges	**Responses**	**Responses %**	**Not Responded**	**Not Responded %**		
Lack of access to quality supply	45	85	8	15		
Availability of reliable transportation	40	75	13	25		
Unpredictable political and economic	49	92	4	8		

condition						
Language and cultural barriers	44	83	9	17		
Difficulty in tracking and managing shipments	47	89	6	11		
Limited access to technology and resources	49	92	4	8		
Weak infrastructure and communication networks	42	79	11	21		
Lack of skilled personnel and Expertise	50	94	3	6		
Difficulty in enforcing contracts	42	79	11	21		

Source: Field Survey, 2026

Table 4 shows the challenges of procurement and supply chain. Out of the percentage total of fifty-three 53 (100%) respondents (45) representing 85% responded to lack of access to quality suppliers, whereas eight (8) representing 15% did not respond to lack of access to quality suppliers. (40) respondents out of total of fifty-three (53) respondents, representing 75% responded to the availability of reliable transportation, whereas (13) respondents representing (25%) did not respond to the challenges. 49 respondents representing 92% responded to unpredictable political and economic condition but 4 respondents representing 8% did not respond to the challenges. Equally, 44 respondents representing 83% responded to language and

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cultural barriers while 9 respondent representing 17% did not respond, 47 respondents representing 89% responded to difficulty in tracking and managing shipment but 6 respondents representing 11% chose not to respond to the challenges. 49 respondents representing 92% responded to limited access to technology and resources but 4 respondents representing 8% did not respond, 42 respondents amounting to 79% responded to weak infrastructure and communication network but 11 respondents chose not to respond, 50 respondents representing 94% responded to lack of skilled personnel and expertise but 3 respondents amounting to 6% did not respond, 42 respondents representing 79% responded to difficulty in enforcing contracts but 11 respondents representing 21% did not respond.

The overwhelming number of respondents indicated that access to quality suppliers is one of the main challenges militating against the implementing and managing an effective procurement supply chain in infrastructure projects.

Table; 5 Strategies to reduce procurement lead time supply chain disruption

Strategies	**Responses**	**Responses %**	**Not Responded**	**Not Responded %**
Developing a comprehensive procurement lead time supply chain strategy	53	100	0	0
Establishing strong relationships with suppliers	51	96	2	6
Implementing sound inventory management practice	48	91	5	9
Utilizing the latest technology	47	87	6	13

to automate process				
Developing a risk management plan to address supply chain disruption	50	94	3	6
Utilizing data analytics to identify cost saving opportunities	47	87	6	13

Source: Field Survey, 2026

Table 5 shows the responses to the question on procurement supply chain strategies to be adopted. (53) respondents representing 100% responded to developing a comprehensive procurement lead time supply chain strategy while 0 respondent amounting to 0% did not responded. 51 respondents representing 96% responded to establishing strong relationships with suppliers but 2 respondents representing 6% did not responded. However, 48 respondents amounting to 91% responded to implementing sound inventory management practice but 5 respondents representing 9% did not respond, 50 respondents representing 94% believed that the strategy that utilizes latest technology to automate procurement process as the ideal strategy, whereas (3) respondents representing (6%) did not respond to the strategy. 47 respondents representing 87% responded to developing a risk management plan to address supply chain disruption but 6 respondents representing 13% did not respond to the strategy.

Table; 6 Procurement lead time Supply chain Success Factors

Success Factors	**Responses**	**Responses %**	**Not Responded**	**Not Responded %**
Quality control	50	94	3	6
Availability of Resources	52	98	1	2

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Accurate Forecasting	40	75	13	25
Automation	48	91	5	9
Cost Efficiency	44	83	9	17
Effective inventory management	50	94	3	6
Strategic partnerships	52	98	1	2
Innovative technologies	44	83	9	17
Flexibility	48	91	5	9
Robust supply chain management	50	94	3	6

Source: Field Survey, 2026

Table 6 shows the responses to the question on procurement lead time supply chain success factors. (50) respondents out of total of fifty-three (53) respondents, representing 94% responded to the quality control, whereas (3) respondents representing (6%) did not respond to the success factor. 52 respondents representing 98% responded to availability of resources but 1 respondent representing 2% did not respond to the success factor. Also, 4- respondents representing 75% responded to accurate forecasting while 13 respondents representing 25% did not respond, 48 respondents representing 91% responded to automation but 5 respondents representing 9% chose not to respond to the success factor. 44 respondents representing 83% responded to cost efficiency but 9 respondents representing 17% did not respond, 50 respondents amounting to 94% responded to effective inventory management but 3 respondents chose not to respond, 52 respondents representing 98% responded to strategic partnership but 1 respondent amounting to 2% did not respond, 44 respondents representing 83% responded to innovative technologies but 9 respondents representing 17% did not respond, 48 respondents representing 91% responded to flexibility while 5 respondents amounting to 9% did not respond and 50 respondents representing

94% responded to robust supply chain management while 3 respondents amounting to 6% did not respond.

Table; 7 Procurement lead time Supply chain Improvements

Procurement lead time supply chain improvements	**Responses**	**Responses %**	**Not Responded**	**Not Responded %**
Streamlining the procurement lead time supply chain process through process re-engineering can improve results for disruption of infrastructure projects	50	94	3	6
Investing in the training and capacity building for procurement personnel can improve results	52	98	1	2
Adopting modern and innovative procurement lead time supply chain solutions can improve results	47	89	6	11
Incorporating	51	96	2	4

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data analytics and artificial intelligence into the procurement process can improve results				
Utilizing digital platform and online market places for procurement lead time supply chain can improve results	46	87	7	13

Source: Field Survey, 2026

Table 7 shows the responses to the question on procurement lead time success. (50) respondents out of total of fifty-three (53) respondents, representing 94% responded to the streamlining the procurement lead time supply chain through process re-engineering can improve results for disruption of infrastructure project, whereas (3) respondents representing (6%) did not respond to the supply chain success. 52 respondents representing 98% responded to investing in the training and capacity building for procurement personnel can improve results but (1) respondent representing 2% did not respond to the supply chain success. Also, 47 respondents representing 89% responded to adopting modern and innovative procurement lead time supply chain solution can improve results while 6 respondents representing 11% did not respond, 51 respondents representing 96% responded to incorporating data analytics and artificial intelligence into the procurement process can improve results but 2 respondents representing 4% chose not to respond to the supply chain success. 46 respondents representing 87% responded to utilizing digital platform and online market places for procurement lead time supply chain can improve results but 7 respondents representing 13% did not respond.

Table; 8 Successful Implementation of Procurement lead time Supply chain

Successful Implementation of Procurement lead time supply chain	**Responses**	**Responses %**	**Not Responded**	**Not Responded %**
It can reduce costs associated with procurement lead time supply chain	43	81	10	19
It can reduce the time required to source materials	40	75	13	25
It can improve the quality of materials sourced	44	83	9	17
It can improve the reliability of supply chain	40	75	13	25
It can increase the efficiency of procurement operation	40	75	13	25
It can improve customer service levels	51	96	2	4
It can increase the speed of delivery of	40	75	13	25

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materials				
It can reduce inventory levels	41	77	12	23
It can improve the accuracy of orders	41	77	12	23
It can enable businesses to better compete in the global markets	47	89	6	11

Source: Field Survey, 2026

Table 8 shows the responses to the question on successful implementation of procurement lead time supply chain. (47) respondents out of total of fifty-three (53) respondents, representing 81% responded to it can reduce cost associated with procurement lead time supply chain, whereas (3) respondents representing (6%) did not respond to the successful implementation. 40 respondents representing 75 % responded to it can reduce time required to source materials but 13 respondents representing 25% did not respond to the success implementation. However, 44 respondents representing 83% responded to it can improve the quality of materials sourced while 9 respondents representing 17% did not respond, 40 respondents representing 75% responded to it can improve the reliability of supply chain but 13 respondent representing 25% chose not to respond to the successful implementation. 40 respondents representing 75% responded to it can increase the efficiency of procurement operations but 13 respondent representing 25% did not respond, 51 respondents amounting to 96% responded to it can improve customer service levels but 2 respondents chose not to respond, 40 respondents representing 75% responded to it can increase the speed of delivery of materials but 13 respondents amounting to 25% did not respond, 41 respondents representing 77% responded to it can reduce inventory levels but 12 respondents representing 23% did not respond, 47 respondents representing 89% responded to it can improve the accuracy of order while 6 respondents amounting to 11% did not respond and 47

respondents representing 89% responded to it can enable business to better compete in global markets while 6 respondents amounting to 11% did not respond.

4.2 DISCUSSION OF RESULTS

Regarding the procurement lead time supply chain concepts, not all of the respondents are aware of the subject matter. The majority of the respondents strongly disagreed with the statement that the procurement lead time supply chain has positive impact on project disruption and that all the respondents agreed that procurement and supply chain matters have a strong correlation with global economy with none of the respondents objecting the statement. The overwhelming number of respondents indicated that lack of access to quality suppliers, unavailability of reliable transportation, unpredictable political and economic condition, language and cultural barriers, difficulty in tracking and managing shipments, lack of skilled personnel and expertise, difficulty in enforcing contracts, limited access to technology and resources, weak infrastructure and communication network are some of the main challenges militating against the implementing and managing an effective procurement supply chain in infrastructure projects. The respondents believed that streamlining procurement lead time supply chain through process re-engineering, investing in the training and capacity building, adopting modern and innovative solutions, incorporating data analytics and artificial intelligence (A-I) and utilizing digital platform and online market places can improve procurement lead time supply chain results. For successful implementation of procurement lead time supply chain, the respondents believed that it can reduce costs associated with the procurement lead time supply chain, reduce the time required to sourced materials, improve the quality of materials sourced, improve the reliability of supply chain, increase the efficiency of procurement operations, improve customer service levels, increase the speed of delivery, reduce inventory levels and improve accuracy of order. To ensure success in procurement lead time supply chain, the respondents stressed the need to maintain good quality control, availability of resources, accurate forecasting, automation, cost efficiency, effective inventory management, strategic partnership, innovative technologies, flexibility and robust supply chain management.

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5.1 RECOMMENDED SOLUTIONS

1. **Risk Management and Resilience Building:** Supply chain disruptions are common in infrastructure projects due to political instability and infrastructure deficiencies. Effective risk management strategies are crucial for maintaining supply chain continuity. This can be achieved through developing a comprehensive risk management plan that includes identifying potential risks, assessing their impact and creating mitigation strategies, building supply chains through diversification of suppliers and establishing contingency plans capable of withstanding supply chain risks can help projects manage disruptions more effectively.
2. **Automation and Artificial Intelligence (A-I):** Automation and A-I can significantly enhance procurement lead time supply chain efficiency by reducing manual processes and providing advanced analytics for inventory management. Implement A-I driven analytics to optimize procurement decisions and improve demand forecasting accuracy.
3. **Policy and Regulatory Frameworks:** Supportive policies and regulatory frameworks are essential for the development of efficient procurement. Government can play a crucial role in creating an enabling environment for projects. Engage with policy makers to advocate for regulations that support efficient supply chain operations. Collaborate with industry associations t influence policy changes that facilitate trade, improve infrastructure and reduce bureaucratic hurdles.
4. **Strategic Sourcing:** Strategic sourcing involves identifying and cultivating relationships with suppliers to ensure quality and cost-effectiveness of operations. This approach is particularly effective in infrastructure projects, where the reliability and quality of suppliers can vary widely. By this, companies should develop long term relationships with reliable suppliers, conducting regular performance assessments to ensure quality and consistency. Establishing clear contracts and communication channels can also mitigate risks associated with supply chain disruptions.
5. **Enhanced Operational Efficiency:** Effective procurement lead time and supply chain are critical for enhancing operational efficiency. Infrastructure projects often face significant challenges due to inadequate infrastructure, regulatory hurdles and supply chain disruptions. However, companies that prioritize efficient procurement can reduce

costs, improve service delivery and enhance overall productivity. To achieve efficiency of operations, stakeholders in procurement should invest in training programs to develop procurement skills among their workforce. Additionally, establishing robust supplier networks and implementing efficient inventory management systems can significantly improve operational efficiency.

5.2 CONCLUSION

This study has explored the multifaceted impact of procurement lead time supply chain disruption on delivery of infrastructure projects. Through a detailed analysis of effective strategies, best practices, technological advancements, future trends and opportunities, it provides a comprehensive roadmap for projects aiming to optimize their supply chain operations in these dynamic environments. By adopting strategic sourcing, lean management and collaborative supply chain practices, infrastructure projects can navigate the unique challenges for lead time supply chain disruptions and capitalize on their potential. Moreover, the role of technology in transforming procurement lead time supply chain disruption cannot be overstated. Automation, A-I, block chain and data analytics offer powerful tools for improving efficiency, transparency and decision- making. The study also exhibits that the Anambra State Ministry of Works grapples with various challenges in their procurement lead time supply chain which significantly impact their delivery. Addressing these challenges by implementing strategies to streamline supplier selection, mitigating supply chain risks and enhance transparency and data driven decision making can lead to improved procurement lead time supply chain practice, resulting in enhanced government performance, cost efficiency and customer satisfaction. In addition, effective procurement lead time have a profound impact on government performance recognizing the critical role of procurement in driving performance outcomes, government can strategically align their procurement strategies, invest in supplier relationship management and leverage technology to gain a competitive advantage in the marketplace. In addition, these findings demonstrate the need to develop a theory based model that incorporates the primary factors required for the successful implementation of procurement lead time to improve government's performance. These findings underscore the importance of addressing procurement lead time as a critical factor in enhancing government performance.

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