

Operational Efficiency of CapEx Procurement: The Impact of Lead Time and Requisition Quantity on Delivery Performance

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Abstract— A large number of lifestyle brands, such as Aarong, Yellow, Cats Eye, etc., are driving the apparel market of Bangladesh. Within this market, a huge number of capex procurements are required annually to meet companies' requirements. Each completed requisition includes a lead time, which is a critical factor impacting overall operational efficiency. This study determines the impact of the metrics, requisition quantity, and lead time on delivery performance. The purpose of the study was to discover the relationship between key variables that ease decision making and to establish the development of a concrete knowledge base intended to support strategies for managing diverse requisition quantity and lead time. Consequently, the study served the purpose of improving supply chain efficiency. To discover the relationship, supply chain and procurement theories were addressed. A total of 8,099 procurement records were analysed through the lens of a positivist research paradigm to ensure objectivity. A quantitative method was employed to conduct tests that generate accurate results supporting the purpose of this study. Predictions for the test were formulated to develop connection between lead time, requisition quantity on delivery performance. Chi-square tests were carried out to find out the connection. Findings revealed that the lead time and requisition quantity had a significant impact on delivery performance. Altogether, the study contributes to procurement and supply chain management literature by presenting evidence-based analysis into how operational factors and distinct item types may affect delivery efficiency.

Keywords— Supply Chain Management, Procurement, Delivery Performance, Requisition Quantity, Lead Time

1. INTRODUCTION

1.1 Background and Problem Statement

In current supply chain management, effective procurement practices are required to achieve optimum company output. CapEx items are crucial in the smooth running of the entire procurement process of most organizations in various industries. Businesses cannot grow and be efficient without these products. Nonetheless, it is highly likely to introduce complexities that may impact delivery performance [15]. The interrelationships among fixed assets and recurring items, and delivery performance have been studied. Their influence on Aarong's procurement is discussed in this paper. The latter can be seen at lifestyle brands in Bangladesh, where purchasing procedures are complicated and consist of numerous steps, including the creation and sending of requisitions, requests for quotation (RFQs), issuing purchase orders, quality control, etc.

Fixed assets are tangible items, including equipment, infrastructure, and technology required to run long-term operations. In comparison, recurring products are the products that are related to everyday necessities, accessories, routine items, services, and so forth. These two types of products make up CapEx products, each influencing a procurement decision, but CapEx items have not been well studied in relation to other reasons, like lead-time and requisition quantity, in the context of Bangladesh.

One of the most important aspects of the procurement process is lead time, or the duration of time between the time of ordering an item and the time of receiving

it or the service. Lead time delays can severely impact the overall performance of the delivery in terms of stockouts, incorrect deadlines, and unhappy customers. In addition, the volume of ordered items (also known as requisition quantity) is also a significant factor that affects procurement cycle time. Big quantity requisitions typically imply a more logistically complicated procedure and may extend lead time and influence delivery performance.

Earlier studies have demonstrated the effects of lead time, and requisition quantity individually on the procurement activities. However, there is little literature on procurement at lifestyle brands of Bangladesh. Meaning, how these variables relate to each other to determine the effects on the results of the delivery. Moreover, the absence of literature in certain areas, including industrial procurement and retail supply chain in relation to Bangladesh, points to the need for a detailed quantitative study, which examines these impacts and relationships.

Thus, this study attempts to address this gap by conducting an in-depth analysis of the relationship between fixed assets and recurring items, lead time, and requisition quantity and their impact on delivery performance in a descriptive and inferential research study. This study conducts statistical modelling and examines the relationship between these variables and their combined effect on the efficiency of procurement and delivery processes. Therefore, the research will provide beneficial data to companies that aim to streamline their procurement processes and shorten delivery times, which will eventually lead to improved business operations and customer satisfaction.

1.2 Objective(s)

This paper encompasses the following objectives:

1. To identify the impact of lead time on delivery performance
2. To construct a statistical analysis to find the effect of lead time and requisition quantity on delivery performance

1.3 Significance

This study is of great practical importance to the lifestyle Procurement. It looks to improve the process supply chain through faster process in procurement and delivery performance. The paper analyzes specifically the impact of lead time, and the impact of requisition quantity and through that, offering how it can then be analyzed to make supply chain process better. The knowledge can also be used to remove any operational problems, like stockouts or missed

deadlines. Which typically arise due to improper management of these variables. So, this chapter develops on existing supply chain literature with data on the relationship between these variables and the goal is provide solution and knowledge to the world that can make better opportunities for other companies.

1.4 Scope of the Study

It is limited to the scope of lifestyle brands only, where procurement cycles are complex, different, sometimes unstructured. Thus, it doesn't lead to other areas or qualitative features of procurement. Besides, as the research is based on 2024 and 2025, the scope remains to these years only.

The study was limited to procurement data from only the capex items. It excludes areas of procurement, which reduces the possibility of obtaining a generalized result for all procurement for a lifestyle brand. Thus, it affects the results by reflecting the delivery performance of capex items only. Due to data access limitations, further data for other items could not be collected. However, future studies can conduct a comprehensive study based on data from procurement of all products and publish more generalized results.

2. LITERATURE REVIEW

How good procurement strategies are for the modern-day supply chain is highly connected to multiple variables. Those include lead time, requisition quantity, and delivery performance. First, this literature review explains the findings of existing reputable sources regarding the effects of these variables. Then, it identifies key gaps, where the root of the research and objective begins.

2.1 Procurement System

Procurement is an important part of supply chains. Basically, it is how an organization gets the required goods and services strategically. The procurement system generally follows requisitioning, sourcing, purchasing, and supplier management, and all of it normally affects cost, delivery performance, and other functions of an organization [7]. Fundamentally, procurement is highly important because their activities are directly related to other departments. When the activities are in coordination, procurement operations are streamlined, it helps with supply chain process getting faster and reduces lead time [7]. Also, it is important for procurement to promote transparency, as it is directly related to money, and it leads to accountability within the whole process and

with transparency, good and healthy strategic relationships with suppliers, which help organizations to achieve their goals [11], [22].

There are a lot of procurement models existing. Including centralized, decentralized, and hybrid approaches. Centralized procurement describes a single department overseeing all procurement activities, which leads to economies of scale and standardization [13]. However, it may not fulfil the needs of individual departments. On the other hand, decentralized procurement means each department manages their own procurements, which may be useful for a company needing flexibility and responsiveness [13]. However, it might be the reason for inefficiencies and inconsistency. The mixed model combines both approaches, which aligns the organizational needs into the system [13].

An effective procurement system means effective negotiation, an appropriate level of cost saving, and waste reduction, directly impacting the bottom line [7]. Also, procurement means the best quality products, services, and reliable suppliers are always there for any company [13]. Additionally, procurement affects timely delivery and delivery performance overall [7]. It can affect risk management too, as good supplier management and diversification within supplier selection can alleviate supply chain disruptions, further strengthening company resilience [22].

Still, many gaps exist. New technologies such as artificial intelligence and blockchain are not yet explored that much in the field of procurement [7]. Moreover, including procurement within sustainability goals, including ethical sourcing, is still an ongoing process [7]. Additionally, managing complex supply chains with risks and cultural considerations is still an area requiring comprehensive research [22]. Finally, procurement performance needs development of standardized metrics to measure the effectiveness of the system [22].

2.2 Lead Time

Lead time is the interval between order time and receiving the delivery, which is highly important in determining how effective a procurement process is [13]. Lesser lead times usually mean an improved procurement performance because they enable a faster supply chain and minimize inventory stock-out risk [7]. Contrastingly, delays in lead time can result in a hampered process within the supply chain, which generally leads to higher costs and missed deadlines.

Previous literature has consistently shown that lead time directly affects delivery performance. For

example, specific research that explored the relationship between lead time and stock availability has found that long lead times lead to inventory management challenges and delays in delivery []. The same authors suggested that reducing lead time can lead to better procurement operations with high efficiency. Another research study further verified that lead time delays lead to procurement cycle time delays, which in turn lead to disruption within the whole supply chain [16].

With these insights, examining the interaction between lead time and delivery performance becomes easier. Therefore, this gap in the literature gives an opportunity for this paper to analyze how lead time impacts delivery performance.

2.3 Requisition Quantity

A requisition is the request by any internal stakeholder of a company to purchase an item or service. Therefore, requisition quantity is basically the quantity of items ordered. But the relationship between requisition quantity and delivery performance is not straightforward. This is because larger requisitions often have more complex requirements. Research by Heizer & Render from 2014 [11] explains that larger requisition sizes can lead to longer lead times because of greater complexity, complex terms, and difficulties in coordination. Then again, large orders can also mean economies of scale, reduced unit costs, and greater delivery efficiency.

A lot of research has been done on the relationship between requisition quantity and how it affects procurement. For instance, in some contexts, larger requisitions lead to better long-term delivery performance even during of economies of scale and available easy transportation. Research tells it is due to increase in the quantity of purchase orders that result in the accumulation of inventory and high inventory management costs, increasing the difficulty of inventory management personnel. [16].

Existing literature provides how requisition quantity affects procurement, but a more comprehensive understanding of how requisition quantity impacts delivery performance is needed.

2.4 Delivery Performance

Delivery performance is important for procurement and supply chain success. The metric is usually analyzed through on time delivery rate, accurate orders, and delivery speed. These terms are necessary to measure for continuous operations and customer satisfaction [4]. For effective delivery performance,

factors like the procurement process, supplier reliability, lead time, and inventory management are significant [9]. Research also supports the statement. For instance, strategic supplier selection, clear communication, and efficient logistics management are key factors that contribute to a comparatively better delivery [20]. Also, the integration of information systems such as ERP has an important role in making the best of delivery performance. The ERP does this with real-time tracking, better processes, time reduction, cost savings, and much more [7].

So, overall, there is a need to explore how lead time and requisition quantity specifically affect delivery performance in Bangladesh lifestyle brand context for better decision-making within procurement [17].

3. CONCEPTUAL FRAMEWORK

The proposed conceptual framework for this study examines the relationships between lead time, requisition quantity, and delivery performance in fixed assets and recurring procurement items. The model has the following variables:

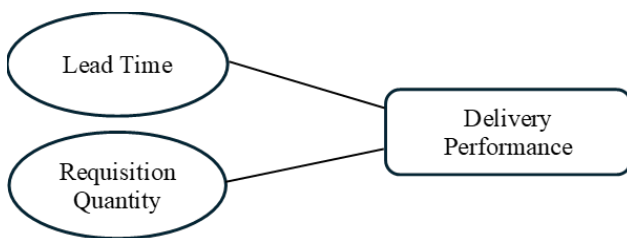


Figure 1. Conceptual Framework

Explanation of figure: The two independent variables are linked directly to delivery performance, while their interactions are hypothesized to impact delivery outcomes.

The framework shows that lead time and requisition quantity might have an impact on delivery performance. Based on the gaps found and the framework, the following hypotheses are proposed:

Hypothesis (H₁): Lead time significantly impacts delivery performance

Hypothesis (H₂): Requisition quantity significantly impacts delivery performance

4. METHODOLOGY

4.1 Research Paradigm

As the research focuses on objectivity, quantity, and hypothesis testing, this research paradigm is

positivism. The reason for that is that positivism allows analysis of the relationship between variables using data and generates findings that may be generalized. With the paradigm followed, this research tests predefined hypotheses based on theoretical models. By which the research determines patterns and relationships. Thus, positivism allows the creation of statistical methods that test the hypotheses and verify existing relationships.

4.2 Research Design

This research is based on a quantitative research design. The quantitative approach follows a reliability, descriptive and inferential analyses of secondary data. It enables the examination of relationships between variables and test the hypotheses. This design ensures objectivity and provides a framework for drawing statistically supported conclusions and inferring patterns from the observed data.

4.2.1 Sample Design

The research implements non-probability sampling approach on procurement records. The population consists of procurement records of lifestyle brands of the years 2024 and 2025.

4.2.2 Sample Size

There was total 9,093 data in the secondary resource. For validity, the minimum required sample size was calculated using Cochran's formula for finite populations [4] with parameters set at a 95% confidence level ($Z = 1.96$), 5% margin of error ($e = 0.05$), and an assumed population proportion of 0.5 to maximize sample size. For the population (total data) of this study, the calculation yielded 369. In this research, however, all the 9,093 procurement records from 2024 and 2025 were analyzed. It far exceeds the statistical requirement and helps in creating a strong reliability, and generalizability of the findings within lifestyle brand's procurement operations.

4.3 Variables

Variable Type	Variable Name	Description
Independent Variables	Lead Time	The time between beginning of an order to receiving the order.
	Requisition Quantity	Quantity of requests to buy product/services.
Dependent Variables	Delivery Performance	This metric measures the performance of delivery. Any positive numbered delivery delay is classified as "On Time". If the delivery delay is negative, then its classified as, "Late".

4.4 Data Collection

The following data was extracted from various organizations' secondary sources, particularly from their ERP system:

- Lead Time
- Requisition Quantity
- Delivery performance metric

The data is of 2024 and 2025. Also, the data will be filtered to exclude any possible irrelevant information (such as missing lead time or requisition quantity values). Which ensures the strength of the dataset. Only the procurement records of CapEx items are considered in the analysis. This process makes sure that the dataset is a representation of the procurement activity relevant to the study. Finally, it ensures the research is free from any potential sources of bias due to incomplete or irrelevant data.

4.5 Data Analysis

Exploratory Data Analysis (EDA) was conducted on all 9,093 data. Consequently, screening/cleaning was done to ensure there were no missing values and data quality was ensured through realistic checking of whether the values represent realistic measurements. Moreover, EDA shows presence of severe skewness/outliers of requisitions quantity and delivery delay. Which provide justification for reliability of this data. Because variability is inherent and expected in procurement activities. The EDA test ensured internal consistency of 8,099 data to progress for further analysis.

Furthermore, the average lead time and requisition quantity metrics for the following product categories were measured and analyzed:

1. Color & Chemical
2. Electrical and Electronics Accessories
3. Fabric
4. Hardware and Repair Maintenance Accessories
5. IT Accessories
6. Office Stationery
7. Packaging Materials
8. Sewing Machine Accessories
9. Trims
10. Uniform Item List
11. Others

The dataset had a total of 8,099 valid observations, representing multiple item categories making up all procurement activities.

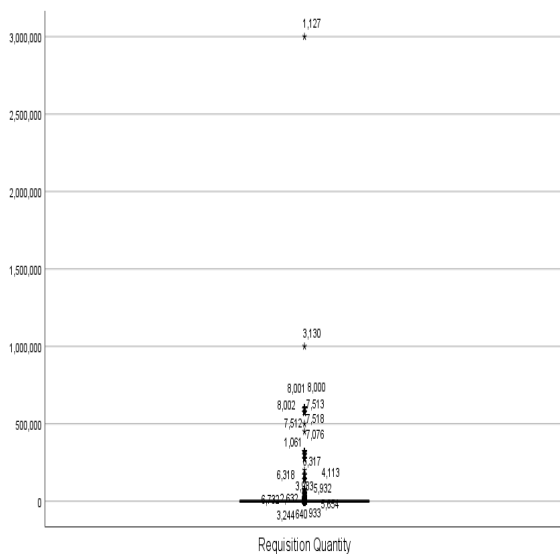
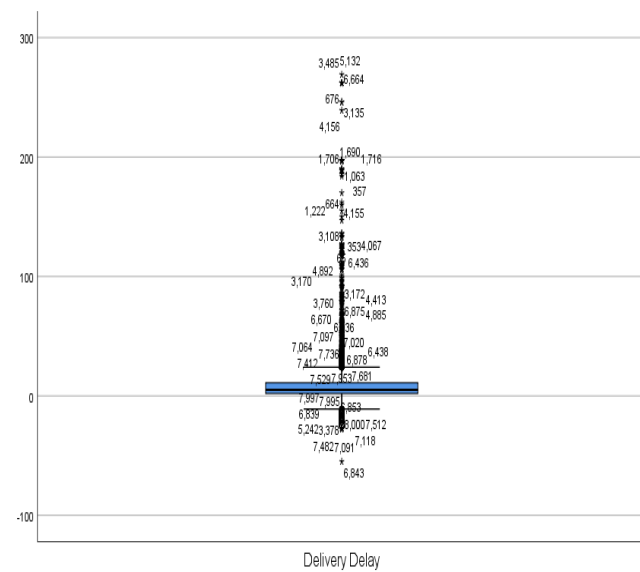
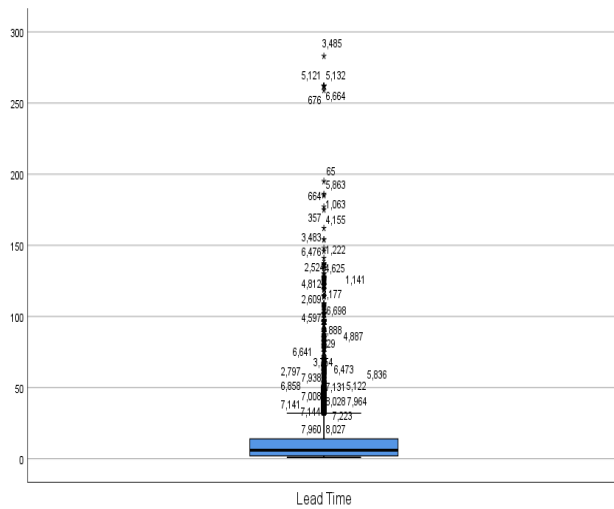
Given that reliability test presented good internal consistency, chi-square tests was examined. This aspect measured the impact of categorized lead time and requisition quantity on delivery performance. The categorization of lead time and requisition quantity into "low" and "high" groups was based on equal percentiles of the values. This analysis used a significance level of $\alpha = .05$. Statistically significant impact which implies that it is not likely due to random chance, a post-hoc analysis would be necessary to understand the specific categories contributing to this impact. The results include the following variables:

Chi Square χ^2 (df, N)	This states the chi-square statistic, which measures the discrepancy between observed and expected frequencies. The df represents the degrees of freedom, and N is the total number of observations for the test.
P value (p)	It indicates the probability of obtaining the observed results if there were no true association between the variables. Value less than the significance level of 0.001 suggests a statistically significant association.
Cramer's V (V)	Indicates effect size for the test as a quantifying strength measure of the significance. The value ranges from 0 to 1, where larger values indicate stronger connection. The analysis is done through IBM SPSS statistics version 25. The tests are reported with p-values with the significance level of 0.05. Meaning, less than 0.05 will mean there is no significant relationship between the variables. Conversely, if the level is more than 0.05, it will mean there is a significant relationship between the variables.

The software used throughout the analysis was IBM SPSS software version 25.

5. FINDINGS AND RESULTS

First, a test was conducted to validate the internal consistency of the Delivery Performance scale. The reliability test was run on a large sample of 8,099 valid cases with 0% missing values. The exploratory data analysis (EDA) verified the quality and logical plausibility of three variables: Lead Time, Requisition Quantity, and Delivery Delay. All these variables are indicators of the effect on delivery performance. The data is considered clean because all lead times were found positive, indicating objectivity, deliveries were received up to 20 days earlier than lead time, and there was no negative requisition quantity. The skewness of requisition quantity and delivery delay is high, showing numerous outliers. However, procurement activities usually denote variability in their operations. As such, this severe skewness is reliable for procurement data and could be analyzed further.



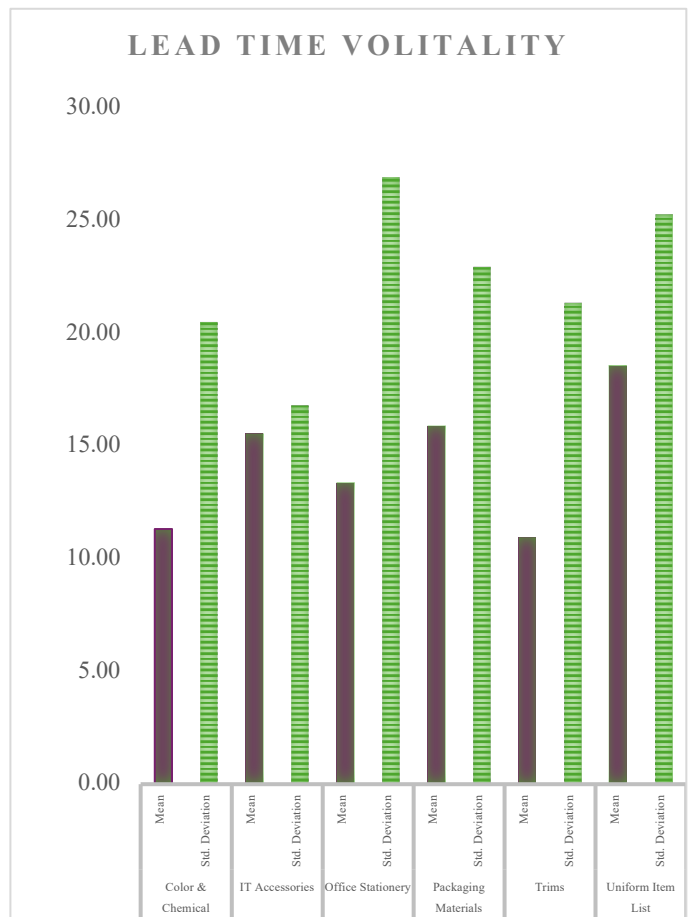
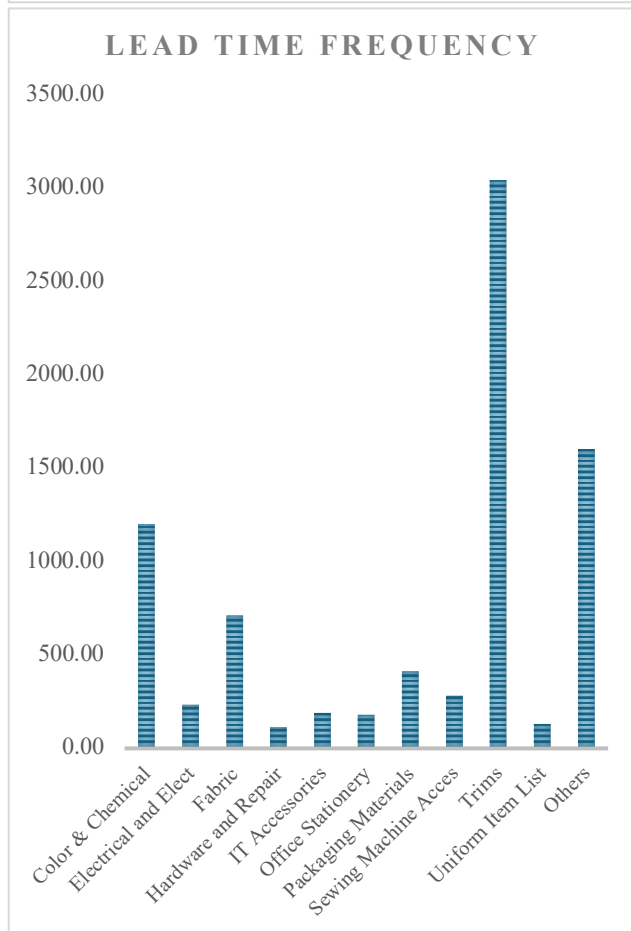
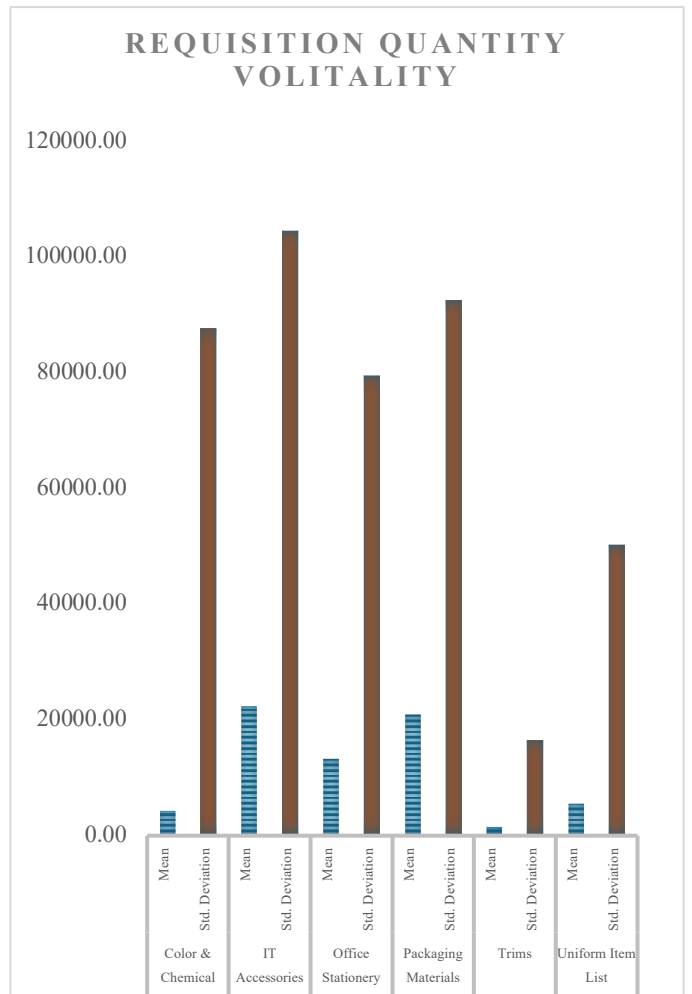
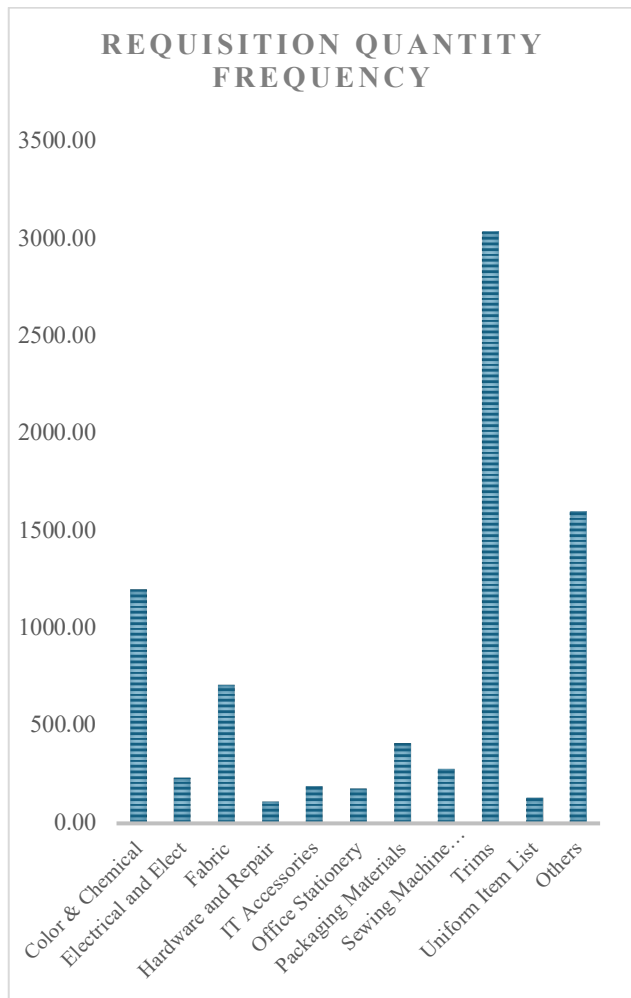
Correlations

		Lead Time	Delivery Delay	Requisition Quantity
Lead Time	Pearson Correlation	1	.797**	.124**
	Sig. (2-tailed)		.000	.000
	N	8099	8099	8099
Delivery Delay	Pearson Correlation	.797**	1	-.029**
	Sig. (2-tailed)	.000		.009
	N	8099	8099	8099
Requisition Quantity	Pearson Correlation	.124**	-.029**	1
	Sig. (2-tailed)	.000	.009	
	N	8099	8099	8099

** . Correlation is significant at the 0.01 level (2-tailed).

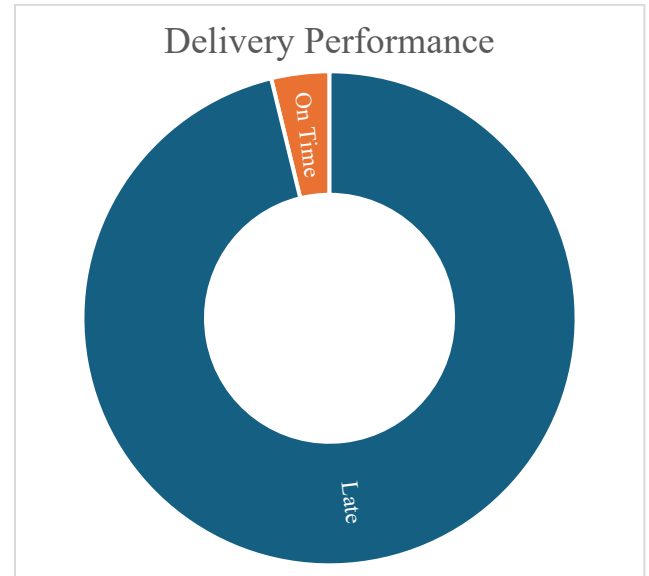
Second, another test was conducted to measure the nature of data based on different categories of the variables. The test yielded that the overall mean Requisition Quantity across all categories was 6,391.50 units with a standard deviation of 59,103.50, which indicates a wide distribution in the quantity of items requisitioned. The average lead time was 12.71 days and the SD was 21.45.

Uniform Items had the longest average lead time followed by packaging materials. Which says the people who wear uniform within the office waits the most after requisition. On the other hand, those who require Trims items, receive their products the fastest with shortest average lead time. Visual representation of the nature of the variables are given below:



Product Details by Category			
Name		Requisition Quantity	Lead Time
Color & Chemical	Mean	4239.83	11.32
	Std. Deviation	87614.30	20.51
	N	1200.00	1200.00
Electrical Equipments	Mean	15103.25	13.73
	Std. Deviation	83354.62	21.30
	N	234.00	234.00
Fabric	Mean	4086.34	11.12
	Std. Deviation	43280.50	21.54
	N	711.00	711.00
Hardware and Repair	Mean	7513.33	14.14
	Std. Deviation	56908.78	20.31
	N	114.00	114.00
IT Accessories	Mean	22273.44	15.57
	Std. Deviation	104425.63	16.81
	N	191.00	191.00
Office Stationery	Mean	13297.27	13.35
	Std. Deviation	79475.16	26.91
	N	179.00	179.00
Packaging Materials	Mean	20849.10	15.90
	Std. Deviation	92449.46	22.93
	N	412.00	412.00
Sewing Machine Acces	Mean	5934.18	13.07
	Std. Deviation	43950.77	21.28
	N	282.00	282.00
Trims	Mean	1469.80	10.94
	Std. Deviation	16418.12	21.34
	N	3040.00	3040.00
Uniform Item List	Mean	5521.23	18.56
	Std. Deviation	50223.30	25.27
	N	133.00	133.00
Others	Mean	10780.21	15.75
	Std. Deviation	66529.93	21.01
	N	1603.00	1603.00
Total	Mean	6391.50	12.71
	Std. Deviation	59103.50	21.45
	N	8099.00	8099.00

Delivery Performance Distribution



As the graph shows, deliveries which failed to meet expected delivery date dominated the pie chart. To be specific, 96.2% deliveries failed to meet expected delivery while 3.8% did get delivered on time. This implies that most deliveries hamper supply chain's efficiency.

Lead Time Effect On Delivery Performance

Chi-Square Results

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	156.815 ^a	3	.000
Likelihood Ratio	151.701	3	.000
Linear-by-Linear Association	79.921	1	.000
N of Valid Cases	8099		

	Value	Approximate Significance
Nominal by Nominal	Phi	.139
	Cramer's V	.139
N of Valid Cases	8099	

Firstly, the p value is less than .001, indicating the result is highly statistically significant. Meaning, the relationship between lead time and delivery performance is extremely unlikely to have occurred by chance. Secondly, the cramer's V value of .139 indicates the significant association between lead time and delivery performance is moderate in strength.

Requisition Quantity Effect On Delivery Performance

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	58.909 ^a	3	.000
Likelihood Ratio	72.097	3	.000
Linear-by-Linear Association	23.332	1	.000
N of Valid Cases	8099		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 31.49.

Requisition Quantity Category

		Low Requisition Quantity	Medium Requisition Quantity	Large Requisition Quantity	Very Large Requisition Quantity
Delivery Performance	Late	1504	1011	821	4455
	On Time	51	13	7	237
Total		1555	1024	828	4692

		Value	Approximate Significance
Nominal by Nominal	Phi	.085	.000
	Cramer's V	.085	.000
N of Valid Cases		8099	

Similarly with requisition quantities, the p value is less than .001, indicating the association between requisition quantity and delivery performance is highly statistically significant. Pearson chi square suggests 58.909, which indicates the distribution of delivery performance across requisition quantity categories differs, supporting the hypothesis. The likelihood ratio of 72.097 confirms the result. 23.332 value of linear association shows that a significant linear trend exists in the association.

Despite of the significant association between requisition quantity and delivery performance, Cramer's v of 0.085, being lower than 0.1 indicates that requisition quantity is a weak predictor of delivery performance. Practically, quantity of late delivery of larger orders are more than double of

quantity of on time larger order. Which suggests, other factors are likely much stronger determinants of delivery performance.

6. CONCLUSION

In summary, the chi square analysis provided evidence to address both research hypotheses. H₁, predicted that lead time significantly impacts delivery performance, and the association was moderate. Conversely, H₂, predicted a significant impact of requisition quantity on delivery performance, and the association was weak. Theoretically, the study calls for the development of more sophisticated supply chain models that explicitly incorporate such variables to account for the dynamic nature of procurement data [18]. Practically, the study proves that a "one-size-fits-all" approach is fundamentally inefficient; instead, management must implement tailored strategies for different item categories, such as lead time optimization for fixed assets and leveraging automation for recurring items, alongside continuous data analytics to detect strategic shifts [1]. Despite providing a credible framework, this research is limited by its focus on only two independent variables and the categorization of continuous data into binary variables, which may overshadow deeper relationships [20]. Therefore, future research is recommended to conduct lengthy longitudinal studies, incorporate a broader set of moderating factors like supplier reliability and product category, and utilize advanced analytical techniques that leverage the original continuous scales to provide a more holistic and detailed understanding of delivery performance dynamics [14].

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