International Research Journal Of Supply Chain and Logistics Management

Vol 8, Issue 1, pp 1-18, May 27, 2026, © International Research Journal Publishers, ISSN 2710-2742 (online) www.irjp.org

Inventory Management Practices and Productivity of Private Universities in Nairobi County, Kenya

[1*]Benson Mwangi Githinji and [2]Dr. Miriam Thogori

[1*]Scholar, Jomo Kenyatta University of Agriculture and Technology, Kenya

[2]Lecturer, Jomo Kenyatta University of Agriculture and Technology, Kenya

Accepted: 25 May 2026

Abstract

For years, inventory management practices have garnered significant attention from researchers, academicians, and practitioners due to poor financial and overall performance resulting from them. This study assessed the influence of inventory management practices on the productivity of selected private universities in Kenya, with a particular focus on those registered and domiciled in Nairobi County. The study evaluated the effects of inventory planning and tracking on the productivity of private universities in Nairobi County, Kenya. The study used Agency Theory and the Theory of Economic Order Quantity. The target population of this study included academic and administrative staff, as well as supply chain management employees. The target population comprised 12 individuals from each of the 10 selected private universities. Using the Yamane formula, a sample size of 92 was achieved. A pilot stage was conducted with 9 participants. Data collected from questionnaires were coded, tabulated, and analyzed using SPSS version 22 and inferential and descriptive statistics. The regression coefficient results showed that the two variables had a positive and significant influence on the institutions' productivity. Inventory planning scored ($\beta = 0.586$, $p < 0.05$), and inventory tracking scored ($\beta = 0.789$, p-value< 0.05). In this regard, it is recommended that institutions should focus on eliminating redundant storage and movement stages and on defining predefined distribution routes from the time the inventory is received to the end user to promote efficiency. The study concluded that inventory management practices directly influence private universities' productivity, suggesting that educational facilities should invest heavily in efficient, effective inventory management systems.

Keywords: *Inventory Management Practices, Inventory Planning, Inventory Tracking, Productivity, Private Universities*

INTRODUCTION

Effective inventory management practices are invaluable to any organization (Atnafu & Balda, 2018). Ufua et al. (2022) refer to inventory management as the art and science of balancing stock levels at a minimum cost in alignment with other targets and organizational objectives, hence serving as a primary function in the system. Inventory management is also the systems or practices that help an organization identify how much and which stock are needed, and when to respond to industry demands and changing trends (Umry & Singgih, 2019).

Like other organizations, educational institutions such as private universities require effective inventory management practices. Inventory practices are paramount because they can

optimize an organization's productivity. As discussed by Rotich and Ndeto (2024), effective inventory management practices improve inter-departmental efficiency within private universities. Since learning facilities have broad assets and supplies distributed in various functional departments like finance, administration, and human resources, inventory management practices facilitate better identification, tracking, and categorization of all resources (Kaewchur et al., 2021).

Most organizations aim to boost productivity and performance with fewer resources while providing quality services or products (Singh et al., 2022). Achuora and Robert (2020) opined that an organization's inventory is one of its most important investments as it embodies various processes, from acquiring raw materials to allocating the final product or services. Organizational productivity can be defined as a summary measure of the effectiveness and efficiency with which available resources or inventory are utilized to achieve desired goals (Leitão, Pereira, & Gonçalves, 2021). Productivity in an organization can be measured by the success of group performance, efficiency, and the effectiveness of set goals. In this study, the dependent variable, productivity, will be assessed through metrics like efficiency, effectiveness, and satisfaction. According to Zuluaga-Ortiz et al. (2022), operational efficiency describes the correlation between an institution's input and output to guide organizations in cutting down unnecessary costs and increasing revenue simultaneously. Kanwal, Rafiq, and Afzal (2023) also describe efficiency as a process to produce high-quality products or services at a low scale or using as few resources as possible. On the other hand, Leitão, Pereira, and Gonçalves (2021) describe effectiveness as the ability of an organization to meet the set goals and objectives, often defined through its growth, market share, and profits. Like other institutions, productivity is imperative in private universities as it fosters the smooth running of administrative and academic operations (Zuluaga-Ortiz et al., 2022). Productivity significantly relies on systems, processes, internal practices, and controls relating to how departments manage their revenue, assets, expenses, contingencies, and liabilities (Kanwal, Rafiq, & Afzal, 2023). Therefore, inventory management practices facilitate better tracking of all resources within a private university, contributing to better operational efficiency, effectiveness, and satisfaction. In this study, productivity marks the dependent variable, and the study will assess how inventory planning and inventory tracking practices directly influence private universities' productivity.

Today, private universities across the globe encounter immense competition in attracting and retaining students. Yet, many private universities still depend on outdated manual inventory management practices, which fall short of real-time insights (Wynn, 2021). For instance, most universities rely on manual processes like spreadsheets to track their inventory, making it nearly impossible to accurately evaluate resources' value, whereabouts, condition, and other crucial data. Given that the data is continually changing and humans are susceptible to making mistakes, these manual inventory management practices have become outdated, resulting in decreased efficiency and poor financial decisions affecting the organization's efficiency (Nzioka & Were, 2017).

Overreliance on conventional inventory management practices not only jeopardizes students' satisfaction but is also detrimental to the organization's utilization and planning of resources. As Kajawo (2019) discussed, ineffective inventory management strategies result in increased operational expenses within an entity due to unplanned and frequent purchases at exorbitant costs without taking advantage of strategic sourcing or other advantageous deals. Moreover, poor inventory management results in increased storage expenses since overstocking prompts the need for additional space, resulting in higher maintenance and facility costs (Kajawo, 2019). Ineffective inventory strategies also lead to poor resource management. Without the right inventory management practices, private universities may overstock supplies, resulting

in increased storage expenses and a waste of resources. On the other hand, Wynn (2021) highlights that poor inventory management results in understocking, causing shortages of crucial resources like office supplies and teaching materials, among others. A lack of accurate visibility and insights into an organization's resources directly affects its effectiveness, satisfaction, and efficiency. Therefore, this study seeks to assess the effects of inventory management practices on the productivity of selected private universities domiciled and registered in Nairobi County, Kenya.

Statement of the problem

The rapid increase in private universities in Kenya has significantly expanded access to higher education, addressing gaps left by public universities in meeting the growing demand for higher education. Nonetheless, this surge in numbers has raised concerns about the sustainability and quality of private universities as they fully depend on tuition fees as their primary source of revenue, making productivity a major concern (Mung'athia, 2018). Due to the increase in numbers, the productivity of most private universities is on the decline, with a scarcity of academic professionals, limited resources, and poor-quality education. For instance, Kenya has around 68 registered public and private higher learning institutions serving over 560,000 students and less than 1,000 professors, translating to an imbalanced ratio of 1 professor to 560 students (KIPPRA, 2024). Additionally, 80% of academic instructors are part-time lecturers in private universities, which denotes overreliance on part-time staff with limited qualifications and responsibilities in institutional development, affecting students' productivity (Commission for University Education, 2023). Since part-time lecturers are not fully integrated into the university system and with little involvement in strategic planning, they may have limited accountability in reporting and maintaining inventory data. Scarcity of resources is also common for many private universities in Kenya, given the increasing student enrollment rate. This has raised the need to evaluate their productivity through the lenses of effectiveness, efficiency, and satisfaction.

According to a recent audit by the Commission for University Education, only 39% of private chartered universities met the recommended staffing ratio between academic professionals and learners (Commission for University Education, 2023). On the other hand, Muchemi (2019) raises concerns about inadequate resources and poor inventory management required to facilitate learning, resulting in low student retention and graduation rates. For instance, the author draws attention to the issue of student retention at Riara University, with a graduation rate below 67%, and St. Lawrence University, with a graduation rate of 47% (Muchemi, 2019). This indicates inefficiency in various operations, resulting in decreased productivity.

The effectiveness of private universities in Kenya has also been challenged by increasing concerns about whether graduates from these institutions possess the right skills necessary in the labor market (KIPPRA, 2022). According to a report by the Kenya Institute for Public Policy Research and Analysis (KIPPRA), 46% of freshly graduated students from private entities take more time to secure a stable job, with employers highlighting gaps in proficiency (KIPPRA, 2022). With these challenges, most private universities' productivity is threatened as they are unable to meet industry demands due to subpar facilities, insufficient resources causing inefficiencies, inadequate inventory reflecting ineffectiveness, and outmoded curricula (Cherotich, 2019).

Even though many studies have explored the causes of poor productivity in the public and private sectors, few studies focus on private universities. This presents a knowledge and contextual gap that this study aims to fill. Additionally, even though there are other studies exploring inventory management practices on the productivity of private universities, a geographical gap persists since the majority explore other regions globally and in other African countries, overlooking Kenya, especially Nairobi County (Frida et al., 2020; Sharma

et al., 2020). Therefore, this study seeks to address the existing studies' geographical, knowledge, and contextual gaps by examining how inventory management practices influence productivity within private universities in Nairobi County, Kenya.

Research Objectives

i. To evaluate the effects of inventory planning on the productivity of private universities in Nairobi County, Kenya.
ii. To assess the effect of inventory tracking on the productivity of private universities in Nairobi County, Kenya.

LITERATURE REVIEW

Theoretical Framework

Agency Theory

Agency theory explains the relationship between a principal and an agent, where the principal delegates decision-making authority to the agent to act on their behalf. The theory emphasizes issues of information asymmetry, goal conflict, and the need for alignment of interests between the two parties (Jensen & Meckling, 2019; Mitnick, 2019). In this study, agency theory is relevant as it underpins inventory planning and inventory tracking in private universities. It explains how differences in objectives between decision-makers and implementers may influence inventory decisions, such as stock levels, procurement timing, and efficiency in resource use. Additionally, agency theory supports the study's focus on productivity outcomes (efficiency, effectiveness, and satisfaction) by emphasizing improved decision-making, reduced waste, and better resource allocation when agents act in the best interest of principals (Jensen & Meckling, 2019; Tekin & Polat, 2020).

Theory of Economic Order Quantity (EOQ)

The Economic Order Quantity (EOQ) model, developed by Ford W. Harris, is an inventory management theory that determines the optimal order quantity that minimizes total inventory costs, including ordering, holding, and shortage costs. It enables organizations to balance demand with supply while reducing unnecessary expenditures (Al-Salamah, 2021; Cárdenas-Barrón et al., 2020). In this study, EOQ theory is relevant to inventory planning in private universities, as it guides decision-making on optimal stock levels by considering ordering costs, holding costs, and demand rates. It helps institutions determine the right quantity of inventory to order, reducing overstocking and stockouts while improving resource allocation and operational planning (Ghosh et al., 2022; Türk, Özcan, & John, 2017).

The theory also supports inventory tracking, as it promotes continuous monitoring of stock levels to ensure replenishment is done at optimal points, reducing waste and improving financial control (Kusrachmansyah et al., 2022). Furthermore, EOQ enhances productivity outcomes (efficiency and effectiveness) by minimizing unnecessary costs, preventing operational delays caused by stock shortages, and ensuring smooth service delivery through optimal inventory levels (Alnahhal et al., 2024; Moradizadeh, 2019).

Conceptual Framework

Varpio et al. (2020) define a conceptual framework as a hypothesized framework that specifies the relationships between independent and dependent variables and the model under evaluation. Below is a figurative representation of the dependent and independent variables to be explored in this study.

Independent Variables **Dependent Variable**

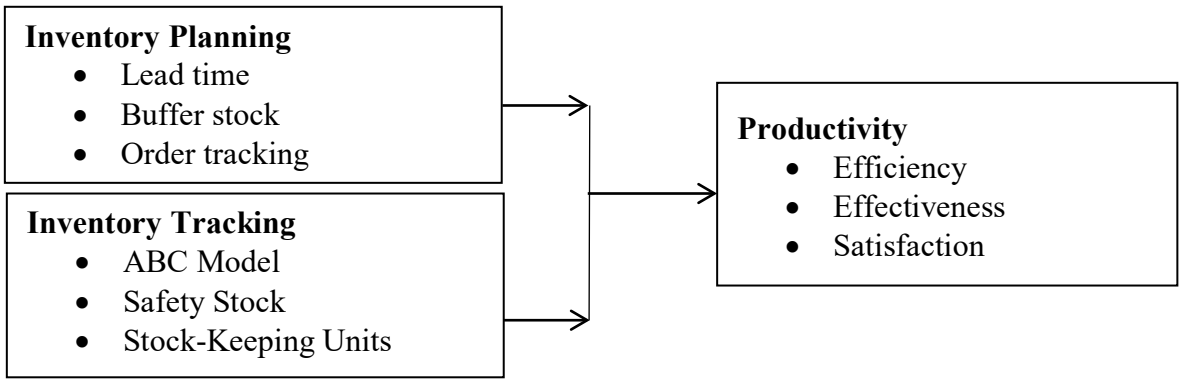

Figure 1: Conceptual Framework

Empirical Literature

Inventory Planning

Muchaendepi et al. (2019) conducted research to evaluate the impacts of inventory planning in the manufacturing companies of Harare, Zimbabwe. The study employed a qualitative research design and purposive sampling method to select a sample size of 244 respondents. Data was obtained through questionnaires and analyzed using the SPSS (version 22) method. According to the findings, organizations employing inventory planning practices as one of the inventory management systems reported better overall performance and optimal efficiency. Nonetheless, the research concluded that organizations face many challenges in inventory planning, including supplier reliability and forecasting issues, suggesting the need for further research in this area.

Lee et al. (2018) also assessed the impacts of inventory planning on the efficiency and productivity of Indonesian hospitality organizations. The research adopted a qualitative method, using interviews and questionnaires to collect data. The study's sample size was 90 organizations in the hospitality sector. The data were then analyzed using both descriptive and inferential statistical methods. The findings denoted a linear relationship between adopting an inventory planning strategy and the multidimensional performance index of Indonesian hospitality sectors, including hotels, motels, and lodgings.

In Kenya, Cherotich and Patrick (2019) conducted research to examine the influence of inventory planning on the performance of fast-moving items in manufacturing companies in Nairobi County. The study employed a descriptive research method examining a target population of 51 manufacturing firms. The study focused on IT and logistics managers of 51 companies, involving 102 respondents. Data was collected through self-administered questionnaires and scheduled interviews, which were later analyzed using descriptive statistics. The findings reverberated the role of inventory planning in reducing operational costs like holding and ordering costs, thus increasing organizational efficiency.

In sum, integrating various inventory planning techniques in inventory control is associated with increased operational efficiency, enhancing productivity (Erkayman, 2019). Numerous studies across different industries and regions have demonstrated a positive relationship between implementing inventory planning and better productivity metrics, including effectiveness, efficiency, and consumer satisfaction. However, the extent of these merits varies depending on factors like industry context or firm size, stressing the need for a tailored approach to inventory planning (Muchaendepi et al., 2019).

Inventory Tracking

Mehdizadeh (2020) examines the impact of the ABC model on the Arian Motor (AM) organization in Iran to increase the service level and reduce the age and value of the inventory of auto spare parts. The study employed a mixed-method research design

integrating qualitative and quantitative techniques to evaluate the impact of ABC analysis on the inventory of auto spare parts within the organizations. A comprehensive analysis was conducted using SPSS software, where descriptive and inferential statistics were applied. The study's findings demonstrate the role of ABC analysis in categorizing the inventory depending on its usage and value via rough set theory to enable the organization to make better financial decisions in resource allocation and when making purchases.

Locally, Achuora and Robert (2020) researched the role of inventory management systems on supermarket performance in Nairobi County, Kenya. The study particularly focused on just-in-time and stock-keeping units in material resource planning to increase the supermarkets' profitability. Achuora and Robert (2020) employed a descriptive research design to examine 113 supermarkets randomly selected from a sample of 158 supermarkets in Nairobi County, Kenya. Using a structured questionnaire, primary data were collected, and the statistical package for social science (version 21.0) was used for data analysis. Based on the findings, the authors concluded that inventory management systems like just-in-time and stock-keeping units improve supermarket performance.

In the real world, organizations aim to place bulk inventory orders in advance to ensure they are available when needed. Demiray Kırmızı et al. (2024) researched how safety stock strategies can enhance the inventory management of a company based in Istanbul, Turkey, named STAR in the manufacturing industry. The study aims to examine STAR's inventory practices through safety stock measures to reduce costs and improve inventory efficiency. The authors used a case study approach to assess the efficiency of various inventory management strategies with a specific focus on safety stock measures. Since the article explores a single case study, specific sample sizes are not indicated; however, various data are derived from the organization's monthly manufacturing plans and inventory records. Using the simulation technique, the data is analyzed to determine and compare the total inventory costs for safety stock strategies. The study's findings revealed that safety stock measures increased operational efficiency, enabling organizations to balance shortages and holding costs, especially during demand variability.

RESEARCH METHODOLOGY

The study adopted a descriptive research design, which was appropriate for examining and explaining the characteristics of the study variables among a selected group without manipulating the study environment. The target population comprised 120 staff members from 10 private universities in Nairobi County, Kenya, including academic, administrative, and supply chain personnel. Given the manageable population size, a census sampling technique was used, ensuring that all 120 respondents were included in the study. However, the sample size was further statistically determined using Yamane's formula, resulting in 92 respondents, although the census approach guided actual coverage to enhance accuracy and reliability.

Data were collected using a structured questionnaire based on a five-point Likert scale, capturing respondents' perceptions on the study variables. Prior to the main data collection, a pilot test involving 10% (9 respondents) of the sample was conducted to refine the instrument and ensure clarity and relevance. The study ensured instrument validity and reliability. Reliability was assessed using Cronbach's alpha, with a threshold of ≥ 0.7 considered acceptable. Validity was established through content validity, confirmed by expert review, and construct validity, tested using Exploratory Factor Analysis (EFA), guided by KMO (>0.5) and Bartlett's test ($p < 0.05$). Data collection was preceded by obtaining approval from the relevant institution and a NACOSTI research permit. Questionnaires were administered personally to enhance response rates and clarify any issues during completion.

Data were analyzed using SPSS version 29, applying both descriptive statistics (mean and standard deviation) and inferential statistics, including multiple regression analysis.

FINDINGS AND DISCUSSIONS

Response Rate

The study's return rate was sought to ensure representation of all respondents from different subgroups, to ensure quality and reliable responses relevant to the study. Out of the 100 distributed questionnaires, 92 were completed and submitted appropriately for the study. This equates to 87.5%, which, according to Waweru and Kimathi (2022), is comparable to an average response rate of 65% for a research study. According to Hendra and Hill (2019), a study with a return rate of above 50% is considered sufficient to collect generalizable data for the study.

Descriptive Analysis

This section presents descriptive analysis, including means, standard deviations, and percentages, for both independent and dependent variables of the study.

Inventory Planning

The study's first objective was to identify the influence of inventory planning on the productivity of private universities in Nairobi County. Participants were asked to respond to the questionnaire on a five-point Likert scale, indicating their level of agreement or disagreement, as shown in Table 1. (SD=Strongly Disagree, D=Disagree, U=Undecided, A=Agree, SA=Strongly Agree)

Table 1: Descriptive Statistics on Inventory Planning

Statement	SD	D	U	A	SA	Mean	Std. Dev.
Inventory planning aligns with the academic calendars and requirements.	5.4%	6.5%	16.3%	26.1%	45.7%	4.00	1.18
Inventory planning has increased the turnover rate of the fundamental inventory in the university	5.4%	8.7%	16.3%	18.5%	51.1%	4.01	1.24
Inventory planning reduces the need for last-minute or emergency purchases.	5.4%	4.3%	19.6%	17.4%	20.7%	4.09	1.18
Implementation of inventory planning has reduced waste and excess inventory.	4.3%	15.2%	17.4%	20.7%	42.4%	3.82	1.26
Inventory planning ensures all departments' needs are prioritized and addressed.	6.5%	8.7%	12.0%	21.7%	51.1%	4.02	1.26

According to Table 2, the majority of the respondents (71.8%) agreed that inventory planning in their respective institutions aligned with the academic requirements and calendars, followed by 16.3% who were undecided. 11.9%, however, disagreed that their inventory planning failed to align with the academic requirements. This item scored a high mean of 4.00 and a standard deviation of 1.18, indicating that most respondents have a positive perception of inventory planning within the institution. However, the high standard deviation of 1.18 indicates that responses varied, suggesting that a number of participants were undecided and disagreed that the inventory systems are aligned with their needs. These differences may be due to institutional planning differences or poor collaboration between academic departments. However, the study reveals that inventory planning is a vital tool for

academic operations, enabling departments to meet academic needs with minimal disruption, aligning with Dickson's (2018) findings.

On the other hand, 69.6% agreed that inventory planning significantly increased the university's inventory turnover rate, whereas 16.3% were unsure. 14.1% of the respondents disagreed that inventory planning increases the turnover rates for fundamental inventory in the institution, recording a high mean of 4.01 and a standard deviation of 1.24. This suggests that the majority of respondents acknowledged the role of inventory planning in enabling faster movement and use of inventory, thereby reducing the risk of obsolescence. The mean also shows a positive perception of inventory planning in driving the stock. Although most participants acknowledged the positive influence of inventory planning on enhancing turnover, the standard deviation indicates variation in responses, suggesting that not all respondents in all institutions benefit equally. These differences may be due to organizational culture, leadership, or weak inventory planning systems. Nonetheless, the study reveals that inventory planning is perceived as a driver of high turnover rates, aligning with Erkayman's (2019) findings.

Additionally, 35.1% of respondents agreed that inventory planning reduced the need for last-minute and emergency purchases. However, 19.6% of the respondents were undecided about the statement, and 9.7% disagreed that inventory planning reduced emergency purchases in their respective institutions. This item recorded a mean of 4.09 and a standard deviation of 1.18, suggesting that most respondents believed that inventory planning reduced unplanned and urgent procurement. The mean score is above the average Likert Scale Score of 3.0, indicating a positive perception of the role of inventory planning in enhancing efficiency and preparedness. The standard deviation of 1.18 also indicates moderate thread differences in responses. The majority of respondents leaned towards agreement; however, there were differences in responses, which indicate that the experiences of inventory planning to minimize urgent procurement vary. According to Ocholla et al. (2024), this could be due to differences in procurement procedures or the level of involvement of the respondents in inventory planning.

Regarding whether inventory planning reduces waste and excess inventory in private universities, 63.1% of the respondents agreed with the statement, whereas 17.4% remained neutral and 19.5% disagreed. Among all the items of this variable, this item scored the lowest mean score of 3.82 and a standard deviation of 1.26, which suggests that participants were moderately in agreement. The standard deviation of 1.26 explains the mean, indicating considerable variability in responses, which implies that although inventory planning minimizes excess inventory or waste, a significant number of respondents were unsure of its impact and effectiveness. These differences in opinions can be attributed to varying levels of awareness or involvement in inventory planning, as well as inconsistencies in implementation across departments. However, the findings correspond with those of Ghosh et al. (2021), which mentions that inventory planning is regarded as a tool to minimize waste and excess inventory as it strengthens inventory transparency and accountability.

Lastly, the majority of the respondents, 72.8% agreed that inventory planning ensures all departments' needs are identified, prioritized, and adequately addressed, whereas 12% were undecided. 15.2% of the respondents disagreed with the statement, recording a high mean and standard deviation of 4.02 and 1.26, respectively. Since the mean value is higher than the midpoint of 3.0, most respondents agreed with the statement, reflecting a positive perception of the influence of inventory planning in addressing departments' needs. This aligns with findings by Frida et al (2020), which emphasize the role of inventory planning in identifying, planning, and prioritizing different inventory needs to ensure all departments are treated uniformly. The standard deviation of 1.26 indicates variability in the responses, suggesting

that although inventory planning is beneficial, its effectiveness varies across workers in different departments.

Inventory Tracking

The study's second objective was to identify the influence of inventory tracking on the productivity of private universities in Nairobi County. Participants were asked to respond to the questionnaire on a five-point Likert scale, indicating their level of agreement or disagreement, as shown in table 2. (SD=Strongly Disagree, D=disagree, U=Undecided, A=Agree, SA=Strongly Agree)

Table 2: Descriptive Statistics on Inventory Tracking

Statement	SD	D	U	A	SA	Mean	Std. Dev.
The university's inventory tracking system provides accurate records of the inventory.	3.3%	9.8%	30.4%	26.1%	30.4%	3.71	1.10
Inventory tracking methods have enhanced the university's ability to align inventory purchases with demand schedules.	2.2%	7.7%	36.3%	26.4%	27.5%	3.69	1.03
Inventory tracking methods have ensured supplies are available when needed.	7.7%	15.4%	28.6%	25.3%	23.1%	3.41	1.22
Adopting inventory tracking has minimized the risk of expired and obsolete inventory.	3.3%	7.6%	28.3%	31.5%	29.3%	3.76	1.06
Stock taking and inventory auditing are conducted regularly.	6.5%	7.6%	26.1%	38%	21.7%	3.61	1.11

The findings in Table 2 show that 56.5% agreed that the university's inventory-tracking systems provided accurate records, followed by 30.4% who were undecided. 13.1% on the other hand, disagreed on the statement, registering a mean of 3.71 and a standard deviation of 1.10. Since the mean score reached the Likert scale threshold of 3.0, it is assumed that the majority of respondents agreed with the statement, even though the standard deviation indicated variation in responses. The differences in responses could be due to variations in inventory-tracking systems across institutions. Nevertheless, the findings aligned with a study by Wambui (2023), which highlights the role of inventory tracking systems, such as just-in-time or ABC model, in enhancing accuracy and transparency in inventory recording.

On the other hand, the majority of the respondents, 53.9% agreed that inventory tracking methods enhanced the ability of the institutions to align inventory purchases according to the demand schedules, whereas 36.3% remained undecided. On the contrary, 9.9% of the respondents disagreed with the statement, scoring a low mean of 3.69 and a standard deviation of 1.03. Despite the low mean score, the majority of the respondents agreed with the statement, even though they varied in opinions. These findings align with a study by Rotich and Ndeto (2024), which highlights the role of inventory tracking systems in real-time monitoring and demand forecasting. According to the study, inventory tracking methods enable institutions to be aware of the stock levels and track their usage trends per academic

semesters, therefore allowing procurement departments to replenish the necessary inventory on time.

Furthermore, 48.4% of the respondents agreed that inventory tracking methods have ensured supplies are always available when needed, whereas 28.6% remained neutral and 23.1% disagreed. The item had a low mean of 3.41 and a standard deviation of 1.22, which shows that the majority of the respondents agreed with the statement, even though they are there was a high difference in opinions. This was probably due to different roles within the institution, whereby most of the staff do not directly use inventory tracking methods. However, the study's findings correspond with that of Saliji (2021), which highlights the role of inventory tracking methods in reducing stockouts and facilitating intended replenishment of academic inventory. According to the author, tracking systems enabled institutions to monitor their stock levels of consumption and reorder inventories before running out.

On the other hand, 60.8% of the participants agreed that adopting inventory tracking reduced the risk of obsolete and expired inventory, whereas 28.3% remained neutral, and 10.9% disagreed with the statement. This item had a mean of 3.76 and a low standard deviation of 1.06, showing that even though the majority of the respondents agreed with the statements, there were minimal differences in opinion. This indicates that many respondents believe that inventory tracking systems minimize the risk of expiration of crucial inventory, which shows the benefits of inventory tracking methods in universities. These results are similar to those of Rono and Musau (2020), which highlight the role of inventory management, tracking systems in recording expiry dates, issuing alerts, and using inventory control methods like first-in, first-out to ensure older stock is used before restocking.

Lastly, the majority of the respondents, 59.7% agreed that stock taking and inventory auditing are conducted regularly in the institutions, whereas 26.1% were undecided, and 14.1% disagreed with the statement. These recorded a mean of 3.61 and a standard deviation of 1.11, suggesting that although the majority of respondents agreed that inventory auditing was done regularly, there is still room for improvement. According to Poi (2018), regular auditing and inventory intake should be conducted to ensure that the physical stock aligns with the recorded data, thereby enhancing transparency, efficiency, and reducing discrepancies.

Productivity

The participants were also asked to respond to the questionnaire based on their level of agreement or disagreement on productivity, using a five-point Likert scale as shown in Table 3 below. (SD=Strongly Disagree, D=disagree, U=Undecided, A=Agree, SA=Strongly Agree)

Table 3: Descriptive Statistics on Productivity

Statement	SD	D	U	A	SA	Mean	Std. Dev
Effective material receiving practices minimize operational delays	6.5%	7.6%	27.2%	34.8%	23.9%	3.62	1.13
The needed resources for my work are readily available when required	6.5%	14.1 %	17.4%	21.7%	40.2%	3.75	1.30
The needed resources for my work are readily available when required	4.3%	8.7%	10.9%	20.7%	55.4%	4.14	1.18
Procurement procedures and acquisition approvals are handled quickly.	6.5%	4.3%	12.0%	19.6%	57.6%	4.17	1.20
The institution uses automated	5.4%	7.6%	14.1%	18.5%	54.3%	4.09	1.22

technologies like barcodes to speed up the receiving and issuing processes							
Access points for stock issuing and service hours are convenient.	6.5%	4.3%	23.9%	28.3%	37%	3.85	1.17
Replenishes essential inventory on time	4.3%	3.3%	31.5%	23.9%	37%	3.86	1.10

According to Table 3 above, 58.7% agreed that effective material receiving practices reduce operational delays, while 27.2% were undecided and 14.1% disagreed. Statements had a mean of 3.62 and a standard deviation of 1.13, indicating a positive perception of material-receiving practices in the institutions. The high standard deviation indicates variation in opinions, which could suggest differences in job descriptions or in experiences with receiving systems and procedures. However, the findings align with those of Kisioya and Moronge (2019), which emphasize the importance of effective material receiving practices, such as inspection, documentation, and timely verification, in enhancing operational efficiency and effectiveness.

61.9% of respondents agreed that the resources needed for their work were readily available when required, whereas 17.4% were neutral and 20.6% disagreed. The item had a low mean of 3.75 and a standard deviation of 1.3, suggesting that the majority believed that the institution's inventory systems are effective, as they were able to acquire the necessary resources, facilitating their work. This suggests that universities should standardize their resource distribution systems to prevent departmental delays or inefficiencies in restocking.

77.2% of the respondents agreed that procurement procedures and acquisition approvals are handled quickly, while 12% remained undecided and 10.8% disagreed. This item had a high mean of 4.17 and a standard deviation of 1.2, indicating that the majority of employees had a positive perception of procurement procedures and acquisition approvals within their respective institutions. According to Kajawo (2019), reliable procurement procedures reduced inventory errors, and well-structured receiving processes fostered efficiency and an uninterrupted inventory supply chain.

On the other hand, 72.8% of the respondents agreed that the institution uses automated technologies to speed up receiving and issuing processes, while 14.1% were undecided and 25% disagreed with the statement. This item had a mean of 4.09 and a standard deviation of 1.22, indicating a general level of agreement among participants across different institutions. In addition, 65.3% agreed that accessing points for stock issuance and the institution's service hours are convenient and reliable, whereas 23.9% were undecided and 10.8% disagreed. This indicates that most universities have reliable inventory management practices that ensure timely stock issuance. The mean score was 3.85, with a standard deviation of 1.17, indicating that the majority concurred with the statement. The results align with those of Kamau and Kagiri (2015), who investigated the role of reliable access points in stock issuance, highlighting reduced operational delays, increased efficiency, and improved service delivery effectiveness.

60.9% agreed that the institutions replenish essential inventory on time, whereas 31.5% were neutral and 7.6% disagreed. This item had a mean of 3.86 and a standard deviation of 1.10. Due to a high number of respondents remaining neutral, this suggests that there were some inconsistencies and uncertainty in how institutions replenished their inventory, indicating a level of dissatisfaction. The study aligns with Jensen and Meckling's (2019) findings, which indicate that organizations with better inventory management practices achieve higher productivity and service outcomes through timely replenishment.

Inferential Analysis Results

Regression Analysis Results

Regression analysis was conducted to analyze the influence of inventory management practices on the productivity of private universities. Table 4 shows the Model Summary results.

Table 4: Model Summary

Model	R	R Square	Adjusted R-Square	Std. Error of the Estimate
1	.867a	0.752	0.741	0.46951

a. Predictors: (Constant), Inventory planning, inventory tracking

According to the Table, the coefficient of determination (R-squared) is 0.752. This suggests that inventory planning and inventory tracking jointly explained 75.2% of the differences in the productivity of private institutions in Nairobi County, Kenya. However, other aspects were not included in the current study, which explains the remaining 24.8% that contribute to the differences in the dependent variable. An R-squared of 30% means that the independent variables in the study explain 30% of the variation in the dependent variables. Statistically, it explain the model and that the predict make meaningful contribution to the variables. Table 5 presents a comprehensive analysis of variance results.

Table 5: ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	35.042	2	17.521	67.388	.000[b]
	Residual	23.14	89	0.26		
	Total	58.182	91			

a. Dependent Variable: Productivity

b. Predictors: (Constant), Inventory planning, inventory tracking

The findings indicate that the model analysis was statistically significant in explaining the influence of inventory planning and inventory tracking on the productivity of private universities domiciled and registered in Nairobi, Kenya. This is seen by the p-value of 0.000, which is less than the significance level of 0.05 ($p = 0.000 < 0.05$). This suggests that the combined influence of all the independent variables on productivity is statistically significant. The F-statistic of 67.388 further confirms that the regression model is suitable for assessing the data.

Table 6: Regression of Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.346	0.255		1.358	0.178
	Inventory planning	0.586	0.061	0.621	9.643	0.000
	Inventory tracking	0.789	0.179	0.770	4.405	0.000

a. Dependent Variable: Productivity

The regression coefficients in Table 6 indicate that inventory planning has a positive and statistically significant influence on productivity in private universities in Nairobi County, Kenya ($\beta = 0.586$, $p < 0.05$). This was further supported by a calculated statistic of 9.643, which is greater than the average T-statistic value of 1.96 in a research study confirming the modern significance. The findings also suggest that a one-unit improvement in inventory planning leads to a 0.586-unit increase in productivity. The findings also suggest that inventory planning has a significant impact on the productivity of private universities based in and registered in Nairobi County. Therefore, the null hypothesis is rejected, stating that inventory planning has no significant influence on the productivity of private universities in Nairobi County, Kenya. These results are consistent with the conclusions by Abe and

Mugobo (2021), who emphasize that inventory planning provides a foundation for identifying inventory needs and creating priorities within departments, thereby improving the overall productivity of institutions.

According to the table, inventory tracking has a positive and statistically significant influence on the productivity of private universities in Nairobi County, Kenya, with a regression coefficient of ($\beta = 0.789$, p-value< 0.05). The coefficient result indicates a strong influence, suggesting that improvements in inventory tracking practices are associated with increased productivity within the institution. This is confirmed by the t-statistic of 4.405, which exceeds the critical value of 1.96, therefore validating the credibility of the findings. According to the coefficient results, a one-unit improvement in inventory striking results in a 0.789-unit increase in productivity within the institutions. This shows the importance of inventory tracking methods in ensuring that resources are allocated effectively and that supplies are replenished on time to prevent shortages and overstocking, as discussed by Aliahmadi (2024). Therefore, this rejects the null hypothesis, which stated that inventory tracking has no significant influence on the productivity of private universities in Nairobi County, Kenya.

DISCUSSION OF FINDINGS

Inventory Planning

According to Achuora and Robert (2020), inventory planning is one of the vital processes for forecasting and estimating demand quantities to avoid overstock or understock and to maintain high customer satisfaction. In this study, among the five items used to measure the implementation of inventory planning practices within the selected private universities, the majority of respondents agreed with the practice and its success. According to the descriptive statistics, most respondents agreed that their respective universities acquired their inventories on time, reducing the need for last-minute purchases, and that the inventories were aligned with their academic requirements. This shows that the selected universities have reliable and effective inventory systems, characterized by strategic planning evident in timely inventory procurement, cost efficiency through avoidance of last-minute purchases, and optimization. As cited by Hassan (2021), an effective inventory management system should encompass operational alignment, cost-efficiency, and accountability, all of which significantly contribute to overall institutional performance. On the other hand, the majority agreed that inventory planning significantly increased the university's inventory turnover rate, reducing the risk of inventory obsolescence. This shows that the institutions are in control of the in-and-out movement of the inventory acquired. According to Frida, Nduku, and Ntabo (2020), a high turnover inventory rate suggests a well-planned system that involves demand forecasting, interdepartmental coordination, and purchase scheduling to align with consumption patterns. This not only improves operational efficiency but also reduces waste and ensures resource availability, thereby improving satisfaction. Lastly, the selected universities also practice inventory planning, which reduces waste and excess inventory. Through inventory planning, private universities, among other institutions, save on ordering, managing, and storing excess stock, thereby lowering associated costs such as labor, security, and warehouse rent, and generating better profit margins.

The regression model indicates that inventory planning has a positive and statistically significant influence on productivity in private universities in Nairobi County, Kenya ($\beta = 0.586$, $p < 0.05$). This means that a one-unit improvement in inventory planning leads to a 0.586-unit increase in productivity. Therefore, the results reject the null hypothesis that inventory planning has no significant influence on the productivity of private universities in Nairobi County, Kenya.

Inventory Tracking

Among the five items set to measure the role of inventory tracking in the selected universities, the respondents agreed with all the statements. They agreed that their respective institutions employed effective inventory-tracking systems and practices that provided accurate inventory records, enhancing their ability to align purchases with demand rates and schedules. According to Goel et al. (2024), the ability to align and track purchases with demand schedules and rates implies a reliable operational system with smooth procurement and inventory management, resulting in better productivity. The respondents also confirmed the positive impacts and changes resulting from reliable, effective inventory tracking practices. They reported that the systems reduced the likelihood of expired or obsolete inventory and ensured that supplies were available when needed, thereby improving stakeholder satisfaction. Notably, the majority of respondents also agreed that their institutions conduct regular, scheduled inventory audits, though there is room for improvement in their efficacy across all departments.

The regression results indicate that inventory tracking has a positive, statistically significant influence on the productivity of private universities in Nairobi County, Kenya, with a regression coefficient of $\beta = 0.789$ (p-value < 0.05). The results suggest that a one-unit improvement in inventory tracking results in a 0.789-unit increase in productivity within the institutions. This emphasizes the significance of implementing effective inventory-tracking methods to ensure resources are allocated efficiently and that supplies are replenished on time. Therefore, this rejects the null hypothesis, which stated that inventory tracking has no significant influence on the productivity of private universities in Nairobi County, Kenya.

Conclusions

The study concludes that inventory planning has a positive and statistically significant influence on the productivity of private universities in Nairobi County, Kenya. Descriptive findings indicate that effective inventory planning enhances alignment with academic needs, reduces emergency purchases, improves inventory turnover, and minimizes waste and excess stock. Regression results further confirm that inventory planning significantly predicts productivity, implying that improvements in planning processes lead to measurable gains in institutional performance.

The study further concludes that inventory tracking has a positive and statistically significant effect on the productivity of private universities in Nairobi County, Kenya. The findings show that effective tracking systems improve accuracy of inventory records, enhance alignment of purchases with demand, reduce obsolescence, and support timely availability of resources. Inferential results confirm this relationship, with inventory tracking significantly influencing productivity, indicating that improved tracking systems substantially enhance institutional performance.

Recommendations

Some universities were unable to avoid last-minute purchases due to late financial disbursements, strikes, supplier delays, and other factors; thus, private universities should develop contingency inventory plans. For instance, diversifying supplier sources, strengthening supplier relationships, and maintaining safety stock levels could improve their resilience to unexpected events without compromising overall productivity. In addition, a few private universities had automated inventory management software and relied on human inventory planning. Although this is also effective, investing in automated software will reduce human errors in planning, enhance inventory visibility across all departments, and improve accuracy.

REFERENCES

Abe, I. I., & Mugobo, V. V. (2021). Low research productivity: Transformation, institutional and leadership concern at a South African university. *Perspectives in Education*.

Achuora, J. O., & Robert, A. (2020). Lean inventory management systems and performance of supermarkets in Nairobi County, Kenya. *European Journal of Business and Management Research*, *5*(2).

Alam, M. K., Thakur, O. A., & Islam, F. T. (2024). Inventory management systems of small and medium enterprises in Bangladesh. *Rajagiri Management Journal*, *18*(1), 8-19.

Aliahmadi, S. (2024). Does CEO power moderate the link between labor productivity and financial performance: Agency theory or stewardship theory. *Asian Journal of Accounting Research*, *9*(1), 47-56.

Alnahhal, M., Aylak, B. L., Al Hazza, M., & Sakhrieh, A. (2024). Economic order quantity: A state-of-the-art in the era of uncertain supply chains. *Sustainability*, *16*(14), 5965.

Al-Salamah, M. (2021). Economic order quantity models for the remanufacturing industry with imperfect process, two-state Markovian, and two types of inventory. *International Journal of Mathematics in Operational Research*, *19*(1), 5-103.

Atnafu, D., & Balda, A. (2018). The impact of inventory management practice on firms' competitiveness and organizational performance: Empirical evidence from micro and small enterprises in Ethiopia. *Cogent Business & Management*, *5*(1), 1503219.

Cárdenas-Barrón, L. E., Shaikh, A. A., Tiwari, S., & Treviño-Garza, G. (2020). An EOQ inventory model with nonlinear stock dependent holding cost, nonlinear stock dependent demand and trade credit. *Computers & Industrial Engineering*, *139*, 105557.

Chan, S. W., Tasmin, R., Aziati, A. N., Rasi, R. Z., Ismail, F. B., & Yaw, L. P. (2017, August). Factors influencing the effectiveness of inventory management in manufacturing SMEs. In *IOP Conference Series: Materials Science and Engineering* (Vol. 226, No. 1, p. 012024). IOP Publishing.

Cherotich, Y. V. O. N. N. E., & PATRICK, N. (2019). Influence of Inventory Management Practices on Performance of Fast-Moving Consumer Goods Manufacturers in Nairobi County, Kenya. *International Journal of Social Sciences Management and Entrepreneurship (IJSSME)*, *3*(2).

Commission for University Education. (2023). *Commission for University Education Statistics*. https://www.cue.or.ke/index.php?option=com_phocadownload&view=category&download=278:universities-data-report-2022-2023&id=90:research-reports&Itemid=187

Demiray Kırmızı, S., Ceylan, Z., & Bulkan, S. (2024). Enhancing Inventory Management through Safety-Stock Strategies—A Case Study. *Systems*, *12*(7), 260.

Dickson, M. M. (2018). *Inventory management practices and operational performance of Kenya animal feeds industry* (Doctoral dissertation, University of Nairobi).

Erkayman, B. (2019). Transition to a JIT production system through ERP implementation: A case from the automotive industry. International Journal of Prod

Frida, A. M., Nduku, E., & Ntabo, J. A. (2020). Financial Factors and Student's Retention in Private Universities in Langata Sub-County, Nairobi County. *African Journal of Emerging Issues*, *2*(12), 1-17.

Ghosh, D., Majumder, P., & Bera, U. K. (2022, April). Economic Order Quantity Model of Deteriorating Items Under Trade Credit Policy: A Game Theoretical Approach. In *2022 IEEE 7th International conference for Convergence in Technology (I2CT)* (pp. 1-6). IEEE.

Goel, L., Nandal, N., Gupta, S., Karanam, M., Prasanna Yeluri, L., Pandey, A. K., … Grabovy, P. (2024). Revealing the dynamics of demand forecasting in supply chain management: a holistic investigation. *Cogent Engineering*, *11*(1). https://doi.org/10.1080/23311916.2024.2368104

Ha, T. T., & Le, P. B. (2021). What are the sources of organizational change capability? The role of transformational leadership and organizational justice. *International Journal of Business Administration*, *12*(2), 76-87.

Han, J. (2020, April). Financial performance evaluation of colleges and universities based on DEA model and balanced scorecard method. In *Journal of Physics: Conference Series* (Vol. 1533, No. 4, p. 042047). IOP Publishing.

Hassan, O. A. (2021). Effect of Inventory Management on Organizational Performance of Food and Beverage Companies in Kwara State, Nigeria (Order No. 28772915). [Master's Thesis, Kwara State University] ProQuest One Academic. (2597871324). https://www.proquest.com/dissertations-theses/effect-inventory-management-on organizational/docview/2597871324/se-2

Hou, Y., Halim, H. A., & Basri, M. F. (2022). Financial Performance Evaluation Using Factor Analysis: A Case of J University. *International Business Education Journal*, *15*(2), 14-28.

Jensen, M. C., & Meckling, W. H. (2019). Theory of the firm: Managerial behavior, agency costs and ownership structure. In *Corporate governance* (pp. 77-132). Gower.

Kaewchur, P., Sritong, C., Sriard, B., & Nima, T. (2021). Role of inventory management on competitive advantage of small and medium companies in Thailand. *Turkish Journal of Computer and Mathematics Education (TURCOMAT)*, *12*(8), 2753-2759.

Kajawo, S. (2019). Examining performance and challenges of private universities in Malawi. *International Journal of Research and Innovation in Social Science (IJRISS)*, *3*(6), 48-58.

Kamau, L. W., & Kagiri, A. W. (2015). Influence of inventory management practices on organizational competitiveness: A case of Safaricom Kenya Ltd. *International Academic Journal of Procurement and Supply Chain Management*, *1*(5), 72-98.

Kanwal, A., Rafiq, S., & Afzal, A. (2023). Impact of Workload on Teachers' Efficiency and Their Student's Academic Achievement at the University Level. *Gomal University Journal of Research*, *39*(2), 131-146.

KIPPRA. (2023). Employment Distribution of Youth Graduates AcrosS Economic Sectors in Kenya. https://kippra.or.ke/

Kisioya, D. K., & Moronge, M. (2019). Influence of Material Handling Practices on Performance of Large Scale Manufacturing Firms in Nairobi County, Kenya. The Strategic Journal of Business & Change Management, 6(4), 745 – 760

Kusrachmansyah, M. I., Seniwati, E., & Sidauruk, A. (2022). Implementation of The Economic Order Quantity Method For Inventory of Goods. *IJISTECH (International Journal of Information System and Technology)*, *6*(1), 101-110.

Lee, A. H., Kang, H. Y., Ye, S. J., & Wu, W. Y. (2018). An integrated approach for sustainable supply chain management with replenishment, transportation, and production decisions. *Sustainability*, *10*(11), 3887.

Leitão, J., Pereira, D., & Gonçalves, Â. (2021). Quality of work life and contribution to productivity: Assessing the moderator effects of burnout syndrome. *International journal of environmental research and public health*, *18*(5), 2425.

Mehdizadeh, M. (2020). Integrating ABC analysis and rough set theory to control the inventories of distributor in the supply chain of auto spare parts. *Computers & Industrial Engineering*, *139*, 105673.

Mitnick, B. M. (2019). Origin of the theory of agency: an account by one of the theory's originators. *Available at SSRN 1020378*.

Moradizadeh, S. (2019). Economic Order Quantity (EOQ) Measurement Using Intelligent Systems Technique (Publication no. 28208831) [Master's thesis, University of Regina]. ProQuest Dissertations and Theses Global.

Mu, H. L., Xu, J., & Chen, S. (2024). The impact of corporate social responsibility types on happiness management: a stakeholder theory perspective. *Management Decision*, *62*(2), 591-613.

Muchaendepi, W., Mbohwa, C., Hamandishe, T., & Kanyepe, J. (2019). Inventory management and performance of SMEs in the manufacturing sector of Harare. *Procedia Manufacturing*, *33*, 454-461.

Musa, A., Gregory, D. M. &Abdullahi, I. (2022). Higher Education in Nigeria: Private Universities' Challenges and Coping Strategies. Asian Research Journal of Current Science 4(1), 279-286

Nzioka, J. M., & Were, S. (2017). Effect of inventory management on performance of the education sector in Kenya. *International Journal of Novel Research in Education and Learning*, *4*(6), 48-59.

Poi, E. L. (2018). Inventory planning and agricultural productivity in Rivers State. *RSU Journal of Strategic and Internet Business*, *3*(2), 280-294.

Ramos-Miller, M., & Pacheco, A. (2023). Towards inventory control excellence: An innovative approach based on a web-based platform. *F1000Research*, *12*.

Rono, N. J., & Musau, E. G. (2020). Effect of Material Handling Practices on Supply Chain Efficiency of Flour Processing Firms in Eldoret. *Journal of Procurement & Supply Chain*, *4*(1), 69-80.

Rotich, V. C., & Ndeto, C. (2024). Warehousing Management Practices and Performance of Distribution Firms in Nairobi City County Kenya. *International Journal of Social Sciences Management and Entrepreneurship (IJSSME)*, *8*(4).

Saliji, M. (2021). Effective inventory management in the automotive industry, a literature study.

Sharma, S., Abouee- Mehrizi, H., & Sartor, G. (2020). Inventory management under storage and order restrictions. Production and Operations Management, 29(1), 101-117. doi:10.1111/poms.13097

Singh, S., Kunder, K., Jain, V., & Sagvekar, V. (2022, December). Inventory Management System for Education Institutions. In *2022 5th International Conference on Advances in Science and Technology (ICAST)* (pp. 206-209). IEEE.

Tekin, H., & Polat, A. Y. (2020). Agency theory: A review in finance. *Anemon Muş Alparslan Üniversitesi Sosyal Bilimler Dergisi*, *8*(4), 1323-1329.

Türk, S., Özcan, E., & John, R. (2017). Multi-objective optimization in inventory planning with supplier selection. *Expert systems with applications*, *78*, 51-63.

Ufua, D. E., Ibidunni, A. S., Papadopoulos, T., Matthew, O. A., Khatoon, R., & Agboola, M. G. (2022). Implementing just-in-time inventory management to address contextual operational issues: a case study of a commercial livestock farm in southern Nigeria. *The TQM Journal*, *34*(6), 1752-1771.

Umry, T. F., & Singgih, M. L. (2019). Inventory management and reorder point (ROP) strategy using ABC analysis methods in textile manufacture. *IPTEK Journal of Proceedings Series*, (5), 1-7.

Varpio, L., Paradis, E., Uijtdehaage, S., & Young, M. (2020). The distinctions between theory, theoretical framework, and conceptual framework. *Academic medicine*, *95*(7), 989-994.

Wynn, S. (2021). The Financial Impact of Manual Inventory Record Errors.
Zuluaga-Ortiz, R., DelaHoz-Dominguez, E., & Camelo-Guarín, A. (2022). Academic efficiency of engineering university degrees and its driving factors. A PLS-DEA approach. *Journal of International Studies (2071-8330)*, *15*(2).