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Original Research Article

Knowledge and practices of adolescent girls attending the Nylon Ndog-Passi III bilingual high school Resettlement area on menstrual hygiene.

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Abstract:
Millions of adolescent girls are unable to meet the need for menstrual hygiene management due to various factors. This study aimed to describe the levels of knowledge and practices of adolescent girls enrolled at the Nylon Ndog-Passi III bilingual high school Resettlement area on menstrual hygiene. This was a cross-sectional study of 268 adolescent girls enrolled at the Nylon Ndog-Passi III bilingual high school Resettlement area from September 2024 to April 2025. Systematic sampling was used. Data were collected using a questionnaire and analyzed using SPSS version 23. The survey revealed that only 12.7% of the 268 students, with a median age of 16 years and an average age at menarche of 12.72 ± 1.11 years, had a good knowledge of menstrual hygiene, although 82.1% used sanitary towels, 66% did not wash their hands when changing and only 9% maintained good hygiene of their intimate part, despite problems with dysmenorrhea (73.1%) and cycle regularity (45.1%) ; 81.3% of participants felt they had good menstrual hygiene. These results underline the need for knowledge-building initiatives to improve menstrual hygiene practices. Less than 20% of adolescent girls had good menstrual hygiene knowledge, including poor menstrual hygiene practice.

Key words : knowledge, practices, schoolgirls, menstrual hygiene.

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INTRODUCTION

According to the World Health Organization (WHO), health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity (Schramme, 2023). For women, menstrual health is an integral part of overall health because, between menarche and menopause, periods and menstruation can have a significant impact on their physical, mental, and social well-being (Critchley and al. 2020). Menstruation is a recurring biological phenomenon that begins in adolescence and occurs in women throughout their reproductive lives (Garg and al. 2022). The average age at menarche generally varies across populations between 12 and 13 years (Kaur and al. 2018). The WHO defines adolescence as the period from 10 to 19 years of age, a risky and resilient transition phase between childhood and adulthood (Kaur and al. 2018; Vijayakumar and al. 2018). Puberty, catalyzed by the release of GnRH, leads to physical changes such as the menstrual cycle, the development of secondary sexual characteristics, and growth (Best and Ban, 2021). Adolescence is a crucial period for women to learn how to manage their menstruation safely and cleanly. However, many adolescent girls lack adequate information and feel uncomfortable discussing the subject due to social taboos. This leads them to perceive menstruation as embarrassing, which can increase their vulnerability to mental, emotional, and physical problems. A better understanding of menstruation is linked to better hygiene practices during this period (Belayneh and Mekuriaw, 2019). In developing countries in Africa and Asia, many adolescent girls face difficulties in managing their menstrual hygiene due to taboos, stigma, and limited access to water, hygiene, and sanitation facilities, as well as modern and safe menstrual management materials (Phillips-howard and al. 2016). In Africa in general and Cameroon in particular, few studies have focused on menstrual hygiene management among school-going adolescents ; this study aimed to describe the levels of knowledge and practices of school-going adolescents at the Nylon Ndog-Passi III bilingual high school Resettlement area on menstrual hygiene.

MATERIALS AND METHODS

This was a cross-sectional study conducted at the Lycée Bilingue de Nylon Ndog-Passi III Zone de Recasement between September 2024 and April 2025. Our study included adolescent girls enrolled and attending the Nylon Ndog-Passi III bilingual high school Resettlement area in Douala for the 2024/2025 school year who had already started menstruating and whose parents had given their informed consent. We used systematic sampling. Data were collected anonymously using a pre-tested and validated questionnaire. They were analyzed using SPSS 23 software. The quantitative variable was presented as a median with interquartile range, and counts and frequencies for the qualitative variables. The KHI2 statistical test was used to test pairwise associations in order to identify determinants and the odds ratio to express dependence. The significance threshold was set at 5%.

RESULTS

The study included 268 adolescent girls, with a median age of 16 years (interquartile range 14 to 17 years). The most common age was 17 years, followed by 15 and 16 years (see Figure 1). The mean age at menarche was 12.72 ± 1.11 years. The majority of participants came from nuclear families (52.99%) (see Figure 2) and most of them were Christian (see Figure 3). Among the respondents, 12.7% demonstrated good knowledge, 49.6% had poor knowledge, and 37.7% had average knowledge. In addition, 45.1% of our respondents said they had a regular menstrual cycle, compared to 54.9% who said they did not. Finally, 73.1% of them suffered from dysmenorrhea. Regarding menstrual hygiene practices, 82.1% of adolescents use sanitary pads. When it comes to hand hygiene during changes, it is concerning to note that 66% of adolescents never wash their hands when changing their menstrual protection. Furthermore, when it comes to hygiene of the intimate area before changing, 91% of adolescents do not clean their intimate area before changing their menstrual protection. Despite the questionable practices observed above, 81.3% of adolescent girls consider themselves to have

good menstrual hygiene in their self-assessment. The bivariate analysis revealed that the main determinants of lack of knowledge about menstrual hygiene were : knowledge of the origin of menstruation (OR=0.009 ; p-value=0.000), hand hygiene when changing pads (OR=2.16 ; p-value=0.034), and description of menstrual hygiene practices (OR=0.24 ; p-value=0.041)

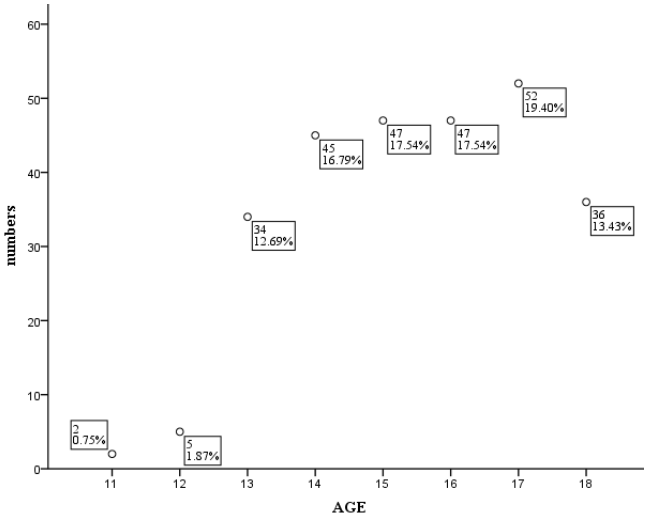

Figure 1: Distribution of female students enrolled at the Nylon Ndog-Passi III bilingual high school Resettlement area by class

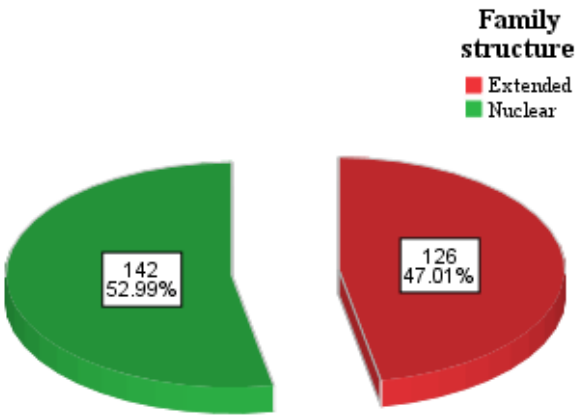

Figure 2: Distribution of adolescent girls enrolled at the Nylon Ndog-Passi III bilingual high school Resettlement area according to family structure

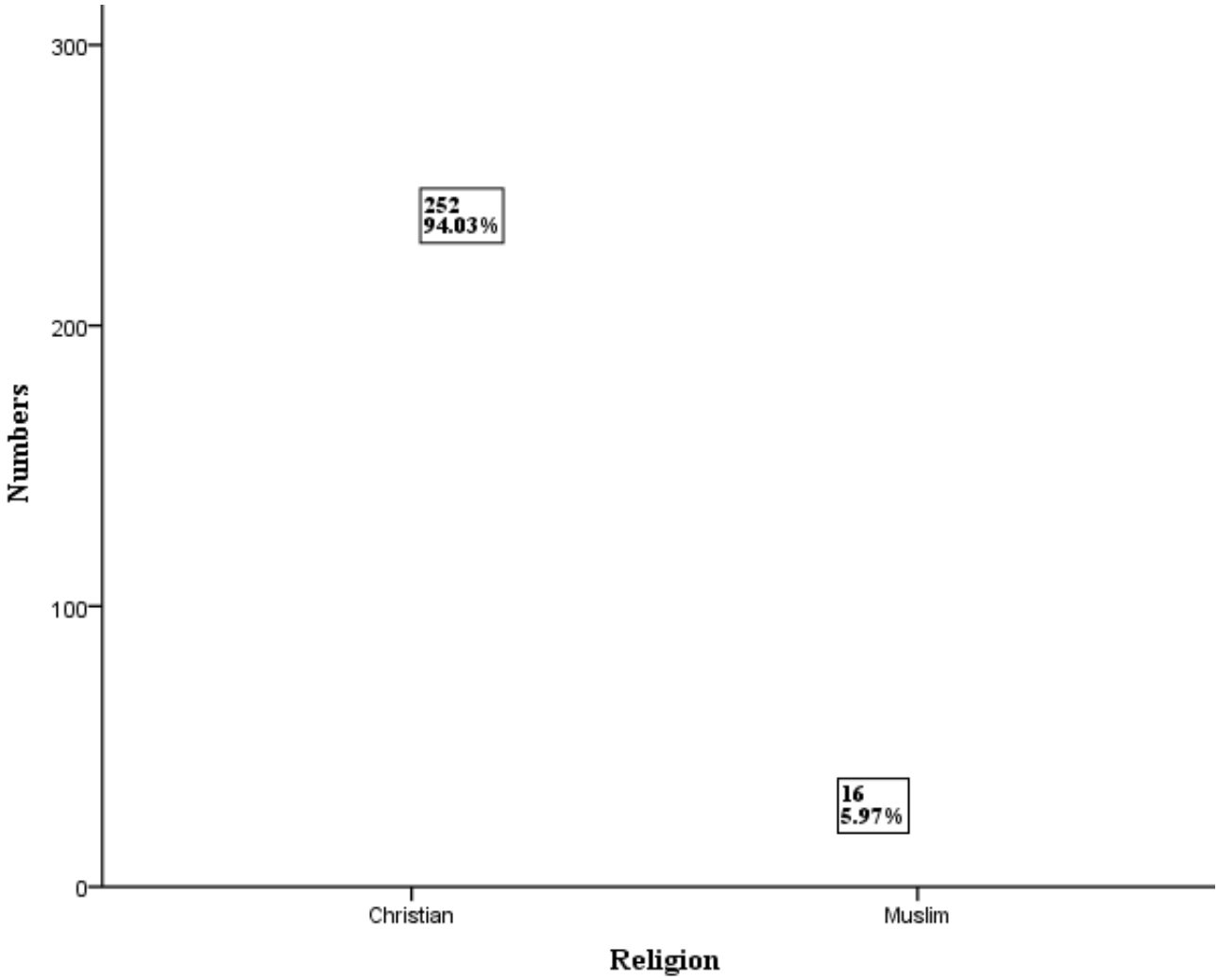

Figure 3: Distribution of respondents by religion

Table 1: Description of the levels of knowledge of adolescent girls enrolled and attending school at the Nylon Ndog-Passi III bilingual high school Resettlement area on menstrual hygiene.

Menstruation	Workforce	Fréquency (%)	95% CI
Knowledge level			
Bad	133	49.6	43.7 – 56.0
Averages	101	37.7	31.7 – 43.6
Good	34	12.7	9.0 – 16.8
	268	**100**	**100 – 100**
Cycle regularity			
Yes	121	45.1	39.2 – 51.1
No	147	54.9	48.9 – 60.8
	268	**100**	**100 – 100**
Dysmenorrhea			
Yes	196	73.1	67.5 – 78.7

No	72	26.9	21.3 – 32.5
	268	**100**	**100 – 100**

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Table 2: Description of menstrual hygiene practices among adolescent girls enrolled and attending school at the Nylon Ndog-Passi III bilingual high school Resettlement area.

Practices	Workforce	Fréquency (%)	95% CI
Type of protection used			
Sanitary towels	220	82.1	77.6 – 86.6
Random fabrics	48	17.9	13.4 – 22.4
	268	**100**	**100 – 100**
Hand hygiene for spare parts			
Never	177	66.0	60.4 – 71.6
Always	91	34.0	28.4 – 39.6
	268	**100**	**100 – 100**
Intimate hygiene before changing			
Yes	24	9.0	5.6 – 12.7
No	244	91.0	87.3 – 94.4
	268	**100**	**100 – 100**
Self-evaluation of menstrual hygiene			
Good	218	81.3	76.5 – 85.8
Wrong	50	18.7	14.2 – 23.5
	268	**100**	**100 – 100**

Table 3: Factors associated with the knowledge of adolescent girls enrolled and attending school at the Nylon Ndog-Passi III bilingual high school Resettlement area on menstrual hygiene.

		Knowledge levels About Menstrual hygiene					
Determinants		**Missing**	**Good**	**Total**	**RC**	**P**	**95% IC**
Origin of menstruation					**0.009**	**0.000**	**0.001 – 0.068**
Uterus	Workforce	54	33	87			
	Frequencies	20.1	12.3	32.5			
Vagina	Workforce	180	1	181			
	Frequencies	67.2	0.4	67.5			
	Workforce	**234**	**34**	**268**			
	Frequencies	**87.3**	**12.7**	**100**			
Hand hygiene when changing towels					**2.16**	**0.034**	**1.04 – 4.47**

Never	Workforce	160	17	177			
	Frequencies	59.7	6.3	66			
Always	Workforce	74	17	91			
	Frequencies	27.6	6.3	34			
	Workforce	**234**	**34**	**268**			
	Frequencies	**87.3**	**12.7**	**100**			
Description of the practice of menstrual hygiene					**0.24**	**0.041**	**0.05 – 1.04**
Good	Workforce	186	32	218			
	Frequencies	69.4	11.9	81.3			
Wrong	Workforce	48	2	50			
	Frequencies	17.9	0.7	18.7			
	Workforce	**234**	**34**	**268**			
	Frequencies	**87.3**	**12.7**	**100**			

DISCUSSION

This series revealed that respondents had a median age of 16 years, with an interquartile range of 14 to 17 years. A similar study conducted in the Chitwan district of Nepal reported a median age of 15 years (Sharma Neupane and al. 2020). This difference could be explained by the larger size of the respondents in the present study. The mean age at menarche was 12.72 ± 1.11 years. Recent studies in Kisangani and rural Patna, Bihar, reported similar mean ages at menarche, 12.8 ± 1.1 years (Ngandru Kiza and al. 2025) and 12.37 ± 0.92 years (Ngandru Kiza and al. 2025; Singh and al. 2023), respectively, suggesting relative consistency in this mean age in similar social and economic contexts.

This study found that 49.6% of adolescent girls had poor knowledge of menstrual hygiene, a figure well below the 68.3% observed in a similar study conducted in southern Ethiopia (Belayneh and Mekuriaw, 2019). This difference could be explained by the size and cultural diversity of the samples, as the Ethiopian study included 791 adolescent girls from several secondary schools in the Gedeo zone, compared to only 268 from a single high school in the city of Douala for the present study. However, only 9% of the participants in this study had good knowledge of menstrual hygiene, a result well below the 26.4% observed in a study conducted in Nepal (Naresh Yadav and al. 2018), probably due to geographical and sociocultural differences between the respondents.

Dysmenorrhea and menstrual cycle regularity affected 73.1% and 45.1% of adolescents, respectively. These results differ from those presented by Deshpande et al. in a similar study, where 40% of adolescents suffered from dysmenorrhea and 82% had a regular menstrual cycle (Deshpande and al. 2018). This disparity could be explained by the fact that the present study included a large number of adolescent girls aged 11 to 18 years.

The protection methods used were as follows: 82.1% of adolescents opted for sanitary pads, while 17.9% used pieces of cloth. Only 34% of adolescents washed their

hands when changing protection, and only 9% took care of their personal hygiene before changing. Despite this, 81.3% of adolescent girls considered themselves to have good menstrual hygiene. These results contrast with those of Deshpande et al., who observed that 60% of girls used sanitary pads, with the rest using pieces of cloth, and that washing of intimate areas during menstruation was generally done during bathing (Deshpande and al. 2018). This discrepancy could be attributed to the socioeconomic context of the participants. Indeed, Deshpande et al. conducted their study in an urban slum. Boakye-Yiadom et al. reported that 31.1% of adolescent girls practiced good menstrual hygiene management (Boakye-Yiadom and al. 2018). This difference could be explained by the sample size, the number of collection sites, and the sociocultural context of the participants.

Teenage girls who are unaware of the origin of menstruation are less likely to lack knowledge about menstrual hygiene than those who are aware. This could be due to the absence of educational classes in schools by teachers, educational talks on health by peer educators and parents. This is corroborated by a recent study conducted in Chitwan, which revealed that before health education, respondents had an extremely low level of knowledge on aspects such as: “Menstruation as a normal and healthy process in women,” “The uterus as the main source of bleeding during the menstrual cycle,” etc. (Khanal and al. 2023). Similarly, a similar study in northeastern Ethiopia revealed that learning about menstruation in school was also associated with good knowledge of menstrual hygiene management (Shikur Shumie Z and Abita Mengie, 2022), suggesting the need to include menstruation in school textbooks.

Adolescent girls who never wash their hands when changing pads are more likely to have gaps in their knowledge of menstrual hygiene than those who do wash their hands. In addition, those who consider themselves to have good menstrual hygiene are less likely to lack knowledge on the subject than those who consider their practice to be inadequate. A recent study conducted in Chitwan found that having attended public schools, not having a close friend, belonging to a caste other than Brahman/Chhetri, and factors such as living in a mixed family were significantly associated with an unsatisfactory level of knowledge about menstrual hygiene management (Khanal and al. 2023). These results suggest the implementation of hygiene programs targeting adolescent girls in schools. In addition to school programs, parents should have discussions with their children to promote hygiene rules in their environment.

CONCLUSION

This study highlights a significant knowledge gap and inappropriate practices in menstrual hygiene. It is crucial to implement education and communication activities on menstrual health in order to change behaviors related to menstrual hygiene and prevent reproductive tract infections, urinary tract infections, and various sexually transmitted diseases.

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Original Research Article

Unlocking How Supplier Management, Customer Management and Level of Information Sharing Drive Success in Cameroon's Pharmaceutical Sector.

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Abstract:
The purpose of this paper is to examine the effect of supplier relationship management, customer relationship management and level of information sharing on the performance of some selected pharmaceuticals companies in Douala. In order to meet the objectives of this research, the study adopted a quantitative method. The primary data was collected from 72 employees by using Likert scale type questioner as measuring instrument for collection of the employees' perception towards the variables. The collected data was analysed using descriptive statistics, correlational and multiple regression analysis. Findings showed that Supplier Relationship Management (SRM) has mean of 4.06, Customer Relationship Management (CRM) has mean of 3.77 while the Level of Information Sharing (LIS) has mean of 3.89 all showing significant positive correlation between the two variables (quality of information sharing and customer relationship management) and organizational performance at ($p<0.01$) and ($p<0.05$) respectively. The other two variables (supplier relationship management and level of information sharing) have no significant correlation with organizational performance. Finally, according to the regression analysis result, only customer relationship management and quality of information sharing has positive and significant influence on organizational performance and so were accepted. This implies that quality of information sharing and customer relationship management must be in the best attention of pharmaceutical organizations to take a proactive role in the management of their supply chain in establishing a strong position over its competitors and achieving its goals.

Key words : Supplier Management, Customer Management, Level of Information Sharing and Performance

To Cite this article :

Tarh. C. F, Sundjo. F, Penyia. E. C. (2025) Unlocking How Supplier Management, Customer Management and Level of Information Sharing Drive Success in Cameroon's Pharmaceutical Sector**.** *IQ Research Journal :* Vol. 004, Issue 003, 09-2025, pp. 009-030

INTRODUCTION

In earlier years, the pharmaceutical industry is one of the most successful industries with various disciplines including research and development, production, sales and marketing (Amegashie-Viglo *et al.*, 2014). Both sales and profits have been increased by continuing the top safety and quality standards in the pharmaceutical industries (Nakov *et al.*, 2014; de Vries and Huijsman, 2011).

In the developed countries like America, health care organizations are making more investments in their supply chain especially in the area of technology. According to a Gartner's (2021) study, 63% of health care organizations indicated that they planned to increase their investment in technology in 2022, and 61% indicated that their new technology investments were a direct response to COVID-19. A 2021 study conducted by Deloitte and the Scottsdale Institute, a not-for-profit health care membership organization, found that digital transformation leaders were most interested in using digital technology to enhance patient satisfaction and engagement, improve quality of care and ensure better patient outcomes (Chuck *et al.*, 2021).

In developing countries, pharmaceutical companies are encountering numerous challenges, including an aging population, rising healthcare costs, government pressure to lower drug prices, barriers to entry in emerging markets, and increased use of generic drugs (Beek et al., 2016). Patients are seeking more personalized care across various touchpoints, while the pharmaceutical industry is experiencing a shift towards niche products and a growing demand for over-the-counter products (Beek et al., 2016). Additionally, the industry is grappling with the proliferation of counterfeit drugs, prompting the need for stronger supply chains to ensure full traceability (Beek et al., 2016). The consumption of pharmaceuticals has significantly increased due to factors such as a growing global population, increased investment in healthcare, advances in research and development, and aging societies in industrialized nations (Beek et al., 2016). This surge in consumption has led to a rapid growth of generics and a more complex product portfolio, particularly in emerging markets (Beek et al., 2016).

In Nigeria, the Ministry of Health (MOH) establishes semi-autonomous entities like the National Level Medical Store (NLMS) to manage medicine supply to health centers, facing challenges such as inadequate forecasting and funding delays (Yadav, 2015). The ongoing insurgencies in northeastern Nigeria further hinder medicine supply, compounded by parallel donor-funded supply chains, leading to inefficiencies (Adamu et al., 2019 ; Kamta et al., 2020). The NLMS encounters distribution challenges due to poor communication, limited technology use, and inadequate infrastructure (Yadav, 2015 ; Enabulele & Enabulele, 2018). Nigeria's health system performance is ranked low, and it struggles to meet Millennium goals (Alonge, 2020 ; Karaye et al., 2022). The impact of terrorism, such as Boko Haram, negatively affects the health and well-being of the population (Karaye et al., 2022 ; Susan et al., 2020). The inefficiency in healthcare supply chains in developing countries, including Nigeria, is a significant concern (Yadav, 2015; Mathur et al., 2018). The COVID-19 outbreak has exacerbated challenges in healthcare supply chain management globally (Lau et al., 2022; Dai et al., 2020). The inadequate regulation and management of health and safety systems in Nigeria contribute to the challenges in healthcare supply chains (Diugwu et al., 2012). The country's poor health outcomes are attributed to inadequate primary healthcare services and high user fees (Alonge, 2020; Olayiwola & Adeyemi, 2022). The USAID observed significant funds wastage in Nigeria's healthcare delivery due to inefficiency (Olayiwola & Adeyemi, 2022). These issues highlight the urgent need for reform and improvement in Nigeria's healthcare supply chain management to ensure adequate and efficient medicine supply to health centers.

The integration of supply chain management (SCM) practices has been shown to significantly impact the performance of pharmaceutical companies. A study conducted in Cameroon

on three pharmaceutical companies namely ; CAMPHARDIS SARL, SIAP PHARMA SARL, and PHARMEZON SARL demonstrated that SCM has enabled these organizations to enhance their competitive performance by integrating internal functions and collaborating with external parties such as suppliers and customers (Rao & Holt, 2005). This integration of the supply chain is crucial for achieving superior and successful supply chain performance, as it links various SCM practices to improve organizational agility and flexibility (Hwihanus et al., 2022). Furthermore, the study emphasizes the importance of integrating organizational internal cross-functional boundaries and external integration of suppliers and customers as essential aspects of SCM practices (Akwalu, 2022). The findings also underscore the significance of green supply chain initiatives in enhancing competitiveness and economic performance, providing further impetus for organizations to integrate sustainable practices into their supply chains (Almasarweh, 2022).

Moreover, the study highlights the role of green supply chain management in improving environmental sustainability performance, particularly in the pharmaceutical industry (Almasarweh, 2022). It suggests that incorporating green supply chain practices into strategic plans can lead to increased environmental performance for pharmaceutical manufacturing organizations. Additionally, the study emphasizes the influence of supply chain management on the competitive advantage and performance of small and medium enterprises (SMEs), further underlining the critical role of SCM in driving organizational success (Hwihanus et al., 2022). The importance of supply chain uncertainty and risk management in the pharmaceutical industry is also evident, as it is crucial to assess and address these factors to ensure the resilience and efficiency of the supply chain (Wang & Jie, 2019; Lücker & Seifert, 2017).

In Cameroon, a study conducted on a group of pharmaceutical companies in Douala namely CAMPHARDIS SARL, SIAP PHARMA SARL and PHARMEZON SARL showed that Supply chain management (SCM) has helped so many organizations especially pharmaceutical companies to integrate on their internal functions and in force them with external parties like suppliers and customers so that they are able to improve their competitive performance. Supply chain integration advantage can succeed when the effectiveness in use of different supply chain practices are link together on integrating the supply chain. Integrating an organizational internal cross functional boundaries and external integration of suppliers and customers are important aspect in SCM practices so that it can be able to gain superior and successful supply chain performance. The importance of supply chain management practices is no doubt and lots of studies have confirmed the importance of organizational supply chain level that will influence on company's agility and flexibility. The main objective of this study is to examine how supply chain management activities affects performance of CAMPHARDIS SARL, SIAP PHARMA and PHARMEZON Pharmaceutical companies in Douala.

Statement of the Problem

The pharmaceutical industry in Cameroon, particularly in Douala, has recognized the critical impact of supply chain management (SCM) on the sustainable competitiveness of their products and services in a highly competitive market. Recent studies have revealed that global pharmaceutical companies in Cameroon experience at least one supply chain interruption annually, leading to decreased profitability and competitiveness. Challenges such as inadequate forecasting, funding delays, long lead times, poor integration, and delays in drug delivery have been identified, which ultimately result in customer dissatisfaction. Additionally, political and economic crises, as well as global health crises like COVID-19, have significantly disrupted the supply chains of pharmaceutical companies in Douala, including CAMPHARDIS SARL, SIAP PHARMA, and PHARMEZON. These disruptions are expected to persist, necessitating the reestablishment of these companies to enhance product quality, reduce waste, and efficiently manage their supply chains. To address these challenges, it is

crucial for pharmaceutical companies to understand and establish a resilient supply chain. This is essential for not only improving their individual performance but also coordinating with supply chain partners to enhance joint performance. Therefore, the study aims to examine the impact of SCM activities on the performance of these pharmaceutical companies and propose best practices to address the identified challenges.

REVIEW OF LITERATURE

Conceptual Review

The concepts reviewed here will be: the concept of supply chain management practices and organizational performance

Concept of Supply Chain Management

Supply chain management (SCM) has gained significant attention from various stakeholders, including academicians, consultants, and business managers from different fields (Golicic & Smith, 2013). The concept of SCM has been approached from different perspectives, such as purchasing and supply management, logistics and transportation, operations management, marketing, organizational theory, and management information systems (Golicic & Smith, 2013). Initially, SCM was introduced in logistics literature in 1982 as an inventory management approach with a focus on the supply of raw materials, and by 1990, it was described from a theoretical standpoint to differentiate it from traditional approaches to material and information flow management (Golicic & Smith, 2013). The development of SCM has been primarily influenced by two bodies of knowledge : purchasing and supply management and transportation and logistics management, which eventually evolved into an integrated SCM encompassing all activities along the entire supply chain (Golicic & Smith, 2013).

The definition of SCM involves the strategic coordination of traditional business functions within a company and across businesses within the supply chain to enhance long-term performance (Golicic & Smith, 2013). It integrates material and service procurement activities, conversion into finished goods, and delivery to customers (Tarigan et al., 2021). The concept has been described as an integrating philosophy for controlling the flow of a distribution channel from a supplier to an end-user (Mukhamedjanova, 2020). Furthermore, SCM encompasses the total flow of materials from suppliers through end-users, including the information flow associated with the physical materials flow (Kim & Chai, 2017). It also involves the rationalization of the supply base and the integration of suppliers into product development and manufacturing activities, as well as the reduction of inventories within and across organizations in the supply chain and the improvement of service levels (Golicic & Smith, 2013).

The evolution of SCM has been influenced by various researchers who have extended its scope to include aspects such as research and development in an inventory context, integration of business operations along the supply chain, and the identification of the need for a new approach within materials management to avoid sub-optimal asset utilization (Golicic & Smith, 2013). Additionally, the concept has been associated with risk management, sustainability, and the development of local suppliers to enhance competitiveness and growth for both firms and local communities (Yang & Ren, 2021; Halili & Fernando, 2019; Neiger et al., 2007). The adoption of SCM has been found to have a positive influence on firm performance, technological innovation, and product performance, while also enabling the strengthening of credit risk management tools and the consideration of sustainability measures in supplier selection (Tarigan et al., 2021; Yang et al., 2015; Amindoust, 2018; Xiao & Xiong, 2023).

In conclusion, SCM has evolved from a focus on inventory management to a comprehensive, integrated approach that encompasses various business functions and extends across the entire supply chain. It has been associated with numerous aspects such as risk management, sustainability, and

performance improvement, making it a critical area of study and practice in modern business operations.

Supply Chain Management Practices

Supply Chain Management (SCM) practices encompass a range of activities aimed at enhancing the efficient management of a company's supply chain, with a significant impact on the performance of supply chain partners. Haque (2013) emphasizes the fundamental role of SCM practices in enhancing firm performance, particularly in the context of globalized business environments. Effective SCM not only benefits the organization itself but also extends to both upstream and downstream partners, allowing firms to realize the potential of integrating external relationships, including suppliers and customers. Krimi and Rafiee (2014) further elaborate on SCM practices, identifying core competencies, inter-organizational systems, and inventory management as key components. Their empirical study identifies supply chain integration, information sharing, customer service management, and just-in-time capability as critical aspects of SCM practices. Additionally, Zhao and Lee (2009) highlight the importance of buyer-supplier relationships, emphasizing factors such as supplier base reduction, long-term relationships, and cross-functional teams in measuring these relationships.

Strategic Supplier Partnership (SSP)

The Strategic Supplier Partnership (SSP) is a long-term relationship between an organization and its suppliers, aimed at leveraging the strategic and operational capabilities of the participating organizations to achieve ongoing benefits (Ibrahim & Hamid, 2012). This partnership emphasizes direct, long-term association, mutual planning, and problem-solving efforts, with the goal of promoting shared benefits and ongoing participation in key strategic areas such as technology, products, and markets. By forming strategic partnerships with suppliers, organizations can effectively collaborate with a select group of suppliers who are willing to share responsibility for the success of the products (Ibrahim & Hamid, 2012).

Customer Relationship (CR)

Customer Relationship (CR) management encompasses various practices for managing customer complaints, building long-term relationships, and enhancing customer satisfaction. It is considered a crucial component of supply chain management (SCM) practices, as committed relationships with customers provide a sustainable advantage due to inherent barriers to competition. The increasing trend of mass customization and personalized service underscores the growing importance of customer relationship management for corporate survival. Strong relationships with supply chain members, including customers, are essential for the successful implementation of SCM programs. Close customer relationships enable organizations to differentiate their products, maintain customer loyalty, and significantly enhance the value provided to customers (Ibrahim & Hamid, 2012).

Level and Quality of Information Sharing

The concept of information sharing in supply chain management (SCM) encompasses two crucial dimensions : quantity and quality. Historically, these dimensions have been treated as independent constructs in SCM studies (Karimi and Rafiee, 2014).

The quantity aspect of information sharing pertains to the extent to which critical and proprietary information is communicated to supply chain partners. This shared information can range from strategic to tactical in nature, encompassing details about logistics activities, market trends, and customer information. It has been suggested that the seamless functioning of a supply chain relies on the availability of undistorted and up-to-date marketing data at every node within the supply chain (Karimi and Rafiee, 2014). Regular exchange of information among supply chain partners enables them to function as a cohesive unit, leading

to a better understanding of end customer needs and a more agile response to market changes. Effective utilization of relevant and timely information by all functional elements within the supply chain is considered a key competitive advantage (Karimi and Rafiee, 2014).

Theoretical Review

The theoretical review section of the study introduces theories related to supply chain management (SCM) practices and organizational performance. The study focuses on adoption theories from various fields such as accounting, management, economics, sociology, and engineering, which have been linked to SCM practices.

The resource-based view (RBV) theory, proposed by Wernerfelt in 1984,

It's a popular theory of competitive advantage that describes how firms can achieve sustainable competitive advantage through the acquisition and control of resources (Chong et al., 2011). RBV emphasizes the strategic value, rarity, inimitability, and non-substitutability of resources for achieving competitive advantage. These resources can be physical, human, or organizational, and tangible or intangible, and their impact on organizational performance is contingent on their integration into sustaining activities and business processes.

The RBV theory is relevant to understanding the link between SCM practices and competitive advantage, as it explains how SCM practices become organizational resources contributing to SCM excellence and improved performance of pharmaceutical companies. Additionally, RBV has received attention in operations management and SCM for proposing that efforts in SCM operations based on sustainability can provide a competitive advantage. Furthermore, RBV has been used to analyze the role of accounting within the context of the supply chain network and its influence on SCM practices.

The knowledge-based view (KBV) of the firm, as proposed by Grant (1996)

It's an extension of the resource-based view (RBV) of the firm. This perspective emphasizes the significance of knowledge resources in analyzing firms (Blome et al., 2013). According to Grant (1996), knowledge is considered the most important strategic resource within the KBV framework. The unique advantage and role of the firm are rooted in its ability to integrate the knowledge of individuals into the production process of goods and services (Grant, 1996).

The development of the KBV theory has been influenced by various dimensions, as described by Grant (1997). Firstly, organizational learning is highlighted as a key aspect, where learning processes create new knowledge and form the basis for organizational growth through the recombination of existing resources (Eisenhardt and Santos, 2001). Secondly, evolutionary economics is emphasized, with the KBV promoting the sharing of knowledge as the primary competitive advantage in the modern economy (Lavassani and Movahedi, 2010). Thirdly, organizational capabilities and competencies are considered crucial, with knowledge-based capabilities recognized as strategically important for creating and sustaining competitive advantage (Curado, 2006). Lastly, innovation and new product development are emphasized, with the application of competitive knowledge and skills being essential for efficient and effective innovation (Bosch-Sijtsema and Postmab, 2004).

In recent years, the KBV of firms has garnered increasing attention, particularly due to the high value placed on intangible assets, especially knowledge, in the global economy (Bosch-Sijtsema and Postmab, 2004 ; Curado, 2006). This recognition of knowledge as a fundamental economic driver forms the basis for creating and sustaining competitive advantage within firms. Furthermore, the manipulation of information and symbols, rather than physical products, has become the basis for economic changes, particularly in the shift from manufacturing to

services in developed economies (Bosch-Sijtsema and Postmab, 2004 ; Curado, 2006).

In conclusion, the knowledge-based view of the firm offers valuable insights into the strategic significance of knowledge resources and their impact on organizational capabilities, innovation, and supply chain management. Embracing this theory can empower pharmaceutical companies such as CAMPHARDIS SARL, SIAP PHARMA SARL, and PHARMEZON SARL in Douala to adapt to evolving business needs and enhance customer satisfaction through innovative methods and employee empowerment.

Empirical Review

The empirical literature review section of the study aims to demonstrate various studies conducted globally related to the subject of interest and specific objectives. The relationship between supplier relationship management practice and organizational performance is a critical aspect of supply chain management. Strategic supplier relationships emphasize long-term association, mutual planning, and problem-solving efforts, promoting shared benefits among the parties (Qrunfleh & Tarafdar, 2013). Notably, not all suppliers can be considered strategic, and the strategic supplier relationship is characterized by long-term association and leveraging the strategic and operational capabilities of individual participating organizations (Koufteros et al., 2012). The benefits of strategic supplier partnerships include more efficient work, cost-effective design alternatives, and the elimination of wasteful time and effort (Kim, 2008). Furthermore, the strategic partnership with suppliers is not only applicable to local suppliers but also to international suppliers, impacting the entire supply chain performance (Espino-Rodríguez & Ramírez-Fierro, 2018).

Similarly, the relationship between customer relationship management practice and organizational performance is crucial in supply chain management. Customer relationship practices involve evaluating customer complaints, enhancing customer support, and predicting key factors affecting customer relationships (Baah et al., 2021). Good customer relationships enable organizations to differentiate themselves from rivals, retain customer loyalty, and ultimately improve organizational performance (Ibrahim et al., 2023). Additionally, information sharing among supply chain partners is related to the degree of critical and proprietary information shared, enabling quicker responses to market changes and reducing uncertainties in the market (Nenavani & Jain, 2021). Information sharing also contributes to smoother operational processes and greater organizational performance (Kwateng et al., 2021) finally, the synthesis of these references highlights the significance of strategic supplier partnerships, customer relationship management, and information sharing in supply chain management practices. These practices play a crucial role in enhancing organizational performance and competitiveness, emphasizing the importance of long-term associations, mutual planning, and problem-solving efforts among supply chain partners.

Research gaps

The identification of research gaps in the field of supply chain management is crucial for the effective management of organizations. While various studies have focused on different aspects of supply chain management, there is a lack of consensus on the impact of supply chain practices on organizational performance. Some studies have concentrated solely on either the upper tier (suppliers) or the lower level (customers) of the supply chain, while others have examined both, using varied variables for supply chain practices. This absence of agreement on supply chain practice variables and their effects on organizational performance highlights the need for further research in this area (Maaz & Ahmad, 2022 ; Green et al., 2008 ; Longoni & Cagliano, 2018 ; Chinomona & Mahlatsi, 2020; Parast, 2013).

The literature suggests that supply chain management practices have a significant impact on organizational

performance. For instance, a study in the dairy industry found that supply chain performance positively influences organizational performance, with customer satisfaction mediating this relationship (Maaz & Ahmad, 2022). Additionally, green supply chain management practices have been shown to improve supply chain performance, particularly in the context of environmental sustainability (Green et al., 2019; Longoni & Cagliano, 2018; Chinomona & Mahlatsi, 2020). Furthermore, the relationship between logistics performance and organizational performance within a supply chain context has been highlighted, emphasizing the importance of improving logistics processes for overall supply chain performance (Green et al., 2008).

Moreover, the role of organizational culture, corporate entrepreneurship, and knowledge sharing in influencing supply chain management and business performance has been explored, indicating the complex interplay of various factors in determining organizational success (Nguyen et al., 2020 ; Hejazi, 2021 ; Porter, 2019). Additionally, the importance of supply chain quality management and its impact on buyer-supplier performance outcomes has been emphasized, highlighting the significance of quality management in enhancing inter-organizational learning processes (Parast, 2013).

In conclusion, the existing literature underscores the need for further research to understand the intricate relationship between supply chain management practices and organizational performance. By addressing the gaps in current knowledge, future studies can contribute to the development of effective strategies for enhancing supply chain performance and overall organizational success.

METHODOLOGY

Introduction

The research methodology consisted of three distinct phases : data collection, data analysis, and data presentation, all of which were designed to fulfill the research objectives and hypotheses. These phases encompassed a comprehensive set of research techniques that formed a systematic approach to problem-solving. The study aimed to evaluate the impact of supply chain management practices on the organizational performance of pharmaceutical companies in Douala, Cameroon. The data collection process involved gathering information from various sources, and the subsequent analysis was conducted to achieve the research objectives.

The paragraph discusses the sample size and sampling techniques used in a research study conducted in pharmaceutical companies. The researcher selected 72 staff members from the total employee population of over 110 using purposive sampling. The Taro Yamane formula was employed to determine the sample size, resulting in a sample size of 72. Additionally, the researcher utilized a combination of purposive and simple random sampling techniques to select the target population and then the actual sample from that population.

Sample Size

The sample size in a research study is a critical aspect that determines the representativeness and generalizability of the findings to the larger population. In this study, the researcher selected a sample size of 72 from a population of over 110 employees in the pharmaceutical companies. The Taro Yamane formula, as described by Yamane (1967), was used to calculate the sample size, taking into account the population size (N), the acceptance sample error (e), and the desired confidence level. The formula used in this study is represented as :

\ n = \frac{N}{1 + N(e)^2} \

Where :
- n = sample size
- N = population size
- e = acceptance sample error

In this case, with a population size of 110 and an acceptance sample error of 0.5721, the calculated sample size using the Taro Yamane formula was 72.

Sampling Technique

The sampling technique employed in the study was a combination of purposive and simple random sampling. Purposive sampling, also known as deliberate or judgmental sampling, is a non-probability sampling technique where the researcher selects specific individuals based on the purpose of the study. In this case, the researcher used purposive sampling to select the target population of 72 staff members from the pharmaceutical companies. Subsequently, simple random sampling, a probability sampling technique where each member of the population has an equal chance of being selected, was used to choose the actual sample from the target population.

The combination of purposive and simple random sampling techniques was employed to increase the convenience of the study and ensure that the selected sample represents the target population effectively.

Data Collection

The research work utilized both primary and secondary sources for data collection.

The primary data was gathered through structured questionnaires and interviews. The structured questionnaires were administered to individuals, including inhabitants and relevant authorities. The Likert scale, a widely used rating scale, was employed in the questionnaires to gauge the degree of agreement or disagreement with a series of statements or questions. This type of questionnaire was chosen due to its ease of administration to groups, cost-effectiveness, and time efficiency compared to other measuring instruments.

Additionally, the questionnaire included inquiries about the educational background, employee level, and experience of the population at their current position. To ensure the completeness of the questionnaires, the researchers conducted a thorough review of the literature and previous research in the area of study. The questionnaires were validated through pre-pilot and pilot surveys to test their reliability and validity in the current survey situations.

Table 3.1 Number of questionnaires administered

S/N	**Stakeholders**	**Number of Questions**	**Percentages**
1	Supply chain practitioners	10	13.8%
2	Supervisor	04	5.55%
3	Pharmacist	09	12.5%
4	Delivery agents	11	15.3%
5	Commercial agents	19	26.4
6	Stock keepers	08	11.1%
8	Accountants	06	8.3%
09	Sales managers	05	7%
		72	**100**

Source : Field work (2023)

The method of personal interview was employed in this study to gather detailed information from staff and clients in the field. The researcher conducted face-to-face interviews with staff from three pharmaceutical companies, with each session lasting approximately 10 minutes. An interview guide, informed by the literature review and research questions, was utilized to structure the discussions and focus on how supply chain management practices impact organizational performance. Additionally, telephone interviews were conducted with some clients, often during impromptu discussions. The interviews were documented in writing, with key points noted down. Prior notification was given to staff before the interviews, while interviews with clients were often spontaneous and occurred during conversations.

The face-to-face interviews with staff were arranged based on their availability, and the interviews were conducted following the predetermined interview guide. In total, 14 staff members from the selected pharmaceutical companies were interviewed to assess the operational and competitive performance of these companies.

PRESENTATION OF FINDINGS

Introduction

This chapter consists of presentation of research findings gathered through structured questionnaires which were presented using descriptive statistics. After that correlation and multiple linear regression analysis of the questionnaire were presented using inferential statistics.

Supplier Relationship Management (SRM)

Supplier relationship management is the process of evaluating suppliers and identifying which relationships are essential to effectively and efficiently do business. As the relationship between CAMPHARDIS SARL, SIAP PHARMA and PHARMEZON pharmaceutical companies in

Douala and their suppliers is complex, the more the supply chain grows. Though as with any relationship both parties strive to build value and profitability (table 4.1).

Table 4.1: Supplier Relationship Management and organizational performance of pharmaceutical companies in Douala

Description	SA	A	N	D	SD	mean	S.D
1. We consider quality as our number one criterion in selecting suppliers	0(0%)	0(0%)	3(4.2%)	31(43.1%)	38(52.8%)	4.49	0.581
2. We regularly solve problems jointly with our suppliers	0(0%)	0(05)	9(12.5%)	38(52.8%)	25(34.7%)	4.22	0.655
3. We have helped our suppliers to improve their product quality	0(0%)	0(0%)	18(25.0%)	33(45.8%)	21(29.2%)	4.04	0.740
4. We include our key suppliers in our planning and goal-setting activities	0(0%)	1(1.4%)	20(27.8%)	33(45.8%)	18(25.0%)	3.94	0.767
5. We actively involve our key suppliers in new product development process	0(0%)	1(1.4%)	10(13.9%)	37(51.4%)	24(33.3%)	4.17	0.712

Source : Field work (2023)

The results from the survey on supplier relationship management, as presented in Table 4.1, indicate the responses to various questions. The first question, "whether the company considers quality as our number one criterion in selecting suppliers," elicited a majority (52.8%) strongly agreeing, with 43.1% agreeing and 4.2% being neutral. The mean for this question is 4.9, with a standard deviation of 0.581.

In response to the question "whether the company regularly solves problems jointly with their suppliers," the majority (52.8%) agreed, with 34.7% strongly agreeing and 12.5% being neutral. The mean for this question is 4.2, with a standard deviation of 0.655.

Regarding the question "whether the company has helped the suppliers to improve their product quality," the majority (45.8%) agreed, 29.2% strongly agreed, and 25% were neutral. The mean for this question is 4.04, with a standard deviation of 0.740.

In relation to "whether the company includes its key suppliers in its planning and goal setting activities," the majority (45.8%) agreed, 25% strongly agreed, 27.8% were neutral, and 1.4% disagreed. The mean for this question is 3.94, with a standard deviation of 0.767.

For the question "Our company has formal performance goals for supplier relationship management (SRM)," the majority (45.8%) agreed, 22.2% strongly agreed, 27.8% were neutral, and 4.2% disagreed. The mean for this question is 3.86, with a standard deviation of 0.810.

Finally, in response to "We actively involve our key suppliers in the new product development process," the majority (51.4%) agreed, 33.3% strongly agreed, 13.9% were neutral, and 1.4% disagreed. The mean for this question is 4.17, with a standard deviation of 0.712.

These results provide valuable insights into the company's approach to supplier relationship management and highlight areas of strength as well as potential areas for improvement. The means and standard deviations offer a quantitative

understanding of the level of agreement and variability in responses across the surveyed population.

Customer Relationship Management

The buyer's journey has evolved through the years and running a business today has become more complex than ever. Business owners and sales people (CAMPHARDIS SARL, SIAP PHARMA and PHARMEZON pharmaceutical companies in Douala) must keep in touch with their customers, follow up with prospects, identify up selling and cross selling opportunities, and initiate customer retention programs while ensuring that the company revenue continues to increase as seen on table 4.2.

Table 4.2: Customer Relationship Management and organizational performance of pharmaceutical companies in Douala

Statement	SA	A	N	D	SD	Mean	S.D
1. We frequently interact with customers to set reliability. responsiveness, and other standards for us	1(1.39%)	2(2.78%)	18(25.0%)	33(45.83%)	18(25.00%)	3.90	0.858
2. We frequently measure and evaluate customers' satisfaction	2(2.78%)	3(4.17%)	23(31.95%)	34(47.22%)	10(13.89%)	3.65	0.875
3. We frequently determine future customers' expectations	3(4.17%)	4(5.56%)	13(18.06%)	37(51.39%)	15(20.83%)	3.79	0.978
4. We facilitate customers' ability to seek assistance from us	2(2.78%)	3(4.17%)	29(40.28%)	26(36.11%)	12(16.67%)	3.59	0.914
5. We periodically evaluate the importance of our relationship with our customers	0(0%)	2(2.78%)	23(31.95%)	27(37.5%)	20(27.78%)	3.90	0.842
Overall						3.77	0.62

Source : Fieldwork, (2023)

The paragraph provided describes the use of a Customer Relationship Management (CRM) measure to assess the extent to which an organization has developed a business process for managing relationships with its customers. The measure consists of 5 items, which were assessed using a 5-point Likert-type response scale. The reported Cronbach's alpha for this measure was 0.754, indicating a good level of internal consistency. The overall mean score for the CRM measure was 3.77, with a standard deviation of 0.62, suggesting that the majority of the population agreed with the items related to CRM.

Furthermore, the responses to the individual items of the CRM measure are detailed. For the first item, "We frequently interact with customers to set reliability, responsiveness, and other standards for us," 51.39% of the population agreed, 20.83% strongly agreed, 18.06% were neutral, 5.56% disagreed, and 4.17% strongly disagreed. The mean score for this item was 3.79, with a standard deviation of 0.978.
Regarding the second item, "We frequently measure and evaluate customer satisfaction," 40.28% of the population were neutral, 36.11% agreed, 16.67% strongly agreed, 4.17% disagreed, and 2.78% strongly disagreed. The mean score for this item was 3.59, with a standard deviation of 0.914.

For the third item, "We frequently determine future customer expectations," 37.5% of the population agreed, 31.95% were neutral, 27.78% strongly agreed, and 2.78% disagreed. The mean score for this item was 3.90, with a standard deviation of 0.842.

Regarding the fourth item, "We facilitate customers' ability to seek assistance from us," 55.56% of the population agreed, 19.44% were neutral, 18.06% strongly agreed, 5.56% disagreed, and 1.39% strongly disagreed. The mean score for this item was 3.83, with a standard deviation of 0.839.
Finally, for the fifth item, "We periodically evaluate the importance of our relationship with our customers," 45.8% of the population agreed, 27.8% were neutral, and 22.2% strongly agreed.

These findings provide a comprehensive overview of the responses to the CRM measure items, indicating the level of agreement and disagreement within the population. The mean scores and standard deviations offer insights into the central tendency and variability of responses for each item.

Level of Information Sharing

Sharing of information among supply chain partners has therefore become the essential next step in supply chain development. Information became useful as a tool for supply chains to create for themselves a capability to respond to coordinate with, and even to control partners within supply chains as seen in table 4.3.

Table 4.3: Level of Information Sharing and organizational performance of pharmaceutical companies in Douala

Statement	SA	A	N	D	SD	Mean	S.D
1. Information exchange between our trading partners and us is timely	1(1.39%)	1(1.39%)	17(23.61%)	34(47.22%)	19(26.39%)	3.96	0.83
2. Information exchange between our trading partners and our company is accurate	0(0%)	2(2.78%)	7(9.72%)	41(56.94%)	22(30.56%)	4.15	0.71

3. Information exchange between our trading partners and our company is complete	0(0%)	1(1.39%)	10(13.89%)	37(51.39%)	24(33.33%)	4.17	0.71
4. Information exchange between our trading partners and our company is adequate	0(0%)	2(2.78%)	12(16.67%)	35(48.61%)	23(31.94%)	4.1	0.77
5. Information exchange between our trading partners and our company is reliable	0(0%)	0(0%)	5(6.94%)	37(51.39%)	30(41.67%)	4.35	0.61
Overall						4.14	0.65

Source: Field work (2023)

The concept of Level of Information Sharing (LIS) pertains to the degree to which critical and proprietary information is conveyed to supply chain partners. This metric was evaluated through the use of 5 specific items, each of which was rated on a 5-point Likert-type response scale, with options ranging from 1 (strongly disagree) to 5 (strongly agree). The assessment aimed to gauge the extent to which critical and proprietary information is shared with supply chain partners. The reported Cronbach's alpha for this measure is 0.736, indicating a satisfactory level of internal consistency. The overall mean score for the responses was 3.89, with a standard deviation of 0.73. These statistics suggest that the majority of the population agreed with the items related to LIS, indicating a common understanding among respondents.

Furthermore, the distribution of responses to specific questions related to the level of information sharing is presented in Table 4.3. For the statement "information exchange between our trading partners and us is timely," the majority of the population (50%) indicated agreement, while 33.33% of respondents strongly agreed. Additionally, 11.11% of the population expressed a neutral stance, and 5.56% disagreed with the statement. The mean response score for this item was 4.11, with a standard deviation of 0.81.

These findings provide valuable insights into the perceptions and attitudes of the population regarding the communication of critical and proprietary information within the supply chain. The reported statistics offer a comprehensive overview of the level of information sharing and the degree of agreement among respondents. It is important to note that these results are based on a specific sample and should be interpreted within the context of the study's methodology and population demographics

Table 4.7: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.444[a]	.197	.149	.51246
Predictors:(Constant),Level of information sharing, Supplier Relationship Management, Customer Relationship Management				

R square is a statistical measure that shows how close the data are to the fitted regression line. In this model R square is 19.7%whichis small that indicates more studies should be done by including more companies and larger sample size to support this study and minimize its limitations as shown on the regression table 4.8.

Table 4.8: Regression analysis of hypothesis

Coefficients[a]						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	T	Sig.
1	(Constant)	2.266	.635		3.567	.001
	Supplier Relationship Management	-.037	.135	-.032	-.277	.782
	Customer Relationship Management	.153	.109	.171	1.399	.046
	Level of Information Sharing	-.031	.090	-.041	-.346	.730
a. Dependent Variable: Organizational Performance						

H1 : Supplier Relationship Management (SRM) has significant influence on organizational performance. The result of multiple regression analysis of the table 4.8 above clearly indicates that Supplier Relationship Management has no significant influence on Organizational Performance ($p>0.05$). Besides, the value of beta ($\beta= -0.037$ shows that the negative influence of Supplier Relationship Management on Organizational Performance. Hence, the above proposed hypothesis is rejected.

H2 : Customer Relationship Management has

significant influence on organizational performance.

The result of multiple regression analysis of table 4.13 above clearly indicates that Customer Relationship Management has significant influence on organizational performance ($p<0.05$). Besides, the value of beta ($\beta=0.153$) shows the positive influence of Customer Relationship Management on Organizational Performance. This implies that one percent increase in Customer Relationship Management results 15.3 percent increase in Organizational performance. Thus, the above proposed hypothesis is accepted.

H3: The level of information sharing has no significant influence on organizational performance

The result of multiple regression analysis of table 4.13 above clearly indicates that Level of Information Sharing has significant influence on organizational performance ($p>0.05$). Besides, the value of beta ($\beta=-0.031$) shows that there is negative influence of Level of Information Sharing on Organizational Performance. Thus, the above proposed hypothesis is rejected.

DISCUSSION OF FINDINGS

The study's findings on Supplier Relationship Management (SRM) revealed several significant outcomes through data analysis. The results indicated a positive and substantial influence of SRM on organizational performance. This finding is consistent with previous studies by Ibrahim and Hamid (2012) and Tan (2002), which also demonstrated the positive impact of SRM on organizational performance. The study's participants experienced enhanced organizational performance as a result of positive engagement in supplier relationship management. The establishment of a reliable partnership between the supply chain and their suppliers facilitated the shared pursuit of common goals, ultimately leading to improved performance. Furthermore, the collaborative management of tasks and details within the supply chain and between suppliers and manufacturers contributed to the timely and efficient development of products, further enhancing organizational performance.

Similarly, the study found that Customer Relationship Management (CRM) also had a positive and significant influence on organizational performance. This result is consistent with previous studies by Al Weshah et al. (2019) and Ibrahim and Hamid (2012), which highlighted the impact of improved customer relationships on organizational performance. The study's findings suggest that employees who were closely connected with customers and engaged in effective communication processes contributed to the improvement of customer relationships, thereby positively affecting organizational performance. Additionally, the provision of reliable services and products, timely product development, innovation, and feedback from the supply chain all contributed to enhancing customer satisfaction and, consequently, organizational performance.

Furthermore, the study revealed that the level of information sharing positively and significantly influenced organizational performance. This finding is supported by a previous study by Karimi and Rafiee (2014), which demonstrated the significant impact of high levels of information sharing on organizational performance. The study found that extensive information sharing among supply chain partners, including customers, suppliers, and internal stakeholders, led to increased efficiency in task achievement and ultimately contributed to improved organizational performance.

CONCLUSION

The main objective of this study was to examine how supply chain management activities affects performance of CAMPHARDIS SARL, SIAP PHARMA and

PHARMEZON pharmaceutical companies in Douala. There are various variables by which this relationship has been evaluated. It included strategic supplier partnership, customer relationship and the level of information sharing, which helped in examining the organizational performance. The current study used quantitative approach with the help of explanatory purpose to collect the data. However, data was collected from the professional of supply chain in pharmaceutical companies. Similarly, the final sample size is 72 and these population size have been selected via using convenience sampling. At last, the data has been analyzed using multiple regression analysis. This study provided several beneficial results in the aspect of supply chain management. However, the relationship between strategic supplier partnership and organizational performance is positive and significant, Customer relationship and organizational performance was positive and significant. The relationships between levels of information sharing were also positive and significant towards organizational performance.

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Sourcing Smarter: The Relationship Between Outsourcing Decision and Material Availability at Sitraser Sarl Douala.

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Abstract:

The purpose of this paper was to assess the effect of outsourcing decisions on material availability in SITRASER Sarl Douala. Specific objectives of the study in this paper were to identify factors affecting outsourcing decisions in in SITRASER Sarl, to find out the effect of cost reduction on material availability in SITRASER Sarl, and to establish the impact of outsourcing decisions on material availability in SITRASER Sarl. The independent variable in this study includes outsourcing decision based on cost reduction, innovation and operational efficiency, while dependent variable is material availability. A case study research design was used in this study. The target population of the study in this paper was 50 employees from SITRASER Sarl Douala. Questionnaire was used as tool of collecting data. From the findings, it can be concluded that, logistics companies base outsourcing on cost reduction. The company equates the cost of outsourcing to cost of acquiring additional resources. Secondly it was concluded that, the major challenge facing adoption of innovation in outsourcing is the existence of risk exposure. The company needs new products and services to maintain its competitiveness. Thirdly, it was concluded that, SITRASER Sarl outsources based on operational efficiency. The company outsource on operational efficiency to increase material supply. Lastly it was concluded that, there is relationship between outsourcing decisions and material availability.

Key words: Assessment, Outsourcing Decisions, Material Availability

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INTRODUCTION

Background of the Study

For most of the 20th century, a successful organization was described by its capability in managing and controlling all of its resources and operations. In the 1960s, in order to maintain profits, organizations start to look for means to expand their market base and take benefit of economies of scale. This occurs from the evolution of diversification as a well-known strategy (Lysons, 2003). Nowadays competition is increasing within businesses, organizations are considering new ways to increase competitive edge and generate value. Lysons (2003) affirm that competitive edge is an important concern that allow an organization to pact with market dynamics and environmental effort better than its competitors. Organizations attempt to gain competitive advantage by outsourcing. Outsourcing has become one of the most important approach a business should adopt due to the increase of globalization and through this strategy, organizations can acquire a competitive advantage if products or services are implemented more effectively by outside service providers (Yang *et al.,* 2007). For an organization to be able to adapt on market change and complications of anticipating the direction of such changes means that they have to emphasize on their core competencies and abilities (Mclvor, 2008). Customarily, outsourcing is an abbreviation for" outside resource using". Outside means to create value from external, not within the organization (Yang *et al.,* 2007) Outsourcing is allocation of services that should be performed inside the company to an external service provide and has become one of the essential factors in several business strategies (Hern Burke, 2006,).

Research on outsourcing has a long-standing history in econmica research. Often, authors argue that cost differences between make and buy are crucial for the outsourcing decision. For example, (Burke, 2006) discuss the outsourcing of HR functions in the context of companies' cost pressures induced by the globalization of companies. (Canez, 2009) present a model of outsourcing decisions and ascertain that cost effects are the most important element in the decision. (Walker and Weber, 2004) analyze transaction and production cost effects of 60 make-or-buy decisions in the U.S. automobile industry. While volume uncertainty and supplier market competition have a small but significant effect, production costs are the strongest predictor of make-or-buy decisions in their analysis. Some authors argue that important benefits of outsourcing need to be assessed against an increase in transactional cost and a decrease in flexibility the benefits being, first, the ability to focus on the core business and strategic issues, second, the utilization of expertise and economies of scale of the service provider, third, better management of the cost structure.Although outsourcing is still at its developing stage in African countries, it has benefited many companies (Orji, 2002) as well as created jobs opportunities for many countries. Firms Outsourcing part of their production process and services as benefiting from increased efficiency and profits. The decision to outsource comes with numerous responsibilities and considerations by the company willing to outsource. The need to improve and speedup the production process of a firm may lead to a firm deciding to contract or outsource some of its production process to another firm or vendor to handle. The issue of wastages in developing countries has been a major issue. However, even when organizations set out to carefully evaluate an outsourcing opportunity, making accurate comparisons of internal processes relative to external providers can be extremely difficult (Hayward & McDonagh, 2002).

In Cameroon, the development and establishment of third party logistics service providers has led to an increase in companies using them to outsource their services. Outsourcing is increasingly been used by companies in Cameroon as they have noticed that they gain competitive advantage over other companies. It is against this background that this paper seeks to assess the effect of outsourcing decisions on material availability in SITRASER Sarl Douala.

Statement of the Problem

Outsourcing is still at its developing phase in SITRASTER Sarl and has brought numerous benefits to company. Nevertheless, scarcity of materials, poorly structured outsourcing problems and decision, wastages of raw materials and human resources have been a major challenge with SITRASTER outsourcing. A good outsourcing manager must be able to motivate partners to do what is needed. They must be able to monitor the deal "without interfering; to get lead signals they need to maintain strategic control. They need a totally different set of management skills, and the real essence of these skills is a learning capacity and willingness. This study therefore seeks to bridge the gap by assessing how outsourcing decision affect material availability in my company.

REVIEW OF LITERATURE

Introduction

At this point this paper is set to give the major debates and competing explanations of the problem under study, empirical studies and research gap on the matters pertaining to the assessment of the effects of outsourcing on decision making.

Conceptual Review

Concept of Outsourcing

Outsourcing strategies have been classified by different scholars in different ways. Some of the classifications are here reviewed and a choice made at the end.

According by Sev (2009), outsourcing strategies can be categorized into the principal type and the common type. The principal type entails traditional outsourcing: Here the routine jobs or task that the staff of the organization does not perform are identified and the service providers aired for the job and Greenfield outsourcing: Without hiring the service provider the organization can directly hire an imminent company which can execute their business which was not done in the organization internally (Sev, 2009). The common type on the other hand includes: Information technology (IT) outsourcing, Call centre, Payroll, Finance functions and activities, E- publishing, Book-keeping service, Accounting, Human resources and Computer Aided Design (CAD) service (Sev, 2009).

This classification, however, is not quite explicit to be used in defining the outsourcing strategies of SMEs. Also, most outsourcing is perceived as human resource management strategy, as such listing human resource outsourcing as a strategy amongst others which obviously entails the use of human resource without adding to head count is rather confusing. According to Harward (2010), there are four (4) outsourcing strategies at an organization's disposal. These four types of outsourcing strategies or what some call engagement models for sourcing are largely grouped into two. The first two are considered business process outsourcing (BPO) engagements, and the other two are considered out-tasking models. The BPO models are comprehensive and selective. And the out-tasking models are licensing and contracting.

Concept of Material Supply

Materials supply can have different meanings depending on who is dealing with the question. Materials supply is here introduced in order to describe what is meant by the term materials supply in this thesis. This is done by presenting how materials supply can be viewed and what the implications are of the different views. In this thesis materials supply is seen as a part of logistics. Logistics provides a fundamental mechanism for linking the firms of diverse supply chains in a coordinated manner in order to ensure materials supply (Fawcett, 2015). Johansson (2006) defines the materials supply system as the system that supplies materials from suppliers through the focal company's production system to industrial buyers. The materials supply system thus comprises materials flows between as well as within plants and includes both physical flows and their planning and control (Johansson, 2006). The aim of the logistics system is to supply customers efficiently with their required products and the purpose of the materials supply system is to supply production with materials and items (Jonsson, 2008)

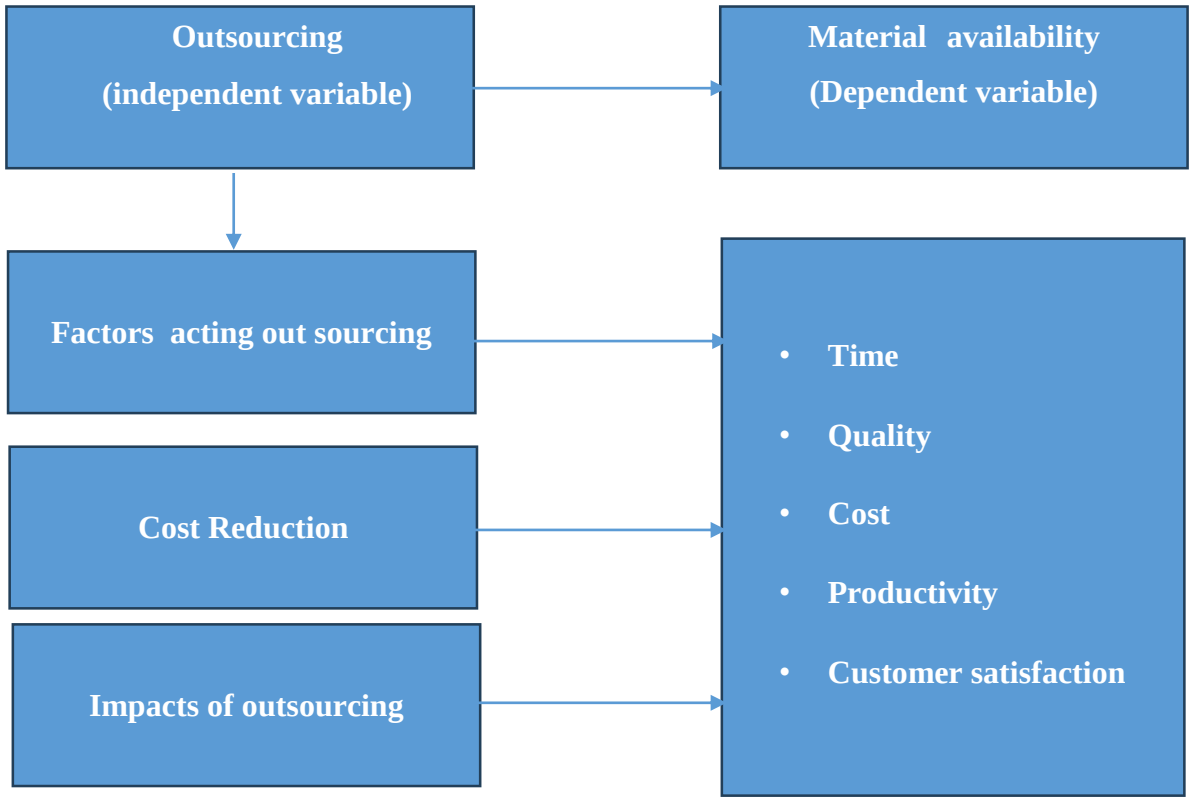

Figure 2. 1: Conceptual framework of the study (own design)

In figure 2.1 above, the study conceptualizes of independent variables which include what the researcher specifically assessed i.e., outsourcing decision based on cost reduction, innovation and operational efficiency, the dependent variable is material availability in terms of supplier reliability, on time delivery, lead time for SITRASER Sarl to ensure material availability, they have to make outsourcing decisions based on factors affecting outsourcing, cost reduction, and impact of outsourcing. However, this depends on the Outsourcing policies and guidelines and procurement procedures.

Theoretical Review

There is need to identify and explain relevant relationship between facts Verma and Beerd (1981). This means that there is need to build a theoretical structure that can explain facts and the relationship between them.

Resource-Based View Theory

This study employed the Resource-Based View theory as argued by Wernerfelt, (2015). The theory argues that a firm has the ability to achieve and sustain competitive advantage if it possesses resources that are valuable, rare, imperfectly imitable and non-substitutable. Not all resources are strategically relevant within an organization.

The goal of an organization is to ensure it has access to and control of valuable resources by developing and securing all the relevant resources either internally or externally. If a firm possesses critical resources that have strategic value, it is better to retain the activity in-house. On the contrary, if the

strategic value of target activities is low and no internal resources are available to perform such activities, it is beneficial for the company to outsource them. For the sustainable competitive advantage's firms are forced to rely on a multitude of outside suppliers for parts, software, knowhow and sales and in doing so gain access to valuable resources and external capabilities (Langlois 1990). The argument here fits with the need and factors that lead to outsourcing decisions in firms, whether they are cost reduction, new product/services introduction, focus on core competencies or labour flexibility and how they improve organizational performance.

Resource Dependency Theory

Resource dependence theory (RDT) is the study of how the external resources of organizations affect the behavior of the organization. The procurement of external resources is an important tenet of both the strategic and tactical management of any company. It was first argued by Pfeffer and Salancik (1978).

Resource dependence theory has implications regarding the optimal divisional structure of organizations, recruitment of board members and employees, production strategies, contract structure, external organizational links, and many other aspects of organizational strategy (Deckers, 2000).

The basic argument of resource dependence theory can be summarized as follows: Organizations depend on resources; These resources ultimately originate from an organization's environment; The environment, to a considerable extent, contains other organizations; The resources one organization needs are thus often in the hand of other organizations; Resources are a basis of power; Legally independent organizations can therefore depend on each other; Power and resource dependence are directly linked: Organization A's power over organization B is equal to organization B's dependence on organization A's resources. 8) Power is thus relational, situational and potentially mutual (Pfeffer and Salancik, 1978).

Diffusion of Innovation theory

The diffusion theory, also known as the diffusion of innovations theory, is a theory concerning the spread of innovation, ideas, and technology through a culture or cultures (Rodgers, 1962). Diffusion theory states that there are many qualities in different people that cause them to accept or not to accept an innovation. There are also many qualities of innovations that can cause people to readily accept them or to resist them.

According to diffusion theory, there are five stages to the process of adopting an innovation. The first stage is knowledge, in which an individual becomes aware of an innovation but has no information about it. Next is persuasion, in which the individual becomes actively interested in seeking knowledge about the innovation. In the third stage, decision, the individual weighs the advantages and disadvantages of the innovation and decides whether or not to adopt it. After the decision comes implementation, in which the individual actually does adopt and use the innovation. Confirmation is the final stage. After making adopting the innovation, the individual makes a final decision about whether or not to continue using it based on his own personal experience with it. These same stages apply, to varying degrees, to groups of people in addition to individuals (Rogers, 1962).

Empirical Review

Defining outsourcing

Outsourcing production has a long history, and a variety of names are present. Outsourcing, subcontracting and make-or-buy all belong to the same family of activities and the differences between them are the drivers, demand on cooperation between involved parties and independence of the supplier (Wasner, 1999). There are several definitions of outsourcing in the literature. For instance, do Bengtsson et al. (2005) define outsourcing as ―when a company hires a supplier to conduct an activity that was earlier performed by the company and McIvor (2005) defines it as ―the sourcing of goods and services previously produced internally within the sourcing organisation from external suppliers‖. It is seen that outsourcing definitions imply that the product or activity

to be outsourced has to have been performed in-house before, i.e., it cannot be a new activity (Moses, 2009). Greaver (1999) has a definition that focuses on recurring activities : ―outsourcing is the act of transferring some of an organisation's recurring internal activities and decision rights to outside providers, as set forth in a contract‖.

Factors Affecting Outsourcing

Cost Reduction and Economies of Scale

According to Kakabadse *et al., (*2005) economies of scale and cost reduction are among the most cited reasons to outsource. They also agree that short term cost saving is the prime motive of most of the western companies particularly to save IT-cost. There are number of other drivers/motivators described by researchers but to achieve operational cost efficiency is the most considered factor so far.

Technology Advancements

Nanda (2008) argues that the globalization and technology advancements created a global workforce, with a blend of different cultures and nationalities working for the common objective across the globe. However, according to Leavy (2009) controlling of the outsourced BPO will be central to the organization and risks posed by vendors must be taken into consideration for the success of the projects. Outsourcing now days has been done in almost every sector. From government departments to NGOs, banks and other financial institution, and health care sector.

Focus on Core Competencies

The recent trend or multinationals strategy to outsource non-core business is motivated by the competence-based view (Kakabadse 2005). The driving forces of outsourcing or offshore outsourcing are most primarily lower labor cost and also firm's motives to focus on core business competences Core competences are however, not easy to identify and certainly poorly defined business to outsource would have an adverse impact on the firm's overall performance.

According to Windrum *et al.*, (2009), successfully identified core competences, for example Dell identified (R&D as core competence) and Tesco (Online Shopping as core competence), whereas Dell outsourced buying process of customer, and Tesco outsourced online banking. The research also indicates that poorly defined core competences have been re-in sourced when realized at later stages, for example J.S. Sainsbury, JP Morgan, Cable and Wireless brought the outsourced functions back in-house (Windrum *et al.,* 2009).

Outsourcing and organizational performance

Organizational performance is measured in different ways depending on the intent. However, whatever criteria is used, organizational Performance is the output of the organization. (Kotabe, 2010) identifies three types of performance measures as necessary components in any outsourcing performance measurement system: strategic measures; financial measures; and quality measures. Other studies use additional dimensions of market performance such as costs savings, cycle time, customer satisfaction, and productivity to measure the effectiveness of outsourcing strategy (Malhorta, 2013).

Organizational Performance here is seen as the output of the organization measured in terms of profitability. Profitability is measured in terms of Cost savings, focus on core business (thus increasing efficiency), Reduction in money spent on fixed assets (cost restructuring), Reduction in tax paid (tax benefit) and Increase turnover (Sales).

This means that organizations can dedicate their resources to productive activities alone and thus enhance their effectiveness and efficiency (Frayer *et al.,* 2000). Successful implementation of an outsourcing strategy has been credited with helping to cut cost (Malhorta, 2013), increase capacity, improve capacity, improve quality (Kotabe, 2010), increase profitability and productivity, improve financial performance, lower innovation costs and risks (Quinn, 2002), and improve organizational competitiveness (Sharpe, 2007). Nevertheless, outsourcing does generate some problems, as outsourcing usually reduces an organization's control over how certain services

are delivered, which in turn may raise the organization's liability exposure (Dominguez, 2006).

Research Gaps Filled

Research on outsourcing in relation to material availability are several. Previous studies have struggled to pinpoint important theories regarding the outsourcing decisions used in the Supply chain activities. Most of reviewed studies have strived to show the way outsourcing and related activities through which supply chain activities can be enhanced and organizational performance and improve efficiency and effectiveness d. Reviewed studies have confined on a single area but on different focus.

Altogether had similar focus but the failed to achieve the clearest intervention about the exact effects of outsourcing decisions on material availability. This observation wants to show the knowledge gap that still exists regarding the information about the subject at hand.

Previous studies did not show how efficiency, effectiveness and performance has been affected by outsourcing some company activities to others who are specialized in it. However, as long as knowledge gap still exits, this study envisaged filling it by focusing on effects of outsourcing decisions on material availability private institutions, such as SITRASER SARL Douala.

METHODOLOGY

Research Design

Research design refers to the structure of an enquiry and to the overall strategy that you choose to integrate the different components of the study in a coherent and logical way, thereby, ensuring you effectively address the research problem; it constitutes the methods of data collection, measurement and analysis of data. Among the different types of research designs the researcher used the explanatory research design.

Sample and Sampling Techniques

The targeted research participants were selected from Logistics and Supply Chain Department of SITRASER Sarl, specifically from (supply chain assistants, transport officers, supply chain officers, senior transport officers, supply chain manager, and supply chain coordinator).

Sample Size

A sample according to Oso *et al.*, (2008) is a small group of individuals selected from a population of study and intended to reflect accurately the characteristics of the total population. A sample size of 150 respondents was selected for this study using the "Yaro Yamane" formula

of finite population 2 at 0.05 0r 5% level of significance.

1+ ( )

This sample was selected because the researcher had limited time and resources to study the entire population. The calculation of the sample was done as follows :

$$n = \frac{N}{1 + ( )^2}$$

Where;

n = the sample size

N= the population of study which is equal to 60

e = the level of significance which is equal to 0.05

$$n = \frac{60}{1 + 60(0.05)^2}$$

$$n = \frac{60}{1.15}$$

$$n = 52.17 \cong 52$$

$$= 50$$

Development of instruments for the study (Validity and Reliability)

Validation of instrument

The questionnaire was developed and submitted to the supervisor to check and approve. check clarity and language, instructions and numbering and make suggestions for face validity. It was pilot tested with personnel of different logistics institutions and SPSS statistics package was used to analyses the responses of the items on the questionnaire and determine if they were correlated to determine content validity. The various corrections were then made and their rating was used to calculate the validity index. This calculation gave a CVI of .821.

Reliability of instrument

This statistical package, SPSS, version 23 was used to determine the reliability of the instruments. The reliability of the instrument was determined according to clusters of items in the questionnaire. The first group of items were those of section B which dealt with the factors affecting outsourcing decision, cost reduction and impact of outsourcing on material availability.

Table 3.1 shows Reliability statistics for items related to factors affecting outsourcing decision, cost reduction and impact of outsourcing on material availability.

Table 3. 1: Reliability coefficient table for the clusters of various items of the questionnaire

Clusters	Cronbach's Alpha[a]	Cronbach's Alpha Based on Standardized Items[a]	N of Items
Factors affecting outsourcing decisions	.770	.790	5

Cost Reduction	.737	.758	5
Impact of out sourcing	.851	.862	5
Average	.816	.855	

Source : field work (July, 2022)

A reliability analysis was carried out on the items relating ti the factors affecting sourcing which consisted of 5 items. Cronbach alpha showed the items to reach acceptable reliability, α=.770. Most items appeared to be worthy of retention resulting in decreasing in the alpha deleted. The second cluster of the items relating to cost reduction gave α = .737. A reliability analysis was carried out on the items relating to the impact of outsourcing on material availability Cronbach alpha of α= .851.

Finally, the average of these reliability coefficient was calculated to determine the reliability coefficient of the instrument. This gave a reliability coefficient of .816 which is above 0.7 indicating that the instrument of the study was reliability.

The questionnaires were distributed to selected Logistics and supply chain staffs, professionals & management bodies. So that it makes the research results dependable and credible.

Methods of Data collection

Data collection plays a very important role in the statistical analysis as there are several methods employed when it comes to research and gathering the necessary information. The researcher employed the use of both primary and secondary sources of data.

Secondary Data:

Secondary data is information gotten by other researchers other than the one carrying out the research and made available from other sources. In other to enrich the study, several different literatures, journals and studies were reviewed as secondary data. The researcher could not realize this work without a proper knowledge on existing relevant literature in this field of study. Fully aware of the availability of literature the researcher made use of secondary information in this research which was gotten from the following sources: Published books, journal, articles online and other projects.

Primary Sources:

The primary data was collected through a self-administered questionnaire. The questionnaire targeted personnel of SITRASER Sarl at the head office, warehouse and their third-party workers were the targeted population of the study. The questionnaire had two parts: part A focuses on the demographic characteristics of the respondents of the organization; part B focuses on how cost reduction affects material stability in the organization.

Methods of data collection, sources and research instruments

The data sources are both primary and secondary. The primary data were collected by using questionnaires and interview from the Logistics and supply chain management staffs of the organization. The secondary data was from internal sources of SITRASER Sarl's manual, reports and related documents to supplement the data getting from primary sources.

The data collection instrument, for collecting the primary quantitative data were a self-developed questionnaire containing self-assessment items measured on the 5-point

Likert type of scale strongly disagree, disagree, neutral, agree, strongly agree and using semi-structured interview.

Questionnaire administration

The questionnaires were distributed by using the hard copies. Semi structured interview was used for Assistant supply chain manager at the head office at Bonanjo Douala because the main outsourcing activities are handled in this office.

PRESENTATION OF FINDING

Introduction

This chapter is set to discuss the findings of the study which explain the findings of each of the objectives pertaining to the impact of outsourcing decisions on material availability in SITRASER Sarl Douala.

Factors Affecting Outsourcing Decisions

The table 4.1 shows the presentation of findings with regard to the first specific objective, which analyses the Factors Affecting Outsourcing Decisions in SITRASER Sarl.

Table 4. 1: Factors Affecting Outsourcing Decisions

	SD		D		N		A		SA		TOTAL	
	N	% SD	N	% D	N	% N	N	% A	N	% SA	N	% TOTAL
Outsourcing depends sorely on the pricing strategy of the products.	5	13%	5	13%	10	25%	15	38%	5	13%	40	100%
Outsourcing enables the company meet up with deadlines on projects.	4	10%	6	15%	13	33%	10	25%	7	18%	40	100%
without trustworthiness outsourcing won't be effective and reliable.	1	3%	2	5%	7	18%	18	45%	12	30%	40	100%
a major contributor to improved supply chain performance.	1	3%	4	10%	10	25%	20	50%	5	13%	40	100%
outsourcing does provide minimal supervision on projects.	10	25%	14	35%	8	20%	4	10%	4	10%	40	100%
outsourcing is necessary and increase an organization's Revenue	3	8%	2	5%	20	50%	10	25%	5	13%	40	100%
TOTAL	**24**	**10%**	**33**	**14%**	**68**	**28%**	**77**	**32%**	**38**	**16%**	**240**	**100%**

Source : field work (feb, 2024)

Table 4.1 answers the questions relating to the factors affecting outsourcing decisions. For the first question, Outsourcing depends sorely on the pricing strategy of the products. 5(13%) strongly disagree that outsourcing depends sorely on pricing strategy of the products while 5(13%) disagree to the statement. 10(25%) of the respondents are undecided about the question while 15(38%) agreed to the fact that outsourcing depends sorely on the pricing strategy of the products and finally, 5(13%) strongly agree with the statement. For the questions that states that Outsourcing enables the company meet up with deadlines on projects. 16(32%) of respondents strongly

degree to the statement while 9(18%) disagreed. 20(40%) of the respondents were undecided concerning the statement while 2(4%) agreed and 3(6%) strongly disagreed.

Effect of cost reduction on material variability

The table 4.2 below answers questions relating to the Effect of cost reduction on material variability in SITRASER Sarl.

Table 4.2: Effect of cost reduction on material variability

	SD		D		N		A		SA		TOTAL	
	N	% SD	N	% D	N	% N	N	% A	N	% SA	N	% TOTAL
outsourcing based on cost reduction is most effective.	5	13%	5	13%	7	18%	10	25%	13	33%	40	100%
cost reduction is a major contributor to improved Performance	5	13%	10	25%	15	38%	5	13%	5	13%	40	100%
cost reduction always leads to more sales and less material availability.	5	13%	5	13%	15	38%	10	25%	5	13%	40	100%
outsourcing for cost reduction creates interruptions in material supply.	10	25%	15	38%	10	25%	4	10%	1	3%	40	100%
cost reduction does not affect material availability directly due to outsourcing.	2	5%	9	23%	8	20%	20	50%	1	3%	40	100%
TOTAL	**27**	**14%**	**44**	**22%**	**55**	**28%**	**49**	**25%**	**25**	**13%**	**200**	**100%**

Source : field work (June, 2024)

Table 4.2 answers questions relating to the effect of cost reduction on material variability. for the questions that states that outsourcing based on cost reduction is most effective. 16(32%) of respondents strongly degree to the statement while 9(18%) disagreed. 20 (40%) of the

respondents were undecided concerning the statement while 2(4%) agreed and 3(6%) strongly disagreed.

Impact of outsourcing decisions on material availabilit

The table 4.3 below answers the questions relating to the impact of SITRASER Sarl Douala.

Table 4. 3*: Impact of outsourcing decisions on material availability*

	SD		D		N		A		SA		TOTAL	
		%								%		%
	N	SD	N	% D	N	% N	N	% A	N	SA	N	TOTAL
The company encourages outsourcing based on material availability.	5	13%	5	13%	15	38%	10	25%	5	13%	40	100%
Outsourcing is major contributor to supply chain performance.	1	3%	5	13%	15	38%	9	23%	10	25%	40	100%
Outsourcing decisions has a significant positive impact on organizational competitiveness.	1	3%	1	3%	8	20%	20	50%	10	25%	40	100%
outsourcing has a negative impact on material availability in the organization.	1	3%	4	10%	20	50%	10	25%	5	13%	40	100%
Outsourcingleads to increased revenue for the company.	1	3%	5	13%	9	23%	20	50%	5	13%	40	100%
TOTAL	**9**	**5%**	**20**	**10%**	**67**	**34%**	**69**	**35%**	**35**	**18%**	**200**	**100%**

Source : field work (feb, 2024)

The table 4.3 above answers questions relating to impact of outsourcing decisions on material availability. for the questions that states that the company encourages outsourcing based on material availability. 16(32%) of respondents strongly degree to the statement while 9(18%) disagreed. 20 (40%) of the respondents were undecided concerning the statement while 2(4%) agreed and 3(6%) strongly disagreed.

Inferential Analysis

Correlation analysis

This part shows the results of the inferential statistics conducted using the SPSS 23. To achieve the objective of this study indicated earlier, Pearson's Product Moment Correlation Coefficient, and multiple regression analysis were computed. Using these statistical tools conclusions were drawn. The relationship between the different aspects of outsourcing on material availability (factors affecting outsourcing, the effects of cost reduction on material availbility and effects of outsourcing decisions on material availibility were investigated). The interpretation was made based on the following measurement scale intervals or range. 1 perfect, 0.8-0.9 very strong, 0.5-0.8 strong, 0.3-0.5 moderate, 0.1-0.3 modest, >0.1 weak, 0 zero, -1 perfect, -0.8 - -0.9 very strong, -0.5- -0.8 strong, -0.3 - -0.5 moderate, -0.1 - -0.3 modest, and > -0.1 weak (Mc Danail and Gates (2006). These findings are presented below.

Assessment of Autocorrelation

This assumption can be tested with the Durbin-Watson test which test for serial correlation between errors and the value closer to 2 are acceptable (Field, 2009). If the Durbin-Watson is substantially less than 2, there is evidence of positive serial Correlation. The Durbin-Watson statistics value are 1.827 suggests that there is no severe autocorrelation among error terms.

Table 4.4: Correlation analysis

Factors affecting Outsourcing	Pearson Correlation	Organizational Performance .401**
	Sig. (2-tailed)	.002
Cost Reduction on material Availibility	Pearson Correlation	.361**
	Sig. (2-tailed)	.005
Outsourcing Decisions on material availability	Pearson Correlation	.325*
	Sig. (2-tailed)	.011

Source : Fieldwork, 2024

Correlation analysis between Factors affecting Material availability

Pearson correlation test was conducted to know the degree of relationship between the independent variable, which is outsourcing, and the dependent variable, factors affecting sourcing. The results of the correlation between these variables are shown in table 4.10. As it

is indicated in the table there is a significant correlation between factors affecting outsourcing.

Moreover, there is a moderate relationship (r = 0.401 with p<0.05).

Correlation analysis between Cost reduction and Material Availibility

Pearson correlation test was conducted to know the degree of relationship between the independent variable, which is cost reduction, and the dependent variable outsourcing. The results of the correlation between these variables are shown in table 4.4. As it is indicated in the table there is a significant correlation between cost reduction and outsourcing. Furthermore, implications of ICT and SCM systems have moderate relationship (r = 0.361** with p<0.05).

Correlation analysis between outsourcing decisions and material availibility

Pearson correlation test was conducted to know the degree of relationship between the independent variable, which is outsourcing decisons and the dependent variable material availibilty. The results of the correlation between these variables are shown in table 4.4. As it is indicated in the table there is a significant correlation between outsourcing decisions and material availibility have a moderate relationship (r = 0.325 with p<0.05).

4.4.3 Analysis of variance (ANOVA)

Table 4. 5: ANOVA table

Model	Sum of Squares	Df	Mean Square	F	Sig.
1Regression	12.369	5	2.474	9.802	.000[a]
Residual	13.628	54	0.252		
Total	25.997	59			
b. DV: Organizational Performance					

Source: own survey, 2024

According to table 4.5 the analysis of variance (ANOVA) for these data, if the F ratio is large and probability is less than 0.05 then it is termed statistically significant (Saunders, 2012). Thus, the F-statistic of each independent variables is 9.802, which is more than 5 this indicates that the model is overall good fit and significant at $p< 0.05$. Therefore, it can be concluded that the regression model overall predicts SCM systems significantly well.

ANOVA (Analysis of variance) was employed to compare whether the mean of one dependent variable differ significantly across the categories of another independent variables. The NOVA table provided, the result of the test of significance for R and R^2 using an F-statistic. Since the result of the test is significant, with P-value below 0.01, that R^2 is significantly different from zero and there is a relationship between the independent variables and dependent variable in the population (Field, 2021).

Table 4. 6: Regression coefficients

Model	Un standardized Coefficients		Standardized Coefficients			Collinearity Statistics	
	B	Std. Error	Beta	T	Sig.	Tolerance	VIF
(Constant)	-.165	.626		-.264	.793		
Factors affecting Outsourcing	.267	.123	.253	2.173	.034	.719	1.392
Cost Reduction	.017	.134	.015	.126	.005	.639	1.564
Outsourcing decisions	.457	.146	.385	3.142	.003	.646	1.548

Source : own survey, 2024

Regression analysis of factors affecting outsourcing

The Results of regression analysis against SCM systems can be seen in Table 4.5 Therefore, from the unstandardized B column it can be seen that receiving activity is found to be statistically positive with a significant effect on SCM systems (with **β** = 0.267). Hence, it is pointed out that 26.7 percent of SCM systems can positively explain the dependent

variable which is SCM systems and reported a positive level of significance which is $p < 0.05$.

Regression analysis of cost reduction on material availibility

The Results of regression analysis towards SCM systems can be seen in Table 4.5. Therefore, from the unstandardized B column it can be seen that implications are found to be statistically positive with a significant effect on SCM Systems (with **β**=0.017). Hence, it is pointed out that 1.7 percent of Implications can positively explain the dependent variable which is SCM and reported a positive level of significance which is $p < 0.05$.

Regression analysis of outsourcing decisions.

The Results of regression analysis towards outsourcing decisions can be seen in Table 4.5. Therefore, from the unstandardized B column it can be seen that outsourcing decisions is found to be statistically positive and significant effect on material availbility (with **β**=0.170). Hence, it is pointed out that a positive level of significance which is $p < 0.05$.

The Hypothesis Analyzed

H0 : H1: There is no relationship between factors affecting outsourcing on material availability. H1: There is a relationship between factors affecting outsourcing on material availability SITRASER SARL Dla.

The result of regression coefficient analysis, in Table 4.5 shows that outsourcing decisions on material availability (**β** =.267, $p< 0.05$). Thus, the researcher may reject the null hypothesis and accepted that, factors affecting outsourcing has a positive and significant contribution on material availability because the present value is less than the significance level (0.01-0.05).

H0: There is no significant relationship between cost reduction and material availability at SITRASER SARL Dla

H2: The is significant There is significant relationship between cost reduction and material availability at SITRASER Sarl

The result of regression coefficient analysis, in Table 4.6 shows that put-way activity has a significant and positive contribution to material availability (**β** =.017, $p< 0.05$). Accordingly, the researcher may reject the null hypothesis and accepted that, cost reduction has a positive and significant contribution on material availability with a significance level (0.01-0.05)

H0: The is no significant impact of ICT used in supply chain systems on comparative advantage of SITRASER Sarl.

H3: The is significant outsourcing decisions on material availability of SITRASER Sarl

The result of regression coefficient analysis, in Table 4.6 shows that outsourcing has a significant and positive contribution in direction of material availability (**β** =.170, $p< 0.05$). Thus, the researcher may reject the null hypothesis and accepted that, outsourcing decisions has a positive and significant contribution on material availability. Because the present value is less than the significance level (0.01-0.05).

4.5 Hypothesis Testing

The table 4.7 below shows the result of the hypothesis tested.

Table 4.7: Hypothesis Testing Results

Hypothesis	**Method**	**Remark**
Factors affecting outsourcing on material availability.	Regression	Accepted
Cost reduction on material availability	Regression	Accepted
Outing decisions on material availability	Regression	Accepted

Source : own Survey, 2024

Verification of Hypothesis

Table 4.8: Summary of Fit

RSquare	0.518521
RSquare Adj	0.492495
Root Mean Square Error	0.387239
Mean of Response	4.21875
Observations (or Sum Wgts)	40

Table 4.9: Analysis of Variance

Source: Own Survey (2024)

Figure 4.1 Summary of fit

The adjusted R2 shows the degree of variation in material availability that can be explained by variations in outsourcing. Inferring from the adjusted R2 (Coefficient of multiple determination), 49.25% of variations in the material availability is accounted for or explained by variations in outsourcing. 50.75% of variations in material availability are accounted for by variations in other variables different from outsourcing (influence of the extraneous variables). This is known as the coefficient of non – determination.

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	5.975143	2.98757	19.9233
Error	37	5.548294	0.14995	**Prob > F**
C. Total	39	11.523438		<.0001*

Source: Own Survey (July, 2024)

The Fisher's F test is used to determine the risk of rejecting the null hypothesis when it is true. Given the fact that the probability corresponding to the F value is 0.0001, it means that we would be taking a 0.01% risk in assuming that the null hypothesis (outsourcing does not have a significant effect on material availability of SITRASER Sarl) is wrong. Therefore, we can conclude with confidence that the two variables (Cost Reduction and Outsourcing) do bring a significant amount of information in predicting the material availability of SITRASER Sarl. The alternative hypothesis of the study is therefore retained which states that outsourcing has a significant effect on material availability of SITRASER Sarl. The risk to reject the null hypothesis while it is true is 0.01%

Table 4.10: Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|	Lower 95%	Upper 95%	Std Beta	VIF
Intercept	-0.131151	0.823967	-0.16	0.8744	-1.800665	1.5383641	0	.
Cost Reduction	0.5191957	0.218927	2.37	0.0230*	0.0756068	0.9627846	0.273787	1.0242089
Outsourcing	0.7163804	0.116579	6.15	<.0001*	0.4801696	0.9525912	0.709426	1.0242089

Source: field work (July, 2022)

Parameter Estimates

The intercept (constant term) is the expected mean value of Y when all independent variables

= 0. Everything being constant, SITRASER Sarl will make a negative material availability in the absence of outsourcing. Furthermore, SITRASER Sarl will not make a significant material availability in the absence of Cost Reduction and Outsourcing. as given by the significance of the t - statistic of 87.44% which is greater than the level of significance of 0.05

At a 95% confidence interval, Cost Reduction has a positive and significant effect on material availability all other variables being constant. For each unit increase In the Cost Reduction, material availability increases by 51.92%. Inferring from the significance of the t statistic of 2.37 we will be taking a 2.30% risk in assuming that the Cost Reduction have a significant effect on the material availability which is lower than the level of significance of 5%. We therefore conclude that the Cost Reduction has a positive and Significant effect on the material availability

At a 95% confidence interval, Outsourcing has a positive but insignificant effect on material availability all other variables being constant. For each unit increase in the Outsourcing, material availability increases by 71.64%. Inferring from the significance of the t statistic of 6.15 we will be taking a <.0001 risk in assuming that the Outsourcing have a significant effect on the material availability which is greater than the level of significance of 5%. We therefore conclude that the Outsourcing has a positive but insignificant effect on the material availability At a 95% confidence interval, material availability has a positive but insignificant effect on material availability all other variables being constant. For each unit decrease in the material availability, material availability decreases by 0.00%. Inferring from the significance of the t statistic of 0 we will be taking a 0.00% risk in assuming that the material availability has a significant effect on the material availability which is lower than the level of significance of 5%. We therefore conclude that the material availability has a positive but insignificant effect on the material availability.

Summary of Findings

The general objective of the study was to assess the effect of outsourcing decision on material availability in SITRASER Sarl. The first objective of the study was to find out the effect of cost reduction on material availability in SITRASER Sarl where the researcher found that, SITRASER Sarl base outsourcing on cost reduction. The company equates the cost of outsourcing to cost of acquiring additional resources. This indicates that the company is committed towards availability of materials.

The second objective of the study was to determine the effect of innovation on material availability in SITRASER Sarl where it was found that the major challenge facing adoption of innovation in outsourcing is the existence of risk exposure. The company needs new products and services to maintain its competitiveness.

The third objective of the study was to establish the effect of operational efficiency on material

availability in SITRASER Sarl where the researcher found that, SITRASER Sarl outsources based on operational efficiency. The company outsource on operational efficiency to increase material supply.

Conclusion

From the findings, it can be concluded that, logistics companies base outsourcing on cost reduction. The company equates the cost of outsourcing to cost of acquiring additional resources. Secondly it was concluded that, the major challenge facing adoption of innovation in outsourcing is the existence of risk exposure. The company needs new products and services to maintain its competitiveness. Thirdly, it was concluded that, SITRASER Sarl outsources based on operational efficiency. The company outsource on operational efficiency to increase material supply. Lastly it was concluded that, there is relationship between outsourcing decisions and material availability.

Recommendations

from the least possible inputs.

Recommendations for Policy and Practice

Based on the second objective on effect of cost reduction on material availability, logistics organizations should employ strategic and well thought out outsourcing to further reduce operating and overhead costs for further firm growth.

Based on the third objective on effect of innovation on material availability, manufacturing organizations should carefully consider the issue of outsourcing to ensure that while outsourcing helps in new innovations, no product quality is compromised, and no money is lost.

Based on the third objective on effect of operational efficiency on material availability, manufacturing organizations should outsource some value chain activities to generate operational efficiency by reducing capital investment and commitment as well as ensuring maximum utilization of the existing resources in a way that generates maximum value

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The Medicine Flow: Unlocking Efficient Inventory Management for Pharmacies in Bamenda.

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Abstract:

The purpose of this paper is to analyze the effects of inventory management practice on the supply of medications to pharmacies in Bamenda town. The paper then continues to look at how the pharmacies in Bamenda town manage inventory management systems. Another objective was to determine how pharmacies in Bamenda town maintain a good relationship with their suppliers and how information and communication technology in inventory management affects the supply of medications in pharmacies within Bamenda town. Data were collected through administered questionnaires using a combined sample size of 50, from 10 pharmacies within Bamenda town. The paper uses descriptive statistics and multiple regression analysis to establish the relationship between inventory management and the supply of medicaments. The analysis from the finding revealed that there is a significant level of acceptance of each of the inventory management practices. Strategic supplier partnership was the most embraced inventory management practices by pharmacies in Bamenda town, having a grand mean score of 4.21. Secondly, followed by Information Communication Technology with a grand mean score of 4.19 and finally the inventory management systems (4.00). While the regression analysis using multiple regression analysis showed that all inventory management practices have an effect on the supply of medications in pharmacies in Bamenda town thereby rejecting all the null hypothesis**.** We therefore recommend that pharmacies in Bamenda town should embrace the various forms of inventory management practices to improve on the supply of their medications especially in the application of information and telecommunication in the practice of their inventory management.

Keywords: inventory management, medications, pharmacies, multiple regression analysis

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INTRODUCTION

Background to the Study

An effective inventory management improves the firm's total performance through matching inventory management practices and a competitive advantage especially now that most organizations operate in a competitive world The main goal and objective of inventory management system is to keep at the necessary required inventory at any time so that production runs smoothly without interruption whatsoever (Panigrahi, 2013) Healthcare sector needs sophisticated supply chain optimization techniques, because of the need to balance future capacity with anticipated demands in the face of the important uncertainty resulting from clinical trials and competitors' activity (Shah, 2004).

Pharmacies can control a number of factors within the pharmacy inventory management and pharmacy revenue cycles that can support better outcomes for patients and enhance the bottom line for facilities. The primary function of a pharmacist is to prepare and dispense medications before the pharmaceutical concept founded in the 90s and role of pharmacist changed. (Alomi 2016) Procurement and stocking of medications is an important step in the inventory management system of a pharmacy. The pharmacist should keep the medications available at all times in the formulary, which is his primary duty as a part of the requirement of national and international standards of the hospital (Medication Management (MM).2015 & Joint Commission Resources. 2016.). under stock or overstock of medications reflect the mismanagement of pharmacy inventory. Shortage of medications reflects the negative outcome of disease management and additional unnecessary economic burden on the healthcare system. (Rosa CMB et al 2016, Mazer-Amirshahi M et al 2014 & 2015 &Fox ER et al 2014.)

Inventory management is a key management function in pharmacies' administration in Cameroon. Most pharmacies in Cameroon are experiencing inventory management problems that have resulted in wastage and shortage of drugs. These problems can affect the supply of medicaments thereby leading to delayed procedures and drug substitutions. Shortages in medicaments can be uncontrollable (during crisis). However, based on daily activities performed in the pharmacy, the main concerns regarding managing inventory occur during purchasing process taking into consideration the product type. It is problematic and time consuming to decide when and how much to order. Improper inventory management can also result from the procurement expertise of those managing the inventory (Alverson, 2003).

The supply of medicines is important as far as the reduction of mortality and morbidity associated with disease burden are concerned. However, lack of essential medicines is still one of the most serious public health problems. About 30 % of the world's population lacks the medicines they need. The situation is worse in the poorest parts of Africa and Asia where the figure rises to over 50 % (*WHO (2004)*).

Therefore, the supply of medicaments could be compromised if the pharmacies in Bamenda fail to execute proper inventory management practices, so that drugs when needed may be readily available.

Statement of the Problem

In reality, having a dynamic inventory system for a pharmaceutical supply is a difficult task in terms of obsolescence of drugs. Limited assortment of drugs to meet up demand, irregular supplies of medications in terms of non-respect of delivery dates, quantity of orders and also unavailability of medications when need arises. From operational viewpoint, according to Carroll (1998), effective inventory management ensures meeting customer and patient demands. This implies that inventory management affects the availability of drugs positively. Unavailability of a product when needed may cause the pharmacy to lose a customer and might lead to inconvenience to the prescribing physician; and may adversely affect patient's wellbeing, especially when the product is an essential lifesaving one.

Considering the role played by pharmacies in patients wellbeing, examining the contribution of inventory management practices in these pharmacies remain of great concern. As a result, this study seeks to examine the contribution of inventory management practices on the

supply of medicaments. From the existing literature examined, it is evident that very little has been done on inventory management in relation to the supply of medications which is a call for concern especially in the context of Cameroon. Also, the fact that there are controversies in most of the studies carried out in this area of studies is problematic.

As a result of this, the researcher deemed it necessary to find out the effect of inventory management on the supply of medications to pharmacies in Bamenda town.

LITERATURE REVIEW

At this point this paper is set to give the major debates and competing explanations of the problem under study, empirical studies and research gap on the matters pertaining to the assessment of the effect of inventory management on the supply of medications to pharmacies.

Conceptual Review

Inventory Management

Inventory is a stock of goods that is maintained by a business in anticipation of some future demand. This definition was also supported by author who stressed that inventory management has an impact on all business functions, particularly operations, marketing, accounting, and finance. Basically, there are three motives for holding inventories, which are transaction, precautionary and speculative motives. Historically, inventory management has often meant too much inventory and too little management or too little inventory and too much management. There can be severe penalties for excesses in either direction. Inventory management refers to all the activities involved in developing and managing the inventory levels of raw materials, semi-finished materials (work-in-progress) and finished good so that adequate supplies are available and the costs of stocks are low. In pharmacy operations, inventory is referred to the stock of pharmaceutical products retained to meet future demand. Inventory represents the largest current asset, as well as liquid asset in pharmacy practice and its value continues to rise because of the growth in variety and cost of pharmaceutical products (West D 2009). An inventory management system aims to assist in determining when and how much stock to order or issue. Orders that are placed timely allow drugs to be available at the right time (Odinga, 2007). For a proper quantification, it is critical to take into account the data on actual drug consumption at health facility level (Talafha, 2006). Maintaining enough stock to avoid shortages, to confront fluctuation and to avoid oversupply also constitutes the aim of successful inventory management (Deliver, 2008; Odinga, 2007).

Theoretical Framework.

Inventory Service Level Rate Model

An inventory management system is necessary to satisfy customer demand at the right time and in a cost-effective manner (Krishnan, Almaktoom, & Udayakumar, 2016). Inventory systems output should be measured and compared with a set of performance measures. To control the performance of an inventory system, the process parameters of pharmacies must be kept within a constant range limit. By doing so, comparisons of target performances and actual performances are possible. Once comparisons are completed, specific identified processes can be targeted in order to improve currant inventory system.

By using appropriate set of measures, the inventory system performance can be monitored closely for its performance. Successive improvements can be applied to each stage in the inventory system to determine the impact of improvements. Thus, it is important to identify an effective measure that can reflect inventory system performance and customers' satisfaction simultaneously (Almaktoom at el. 2014).

Inventory Cost Model

Cost of inventory is the cost a pharmacy incurs over a certain period of time to store its inventory. It determines how much profit can be made on current inventory. Calculating inventory cost helps to balance inventory expenses. It shows

if there is a need to store more or less to keep up with expenses or maintain the same income stream. Mathematically the inventory cost is the total number of product on hand multiply by the product cost per unit.

Empirical Literature

There are several review studies published regarding the pharmacy inventory management system on the supply and availability of medications. They describe the method of inventory control management and factors affecting pharmacy stock in detail. (Gouveia WA et al. 2009, Stephens M et al 2011.and Pharmaceutical Management Sciences for Healthcare. 2012)

i) Inventory Management Control System

Chungsiwapornpong (2007) has conducted her master thesis regarding drug inventory control process and performance among hospital pharmacy departments in Thailand. The survey has been responded by 309 respondents which accounted for 42.92 % of the total of 720 hospitals. The survey results were presented based on 9 important indicators with regards to drug inventory process and drug inventory performance. Based on her findings, ABC and VEN systems were the powerful and effective tools for hospital pharmacies. The survey results showed that hospitals that adopted ABC and VEN approaches have better performance than the ones without.

ii) Strategic Supplier Relationship

A review of drug management and procurement in Uganda revealed that although there was fairly regular supply of kits, there were frequent drug stock-outs in many health units. In addition, large quantities of expired drugs and medical supplies were found in most district level facilities. This was attributed to poor quantification practices and to donors ordering large quantities of drugs without proper co-ordination with the recipient departments (Muying et al p. 15-34). Expired medicines stock is clearly a waste of resources which cannot be afforded in a resource-constrained nation (Foster SD, 1990).

A study conducted in China on prices, availability and affordability of medicines revealed that the mean availabilities of originator brands and lowest-priced generics were 8.9% and 26.5% in the public sector, and 18.1% and 43.6% in the private sector, respectively. The lowest-paid government worker would need 0.1 day's wages to purchase captopril for lowest-priced generics from private sector, while 6.6 days' wages for losartan. For originator brands, the costs rise to 1.2 days' wages for salbutamol inhaler and 15.6 days' wages for omeprazole (Jiang *et al* (2017),).

A study conducted on Prices and availability of locally produced and imported medicines in Ethiopia and Tanzania revealed declining status of medicine availability in Ethiopia. The mean availability of the medicines in the public sector outlets was 64% (Ewen, *et al.* (2017)).

iii) Information and Communication Technology

In a descriptive cross-sectional study carried out in Tanzania, using Inventory Management Assessment Tool (IMAT) – inaccurate records were found in the Mwananyamala and Temeke hospitals while at the Muhimbili national hospital a computerized system was in place besides bin cards. This contributed to the accuracy of the records found (Kagashe & Massawe, 2012). Non-existent computerized systems add to already overworked personnel, exacerbated inaccurate stock recordings practices in MOH hospitals in Jordan (Talafha, 2006).

METHODOLOGY

Research Design

The paper makes use of a descriptive design to describe the existing distribution of variables without regard to causal or other hypotheses. A descriptive design is mainly used in primary studies and it allows one to collect and make a summary of the findings in a clear way. The research tool is a questionnaire which consisted of both open and close questions some of which were on likert scale. The first part of the questionnaire collected demographic data of the respondents before the main questions followed based on the research objectives.

Population

The targeted population in this study was envisaged to cover 10 pharmacies in Bamenda town and 5 respondents from each pharmacy. The respondents were limited to Pharmacists, Nurses, Pharmacy Attendants and Medical Doctors who are knowledgeable about inventory management.

Sample Size

10 pharmacies in Bamenda town were selected at random. Staff from each pharmacy were selected and hence a total of 50 staff were the sample of the study. 50 questionnaires were issued to Pharmacists, nurses, pharmacy attendants and doctors in the selected community pharmacies. 48 of the questionnaires were answered and returned correctly giving 96% response rate.

Sampling and Sampling Technique

Purposive and convenience sampling was used for this study. Again using purposive sampling might not only be economical but also informative. The sampling method used to select the pharmacy workers was convenience sampling method. This method was chosen because it enabled the researcher to identify the staffs that are more knowledgeable in inventory management.

Method of Data Analysis

Statistical Package for Social Sciences (SPSS) software package version 21 and Microsoft excel was used for the analysis of data. Descriptive statistics were used because the level of analysis is bivariate. Both qualitative and quantitative approaches were used to analyze the data. Analysis of data involved the use of tables, frequency tables, percentages, pie charts, mean and standard deviation to explain how inventory management affects the supply of medications to pharmacies in Bamenda town. Also, we use multiple regression analysis to estimate our model.

Reliability of the Instrument

Reliability is the extent to which an instrument would give the same results if the measurement were to be taken again under the same condition. The reliability test used for this study was a test and retest reliability. This involves administering the questionnaires to the respondents and repeating the questionnaires with the same respondents the next day. The use of only one researcher for data collection and entry improved the reliability of the study since inter-researcher variability is nullified.

Model Specification

The variables include both dependent and independent variables. The relationship between these variables is measured using the multivariate regression analysis. This relationship is presented in the form of an equation as seen below.

$SOM= \beta 0 + \beta 1X1+ \beta 2X2+ \beta 3X3+\varepsilon$

Where;

SOM= supply of medicament

β_0 is the intercept of the model.

X_1= Inventory Management System

X_2= Strategic Supplier Partnerships

X_3= Information and Communication Technology ε = Error term β_1, $\beta 2$, $\beta 3$, are the coefficients of model.

The ε = error term represented the unknown variables or those hard to measure but had an effect on the dependent variables.

Ethical Considerations

Some ethical issues were taken into account in conducting this study. The researcher obtained permission from the supervisor in order to carry out this research. The authorisation was to ensure that the researcher has access to the pharmacy owners and to guarantee that the data collected will be treated with confidentiality and for the sole purpose of the research. To pass the questionnaire, the researcher initially went to the various pharmacy owners to seek for approval in order to be able to administer the questionnaire in their establishments. The questionnaire duly highlighted the confidential nature of the questionnaire and also the confidentiality in treating the data collected.

PRESENTATION AND DISCUSSION OF RESULTS

Presentation of Result

Fifty Questionnaires were distributed to pharmacy workers and owners in Bamenda town but 48 were answered by the respondents, hence, the analysis of results in this chapter is based on the 48 questionnaires that were answered.

Demographic Information of Respondents

Table 4.1: Classification of Respondents by Gender

Gender	Frequency	Percentage
Male	12	25%
Female	36	75%
Total	48	100%

Source: Computed by author (2024)

As regards the gender of the respondents, this study reveals that the female sex is dominant (75%) over the male sex (25%) as illustrated in the table above. This shows that more females own and work in most of the Pharmacies around Bamenda town. Therefore, government needs to encourage male workers to engage in the field of pharmacy.

Age Range of Respondents

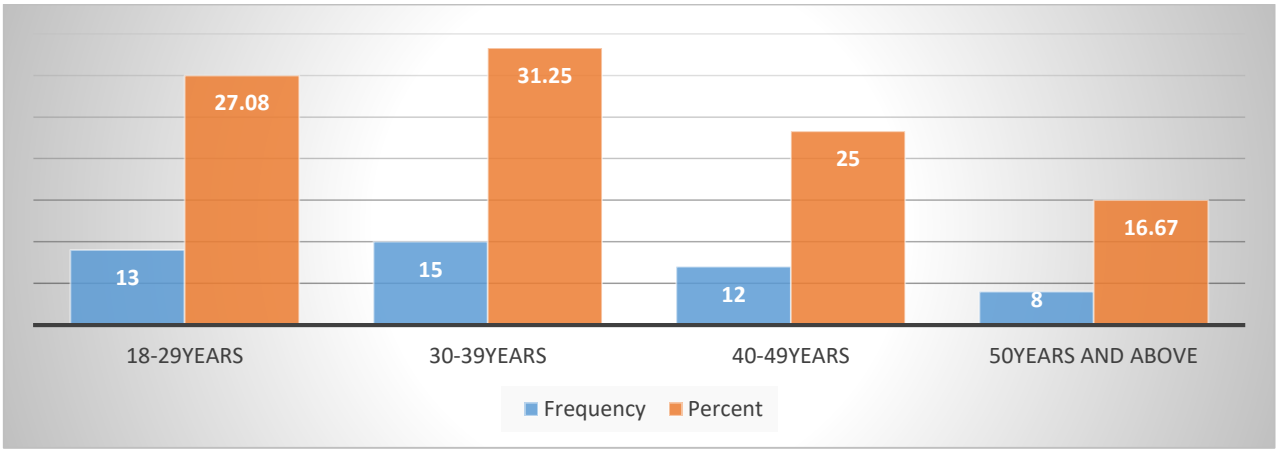

Figure 4.1: Age Range of Respondents

Source: computed by author (2024)

Furthermore, there were four age groups. Results from this study reveal that respondents aged between 30-39 years were 15 having a 31.25% which is the highest age range. Those aged between 18-29years were 27.08% and those between 40-49 years were 25%. The respondents of 50 years and above were16.67%. Meaning that most pharmacy workers are between 30 to 39 years in Bamenda town.

Educational Level

Table 4. 2 Educational Level

		Frequency	Percent
	OL/ AL	12	25

	Valid	HND	18	37.5
		First Degree	13	27.08
		Master Degree	5	10.42
		PhD	0	0
		Total	48	100,0

Source: computed by author (2024)

Equally, concerning the educational level of the respondents, this study found out that most of the respondents have an HND diploma (37.5%). This shows that most of the respondents are those with a good employment and high level of intellectual ability which enabled them to answer the questionnaires correctly. Also, in the table above 25% of the respondents ended their studies at the secondary and high school, meanwhile 27.08 % at first degree and 10.42% had a Master's degree. None of the respondent had a PhD.

Marital Status of Respondents

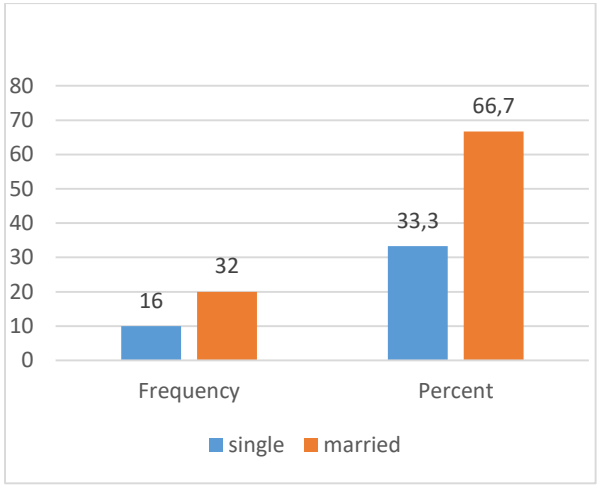

Figure 4. 2 Marital statuses of Respondents

Source: Computed by author (2024)

In addition, the study found out that most of the respondents are married with a 66.7% and those who are single 33,3% as seen in the figure above. This implies that most pharmacy owners and workers in Bamenda town are married people.

Work Experience

From the figure below it is shown that majority of the respondents which represent the highest percentage of 42% have being working for 6-10 years, 28% of the respondents from 0-5years, 21% of the respondents from 11-15 years and lastly 9% of the respondents from 15 years and above

.

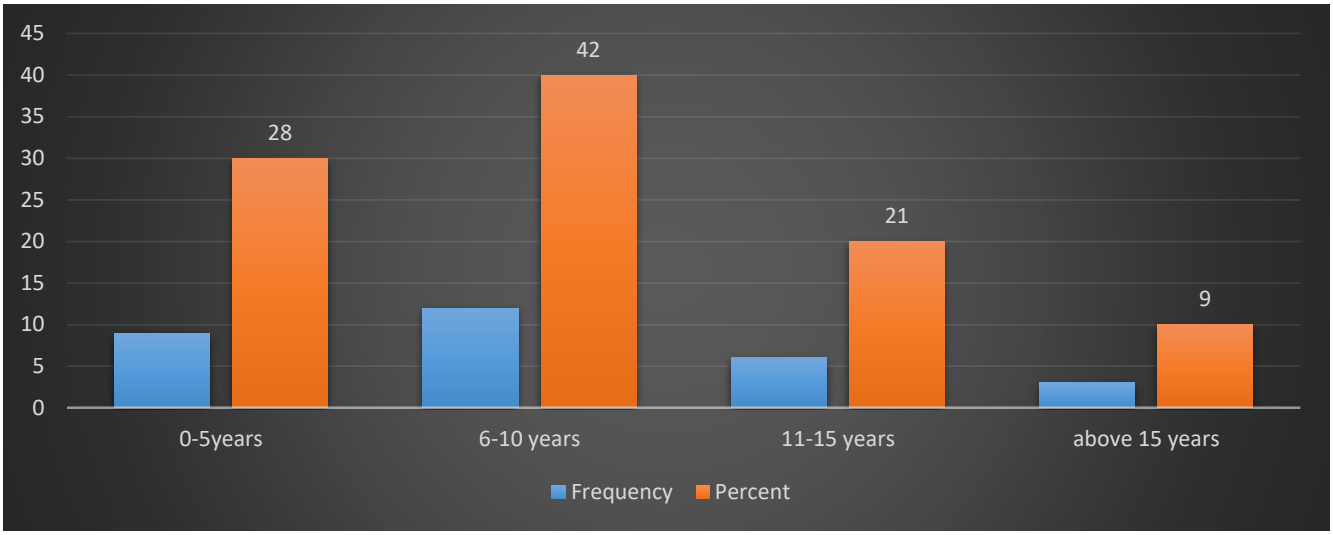

Figure 4. 3: Work Experience

Source: Computed by author (2024)

Position held at the Pharmacy

Table4.3: Position

		Frequency	Percent
Valid	Pharmacy Doctor	6	12.0
	Pharmacy Attendant	12	25.0
	Pharmacist	9	18.0
	Pharmacy Nurse	21	43.0
	Total	48	100.0

Source: Computed by author (2024)

The table above shows that majority of the respondents were pharmacy Nurses (43%), followed by pharmacy attendants (25%), and pharmacy doctors had the lowest number. This indicates that, most of the active and available workers in pharmacies in Bamenda town are pharmacy nurses. This can clearly been seen in the figure below.

Number of years of Pharmacy

Table:4.4 Number of years of Pharmacy

		Frequency	Percent
Valid	less than 10 years	28	58.0
	above 10 years	20	41.0
	Total	48	100.0

Source: Computed by Author (2024)

The results reveal that, most of the pharmacy in Bamenda town is (58%) have been existing for less than 10 years while about 20 of the pharmacies have been existing for more than 10 years. This can be seen clearly in the figure below.

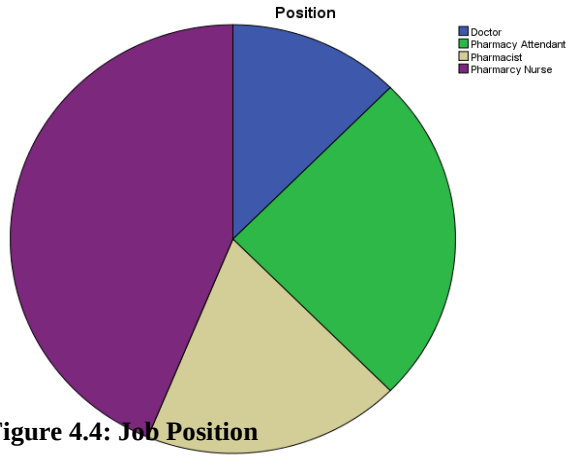

Figure 4.4: Job Position

Parameters	Mean	Std. deviation	Rank
Long-term relationships	4.31	0.83198	1
High level of trust	4.25	0.82382	2
Mutual information sharing	4	0.70711	4
High level of good communication	4.08	0.64024	3
Grand Mean	**4.16**		

Source: Computed by Author (2024)

Inventory Management Practices and Supply of Drugs

The study sought to find out the extent to which inventory management practices by pharmacies in Bamenda town affect the supply of drugs. A number of questions were presented to the respondents who gave their responses on a scale of 1-5 where: 1 to 3 implies to a Very small extent and 4 to 5 implies to Very large extent.

Answers to Research Objectives

Table 4.5 Objective one: - To Determine the Effect of Inventory Management Control System (IMS) on the Supply of Medications in Pharmacies within Bamenda Town.

Parameters	Mean	Std. deviation	Rank
Prepare inventory budgets	4.08	0.92431	1
Review inventory levels	4	0.88192	2
Carryout replenishment of stock	4.08	0.86212	1
Carryout inventory tracking	3.92	0.75933	3
Mean	**4 .02**		

Source: computed by author (2024)

Table 4.5 seek to determine inventory management control practice by pharmacies in Bamenda town. The above table reveals the mean and standard deviation of factors that were used. A mean of 1-3, shows that the factor in question has been adopted by the responding pharmacies to a small extent. A mean of 4-5, shows the factor in question has been adopted by the responding pharmacies to a large extent. This shows a good indication that most of the pharmacies in Bamenda town have adopted the inventory management systems in carrying out their operations on drugs. The results show that the inventory management systems are used to prepare inventory budgets and carrying out replenishment of stock with a mean of (4.08) by pharmacies in Bamenda town. It was followed by review of inventory levels having a mean of (4.0), while the least

parameter used was to carryout inventory tracking with a mean of (3.92). On average pharmacies in Bamenda town adopts inventory management systems to a large extent as indicated by a mean of (4.00). This shows that pharmacies in Bamenda town are conscious of inventory management control in the supply of their drugs. The study therefore rejects the null hypothesis that states that inventory management control system has no significant effect on the supply of medications to pharmacies in Bamenda town.

Table 4.6 Objective Two: - Find out the Effect of Strategic Supplier Partnership (SSP) on the Supply of Medications to Pharmacies in Bamenda Town.
Source: computed by author (2024)

The study also seeks to determine the strategic supplier partnership existing between the suppliers and the various pharmacies. As shown in the Table 4.6 above, a mean of (4.31) of the respondent have long-term relationships with their suppliers, followed closely by high level of trust with a mean of (4.25). The mean of 4.08 indicates a high level of good communication with their partners and (4.00) of the respondents shared mutual information with their partners which allows them to have a strong strategic supplier partnership. With the above analysis, an average (4.16) demonstrates a healthy strategic supplier partnership between the pharmacies in Bamenda town and their various drugs suppliers. The study therefore rejects the second hypothesis that states that strategic supplier partnership has no significant effect on the supply of medications to pharmacies within Bamenda town.

Table 4.7 Objective three: To Determine the Effect of the use of Information and Communication Technology (ICT) in Inventory Management on the Supply of Medications in Pharmacies with in Bamenda Town.

Parameters	**Mean**	**Std. deviation**	**Rank**
Review of inventory levels	4.48	0.86124	1
Determination of appropriate maximum and minimum inventory levels	4.32	0.81833	3
Determination of appropriate reorder level of stock	4.35	0.78938	2
Availability of adequate stock at all times	4.16	0.68773	4
Use of inventory management techniques to determine inventory level	3.73	0.69317	5
Grand Mean	**4.19**		

Source: computed by author (2024)

It was evident from literature review that ICT has an impact on inventory management and consequently on the supply of drugs. From Table 4.7 it indicates that ICT assists in the review of inventory levels having the highest mean of (4.48). This is followed closely by a mean of (4.35) that expresses the determination of appropriate maximum and

minimum inventory levels, (4.32). This indicates determination of appropriate reorder level of stock. The least mean of (3.73) assists to show that the use of inventory management techniques to determine inventory level is not largely used by pharmacies in Bamenda town, meaning that they use other local methods like observations or study of past records. The average mean (4.19) shows that more respondents use ICT to a large extent in the management of drug supply. The study therefore rejects the third hypothesis

Supply and Management of Drugs

We asked respondents to kindly indicate using a scale of 1 to 5 on the effects inventory management practices have on the supply of drugs in their pharmacies.

Parameters	**Mean**	**Std. deviation**	**Rank**
Facilitate emergency order	4.11	0.77401	4
Facilitate the tracking of expiry dates of drug	4.35	0.71555	2
Facilitates standardization of inventory movements	3.97	0.79884	5
Limits the danger of running out of drugs	3.92	0.64024	7
Maintains a good minimum-maximum stocks quantity	3.95	1.07873	6
Faster inventory turns	4.24	0.68335	3
Reduction in inventory paperwork	4.65	0.58766	1
Grand Mean	**4.17**		

Source: computed by author (2024)

Table 4.8 shows the relationship between inventory management practices and supply of drugs, which had an average mean (4.17) which is to a large extent. The mean scores also show that reduction of inventory paperwork ranks high with a mean score of 4.65 in terms of influencing supply of drugs followed closely by facilitate the tracking of expiry dates of drug at 4.35. Limits the danger of running out of drugs ranked low with a mean score of 3.92 in terms of supply of drug followed by maintains a good minimum-maximum stocks quantity at 3.95. None of the respondents disagreed that inventory management practices have assisted the supply of medication in Pharmacies in Bamenda town.

Regression Analysis

Table 4.9: Multicollinearity Test

Source: computed by author (2024)

Table 4.9 above shows the VIF result which is used to further test for multicolinearity. If the VIF of a coefficient of a variable exceeds 10, then that variable is highly collinear, and multicolinearity becomes a problem (Gujarati, 2004). The VIF result shows that individually, none of the VIF exceeds 10, thus it can be concluded that there is no problem of multicolinearity among the independent variables.

	Collinearity Statistics	
	Tolerance	**VIF**
Inventory management systems	0.906	1.104
Strategic supplier partnership	0.854	1.171
Information and communication technology	0.817	1.224

Moreover, the mean VIF do not exceeds 2.5 as prescribed by Gujarati (2004). Hence, the three independent variables, which are indicators of inventory management, can be used in the same model in carrying out the ordinary least square regression analysis.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.780[a]	0.59	0.48	0.39259

a. Predictors: (Constant), Inventory Management Systems, Strategic Supplier Partnership, Information Communication Technology

b. Dependent Variable: Supply of drugs

Source: computed by author (2024)

From the data in Table 4.10 the R^2 was 0.59 which means 59.0% of variation in supply of drugs is accounted for by the variation in inventory management practices. 41.0% is accounted for the variables not included in the model but when adjusted, it is 48%.

The correlation coefficient (R) in this case was 0.780 and thus there was a strong positive correlation between inventory management practices and Supply of drugs.

Model Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	1.999	0.74		2.72	0.01
Inventory Management control Systems	0.266	0.13	0.341	2.12	0.04
Strategic Supplier Partnership	0.127	0.14	0.148	0.92	0.38
Information Communication Technology	0.134	0.15	0.155	0.89	0.37
a. Dependent Variable: **Supply of Drugs**					

Source: computed by author (2024)

From the regression model the following regression equation was derived:

$Y = 1.999 + .266\ X_1 + .127X_2 + .134X_3 + \varepsilon$

Where,

Constant = 1.999, to mean, inventory management practices all held at zero (constant) supply of drugs would change by1.999:

X_1 = .266, to mean, one unit increase in inventory management system equals an increase in supply of drugs by 0.266

X_2 = .127, to mean, one unit increase in strategic supplier partnership equals an increase in supply of drugs by 0.127

X_3 = .134, to mean, one unit increase in inventory management system equals an increase in supply of drugs by 0.134

ε = error term represents all the factors/variables that affects the dependent variable but were not included in the model either because they were difficult to measure or not known.

This is a two-tailed test at 0.05 level of significance. The degree of freedom = n – 2= 37 – 2 = 35. From the t-distribution table, critical t = 2.042. The decision rule would therefore be to reject H0 if computed t is either less than -2.042 or greater than +2.042.

Discussion of Findings

The model shows a statistically positive significant relationship between Inventory management practices and supply of medicament (β = 1.999, t= 2.72, $p<0.05$) in general. It also shows a large significance relationship between inventory management systems and Supply of drugs (β = .266, t= 2.12, $p<0.05$). However, there is no significance relationship when it comes to; Strategic supplier partnership (β = .127, t= .89, $p>0.05$) and Information Communication Technology (ICT) (β = .134, t= 0.92, $p>0.05$) and drug supply for the significance is greater than 0.05. The coefficients are positive which would indicate that as the selected inventory management practices increases, so as drug supply. The consistency of regression coefficients on the selected inventory management practices suggests that these variables are important factors influencing the supply of drugs although at different degrees. From our descriptive tables, the results also show that majority of pharmacies practices inventory management in managing the supply of their drugs and also most of them have a good relationship with their suppliers. This results are in conformity with our expectations and empirical literature. For example ; Inventory management process as stated by Halachmi & Bouckart, (2005) is a process in which a firm convene financially the requirements placed on it by restricting the amount of stock held in various forms. For cost minimization and performance improvement, the quantities of stock in a

firm should be held at an optimal level and this is the major objective of the inventory control system. Malcom, S. (2005) a bit of protection in opposition to uncertainty of supplier performance leads to the existence of buffer or uncertainty or safety stocks in a firm. This uncertainties may arise due to poor inventory management. Employee illness/absenteeism and machine break down are avoided by having the work-in-progress buffer while protection against production failures and unforeseen demand are through finished goods buffer.

Above all, emphasized by Dobler and Burt (2006) as it is the case of cash, stock amount to the monetary value held by a firm and similar control measures. It is essential to have a sound inventory management system as it assists in preventing stock outs, overstocking, deterioration, obsolescence and high carrying cost. An ideal inventory management system is for the essence for decision making in the procurement function and the company as a whole. Strategic supplier relationships, an inventory management system and effective use of information communication technology are important to a company, which expects its procurement function to operate efficiently and offer quality services.

SUMMARY OF MAJOR FINDINGS, CONCLUSION AND RECOMMENDATIONS

This section of the paper gives the summary of study findings, the conclusions, recommendations made based on findings, limitation of the study and the suggestions for further studies.

Summary of Major Findings

The main objective of this study was to investigate the effect of effective inventory management practices on the supply of medicaments in pharmacies in Bamenda town. The study adopted a descriptive statistics and causal research design approach. Data was obtain through a self-administer questionnaire to 50 pharmacies in Bamenda town but only 48 questionnaires were return. The research study was sub-divided into three segments on the questionnaire; firstly, response rate and general information on respondents, secondly, inventory management practices embraced by pharmacies in Bamenda town and lastly, the effect of inventory management on supply of medicaments.

The analysis from the finding revealed that there was a significant level of embracement of each of the inventory management practices. Strategic supplier partnership was the most embraced inventory management practices by pharmacies in Bamenda town, having a grand mean score of 4.21. Secondly followed by Information Communication Technology with a grand mean score of 4.19 and finally the inventory management systems (4.00).

Under strategic supplier partnership, long-term relationships ranked as the highest indicator with a mean score of 4.41 followed closely by high level of trust (4.35). The lowest ranked indicator of strategic supplier partnership was mutual information sharing (4.00). The analysis further revealed that for information communication technology practices, the highest ranked indicator was firms using ICT to review inventory levels (4.38). Similarly, the lowest ranked indicator was use of inventory management techniques to determine inventory level (3.73). For inventory management system practices, firm using the systems to prepare inventory budgets and carrying out replenishment of stock ranked high at 4.08, followed by the use of the systems to review the inventory levels (4.00) and the lowest rank being the carrying out of inventory tracking at 3.92 mean score.

Using a multiple regression model, the data obtained from the respondents was used to regress inventory management practices against supply of drugs in pharmacies around Bamenda town. The analysis on the relationship between inventory management practices and supply of drugs revealed that an overall significant relationship (P=0.01) was attained. Out of all the three (3) inventory management practices, strategic supplier partnership and information communication technology were negatively related to supply of drugs. While the model was generally found to be significant, only inventory management systems were significantly related to operational performance given a p-value of 0.04 while the others (strategic supplier partnership and information communication technology) were not.

Conclusion

The study found that out of the three (3) inventory management practices, inventory management control systems was the most embraced having significance of 0.04. This is because an inventory management system not only reduces inventory wastage but also ensures more efficient use of available warehouse. These findings conform to that of Womack et al., (2003) who introduced the lean production principle which was associated with reduced inventories. As a result of these findings, we conclude by rejecting all of our null hypotheses, which suggested that, there is no relationship between the various inventory management practices and supply of medicament in Pharmacies in Bamenda town.

Recommendations

The overall research findings have established that indeed inventory management have a significant effect on the supply of medicaments in pharmacies in Bamenda town. From the findings made and conclusions drawn after the analysis of data collected, the following recommendations are presented.

- Firstly, practitioners on the one hand may use the findings of this research to find a way to draw attention from all the stakeholders in the health industry to help address the issue of proper inventory management in pharmacies within Cameroon.
- Secondly, most of the health facilities should be advised by the Ministry of Health to use a more advanced inventory management system rather than the traditional system.
- Thirdly, it is recommended that heads of pharmacies should ensure a cordial relationship with their suppliers so as to maintain constant supply of medicaments when need arise. Supplier appraisal by the procurement function should be a key element in inventory management as this will help evaluate the suppliers and choose the best from the many and develop long term round table relationships with them.
- And lastly, it is recommended that Pharmacies in Bamenda town should embrace information and communication technology in inventory management. This approach of inventory control helps to minimize waste since it is one of the primary goals which allow pharmacy to achieve its objective of cost-effective product utilization.

Limitations of Study

Firstly, the independent variables that have been stated in this research are not limited to three (3). Therefore, there could be more variables to measure and assess the effect of inventory management practices on supply of medicaments. Secondly, the research study only focused on pharmacies around Bamenda town thus making the research vague for such a broad industry.

Suggestion for Further Studies

From the recommendations, it shows that the positive effects of Inventory Management System, Strategic Supplier Partnerships, and Information Communication Technology on operational performance of Pharmacies in Bamenda town were irrefutable. Future research work could be directed on the following;

- Collaborative management of inventory in Cameroonian Regional hospital pharmacy supply chains: practices and issues", Supply chain management. Case study Regional hospital Bamenda..
- Effects of drug inventory control process and performance among hospital pharmacy departments in Cameroon.
- Drivers and challenges of inventory management practices in pharmacies in Bamenda.

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Original Research Article

Isolation of production areas and food inflation in northern Cameroon : the case of the Poli Plain.

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Abstract:

The Poli plain, situated in the west of the North region bordering Nigeria and Adamaoua to the south, possesses considerable physical and human potential for economic development. Such growth hinges on ensuring food security. This article aims to examine the obstacles and barriers to economic exchange between this border territory and its surroundings to address its isolation. As a methodology, a sample of 590 individuals was selected for surveys. This was complemented by multivariate interviews with administrative and local authorities and direct field observations. Descriptive and comparative analyses were then conducted to identify the main reasons behind the trends of outflows from the Poli plain. All categorical data were analysed using chi-square tests and expressed as proportions with a significance threshold of 0.05. The study suggests that, due to environmental challenges, farmers employ various means of transport—both traditional and motorised—to meet their economic mobility needs. Moreover, the isolation from the interior of the country heightens foreign trade flows, where mobility is more accessible, which unfortunately harms the local economy and worsens food insecurity in neighbouring towns linked to these production centres.

Keywords: Road transport, isolation, food insecurity, Poli Plain.

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INTRODUCTION

The first roads connecting villages in Cameroon date back to the era of pre-colonial caravans. Since independence, the public authorities have established so-called modern road networks. However, these efforts have not solved the problem of isolation in rural areas known as agricultural basins. Similarly, urban centres are even less well served, with roads that are too old and in need of renovation. As a result, traffic jams and accidents are commonplace in large cities (Douala, Yaoundé) and on various roads in Cameroon. In the hinterland, farmers find it difficult to move around, travel freely and go about their many

activities. In northern Cameroon, most roads are unpaved. Thus, as everywhere in sub-Saharan Africa, the issue of development is and remains a central concern. Its explanation 'raises many economic, security and mobility issues related to local, geographical, spatial and structural factors' (Atangana, B. H., Ndamé, J.P., 2020). This reality forces the inhabitants of these areas to adapt as best they can to this situation of isolation to carry out their economic activities. The Poli Plain in the North Region is a good example of this, as shown in cameroon (figure1).

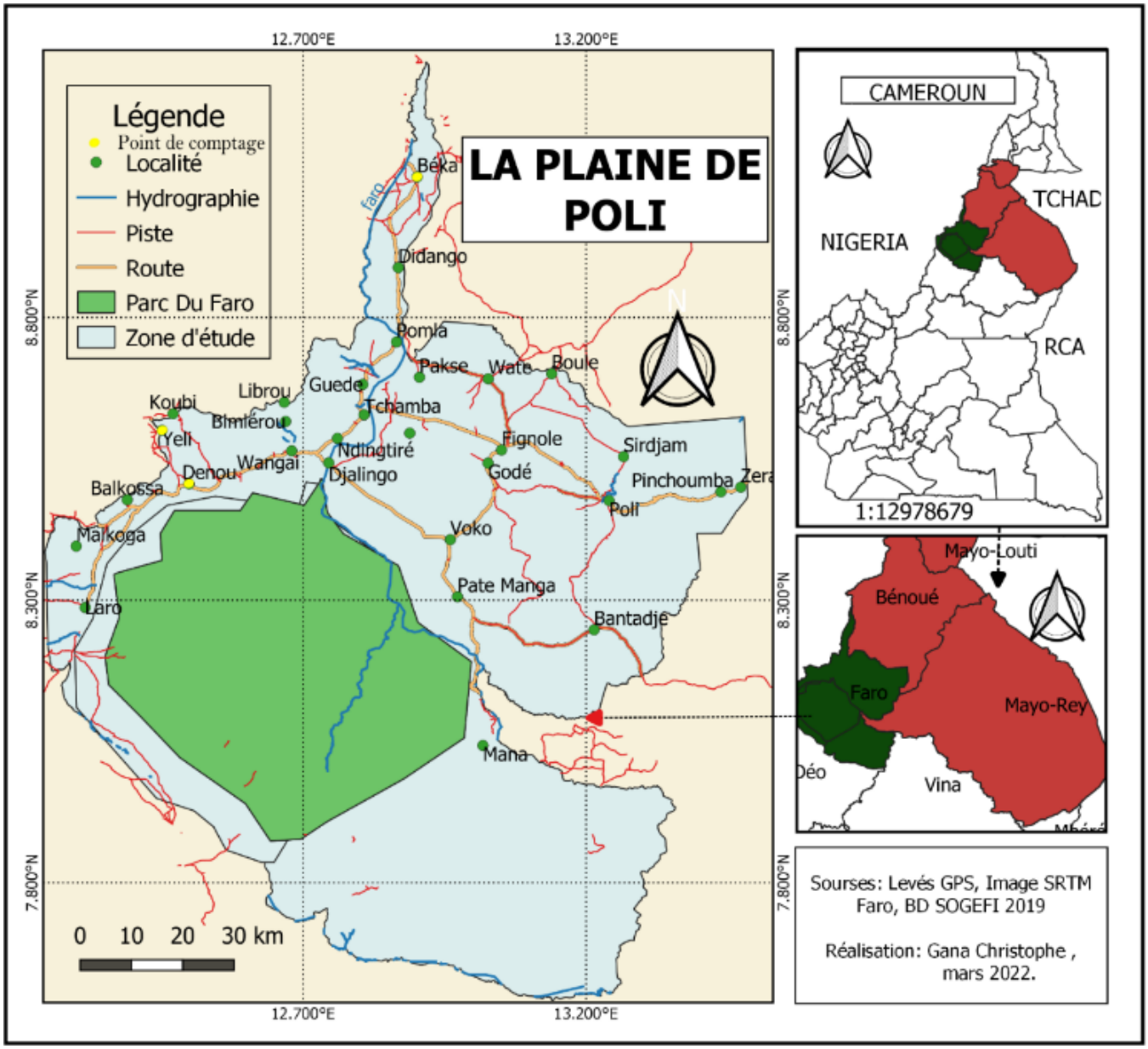

Figure 1: Location of Poli Plain in North Cameroon

This border area has sufficient physical and human potential for economic development (Roupsard, 1987; Gana, C., 2019; Atangana, B. H., 2020). However, the geographical location and physical environment of this territory make communication difficult with the country's major consumer areas and internal trade hubs, such as Poli, Garoua and Ngaoundéré on the one hand, and also make access to the district's agro-pastoral production areas difficult on the other (Gana, C, 2019; Sadio F., 2021). In its report on inflation trends, the National Institute of Statistics (INS 2022, 2023, 2024) indicates that the city of Ngaoundéré (Adamaoua region), which shares administrative borders with the Faro (Plaine de Poli), recorded the highest inflation rate in the country, ranking among the top 10 most expensive cities in Cameroon for three consecutive years with rates of 7.4%, 6.3% and 8.4%. Thus, after an inflation rate of 8.4% in January 2024 and 8% in April, the regional capital of Adamaoua remains in the lead with 7.7% in May 2024. It is followed by Maroua (Far North) with 7.6%. Douala, Ebolowa and Bertoua posted inflation rates of 6.6%, 6.3% and 6% respectively. These are closely followed by Yaoundé (5.6%), Bafoussam (5.6%), Buea (5.6%) and Bertoua (5.4%). (Chronicle by Marius Zogo, 26 July 2024, ECO Matin No. 719).

These cities, which are generally regional capitals, have very poor connections with the surrounding production areas. Worse still, soaring fuel and transport prices are hurting food prices in cities. This situation is illustrated by the Poli plain, a large food production area which, due to its isolation, is unable to supply the hungry domestic markets. However, the geographical position and physical environment isolate this territory, weakening the local economy and destabilising local market activities due to price fluctuations caused by speculation at the end of each agricultural season (Kossoumna Liba'a, N, 2009).

These factors, which isolate the Poli plain, undermine economic mobility, weaken the local and regional economy, and destabilise local market activities as a whole, to the benefit of nearby Nigerian markets where the roads are well paved near the borders. This does little to promote its economic integration, not only in the northern region to which it belongs as an administrative unit and the rest of the country, but even less so in the other member countries of the CEMAC. In view of this reality, it is clear that the transport sector is at the heart of this problem.

This means that infrastructure and transport are crucial to the health of the local and national economy. Unfortunately, the Poli plain is an area that lacks the very foundations of development. The current transport situation in this border area is complex. In this regard, it is worth asking how the Poli plain, through its farmers, manages to communicate with neighbouring territories. What are the main causes and consequences of the isolation of this plain on the local economy? This study aims to examine the difficulties of economic mobility in this border area via the road network in order to overcome the problem of isolation and guarantee mobility, which is a guarantee of food security in Cameroonian cities.

RESEARCH METHODOLOGY

Frequency and choice of sites

It was conducted between November 2022 and June 2023, using a mixed approach (combining quantitative and qualitative methods) from the social sciences. The localities of Dénou, Yeli and Béka, which are the main transit routes for agricultural produce in the Poli plain, a border area between Cameroon and Nigeria (see Figure 1), were therefore chosen as study sites. The villages selected in this border area are those where agricultural and agri-food products are traded and transported to Nigerian markets.

Data collection

In response to mobility needs in the Poli Plain, farmers are strengthening traditional means of transport while integrating motorised means of transport into their habits, which are adapting as best they can to physical and geographical constraints in order to meet their economic needs. In order to verify this hypothesis, the work was carried out in three main stages.

First, an exploratory field trip was necessary to assess a number of mobility indicators. This phase was driven, on the one hand, by participatory observations of the scale of local markets in Poli, Béka, Tchamba, Wangai, and Kodjoli (in Nigeria, to make a comparison in terms of the role transport plays in local economies, which made it possible to capture scenes with geo-referenced images); and, on the other hand, by interviews with key figures in the economic sector (producers, transporters, traders, local authorities).

Secondly, for this study, the opinions of a sample of 590 individuals were collected (farmers or livestock breeders, traders, transporters of local agri-food products). Participants were chosen at random according to availability and consent, mainly in the main localities with high economic potential that host a weekly market.

The latter answered questions according to their professions, via various means of deploying questionnaires on the KoboToolbox server. These questionnaires were then downloaded to smartphones for administration. For remote areas, these questionnaires were printed on paper to be re-entered manually for analysis. This made it possible to assess the role of transport in the duality of isolation/accessibility of the production areas of the Poli Plain and to understand how rural populations communicate and trade with neighbouring areas, particularly Nigeria to the west, Touroua to the east and Vina to the south.

All volunteer participants completed a questionnaire designed to assess the impact of isolation on road transport in border areas, with regard to the production and marketing of local agri-food products.

These questions, divided into sections, including an “Identification” section on the socio-demographic characteristics of the participants, were also administered. This was done by a research team of nine people who travelled around the cantons with cereal markets in the Poli plain.

In addition, the interview guide was administered to the heads of the villages surveyed, asking them about the difficulties of mobility in all seasons in their locality and how they deal with the economic repercussions.

Data analysis method

The socio-demographic variables collected from respondents were gender, age, marital status and level of education. Respondents' income was assessed based on their total annual earnings from their occupation as producers or traders of local agri-food products.

In order to better understand the probable reasons for the influence of agri-food flows towards the Nigerian borders, information was collected on the availability of agricultural labour, access to adequate support (subsidies, loans and training) from agricultural and financial services, access to inputs and access to product markets.

The analysis was carried out using IBM SPSS Statistics 23 software. Descriptive analyses were performed to describe the socio-demographic characteristics of the study population, as well as their mode of transport and the place of sale of their agricultural production. Standard statistical measures were used according to the type of variables, such as the calculation of means with their standard deviations and percentages.

In addition, descriptive and comparative analyses were performed to identify the underlying reasons for the influence of the trend in flows outside the Poli Plain.

All categorical data were compared using chi-square and expressed as proportions with a significance threshold of 0.05. If $p < 0.05$, the means are significantly different from each other; if $p > 0.05$, the means are not significantly different from each other. Other Chi-square

The chi-square is a test for measuring the association between two variables. It is one of the most commonly used analytical tools in social science research, which aims to examine the difference between two given variables. We will first justify the choice of this tool and then show how it works.

- Justification for using the chi-square

The chi-square test is a frequency comparison test that examines the difference between two given variables. The

process of analysing a contingency table using the chi-square test follows these steps:
Formulation of the symmetrical hypothesis of independence, known as the null hypothesis; examination of the test result.

Two factors were taken into consideration when choosing the chi-square association test: the nature of the test and the verification to be carried out.

Finally, quantitative, qualitative and iconographic analyses were essential in order to gain a deeper understanding of the situation. The use of computer tools such as SPSS for the analysis of quantitative field data led to descriptive measurements of the variables.

RESULTS

Impact of isolation on the Poli plain

The Poli plain faces significant challenges in terms of market access and the movement of goods

The Poli plain has approximately 346 km of roads, comprising 149 km of priority dirt roads, 65 km of non-priority dirt roads and 132 km of classified rural roads. Eighty per cent of the Faro road network is in very poor condition. The P34 regional road linking Pana-Poli-Fignolé-Tchamba-Laro is the only road connecting the department of Faro to the North region. On the P34, the Fignolé-Tchamba (T18) axis has significant muddy patches and gullies. The Voko-Fignolé-Bantadjé (T15)

rural road is frequently flooded. The Tchamba-Béka, Tchamba-wangai-Balkossa-(Nigeria)-Laro axis is impassable throughout the rainy season. The Balkossa-Malkoga road is in such poor condition that traffic is diverted via Djomba, a town in Nigeria, to bypass the enclave of broken or non-existent bridges (Table)

Tableau 1.Status of transport infrastructure

BRIDGE CONDITION	STATE OF DESTRUCTION	NUMBER OF BRIDGES
GOOD	Minimal	05
BAD	Partial	37
CUT	Total	13
CONSTRUCTION	Under construction	05
TOTALS	Roads are in poor condition	60

Source: fieldwork 2021

The table illustrates the factors that influence the movement of individuals from one market to another. Market attendance in the plains depends on these factors, as traders seeking profit gradually withdraw when expenses exceed profits. Of the 60 bridges covered by this survey on the plains' main routes, only five are in good condition, interspersed with defects and gaps. The other infrastructures are under construction, and some are never completed, as they are always eventually washed away by

the waters. In this context, we are witnessing endless roadworks causing diversions in several places along the roads. These results can be seen in the condition of the Faro bridges (Figure 2).

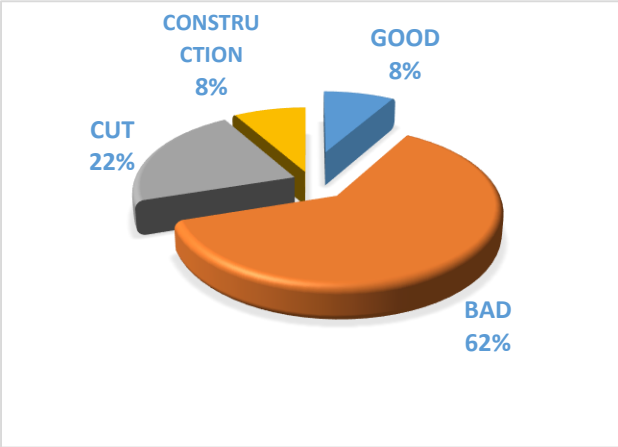

Figure 2: Condition of bridges as a percentage of the Poli plain

The figure above provides information on the condition of the communications infrastructure in Faro. It shows that 62% of the infrastructure is in poor condition; 22% of it is cut off (i.e. in very poor condition), which means that 84% of bridges are dilapidated (Image 1), 8% are under construction, and only 8% are in good condition.

Image 1. Bridge under construction on the Mayo Pintchoumba

This image shows the bridge under construction since 2015, which was destroyed on the main P34 axis of the section connecting the Poli Plain to National Road No. 1. It was still unfinished in September 2025 and remains far from completion, like other construction sites in the plain. This location, a few kilometres from National Road No. 1, has left the Poli area isolated for more than 17 years, with completion remaining a distant and uncertain prospect given the state of progress of the construction sites, characterised by multiple work interruptions. It is important to mention that these project owners are still not meeting the deadlines for completion of the infrastructure due to their choice of contractors to carry out the work. The infrastructure that is supposed to be delivered at

this stage reflects the state of the road infrastructure in the Poli plain. This

infrastructure itself facilitates the mobility of vehicles in all seasons. According to the investigations carried out, the various categories of the population surveyed unanimously agreed that the first obstacle encountered is that of the road. This is because in the Poli Plain, which is predominantly rural, travel conditions vary from one village to another depending on accessibility. Certain roads have not seen bulldozers for more than 20 years without any improvement works (Balkossa-Malkoga). This problem is becoming widespread at both the regional and national levels in production areas. The high cost of living in cities is a primary cause. These roads are often ideal places for animals to drink and for villagers to wash themselves and their clothes. The case of the Fignolé River, image below, is typical of these roads in the plains.

Image 2. Bridge washed away on the Fignole River (2021-2025)

The condition of the road in the Poli plain makes travel very costly. This dynamic clientele reacts according to the situations in which they find themselves. When travellers are under pressure, these public transport vehicles are abandoned. Motorcycles are much more in demand during the rainy seasons when water flows over the roads and vehicles easily get stuck. Motorcycles are the only means of transport available in each village. Regardless of the season, these motorcyclists travel the village streets in all weathers, transporting people and goods at high prices set arbitrarily (Table 1). This leads to an increase in transport costs and food prices.

Table 1. Fluctuation in transport costs in the Poli plain

Destinations	Distances		Motorcycle fares		Car fares	
	Short route	Long route	Dry season	Rainy season	Dry season	Rainy season
Poli-Carrefour poli	36km	38km	2000F	3000F	1500F	2000F
Poli-wate	50km	50km	5000F	6000F	2000	3000F
Poli-Gode	45km	45km	2000F	3000F	1500	2000F
Poli-Voko	50km	60 km	5000F	7000F	3000	4000F
Voko-Bantadje	52	52	4000F	6000F		
Poli-Wangai	77km	87km	7000F	10000F	5000F	6000F
Wangai-Laro	62km	102km	5000F	10000F		
Poli-Tchamba	50km	75km	5000F	7000F	5000F	6000F
Tchamba-Beka	55km	55km	5000F	8000F	3000F	5000F

Source: 2022 field survey

Table 1 above shows the impact of the season on transport fares in the Poli plain. Fares increase systematically during the rainy season, whether by motorbike or car. This increase is probably due to road deterioration, longer journey times and increased risks for drivers. The comparison of motorbike/car fares is based on the urgency of the journey. On roads that are passable over the same distance, motorbikes are more expensive than cars (e.g. Poli-Carrefour Poli, 2,000 F by motorbike compared to 1,500 F by car in the dry season). For long journeys, cars become more expensive (e.g. Poli-Wangai, 7000F by motorbike compared to 5000F by car in the dry season), but the difference varies because there are alternative, shorter routes on this axis that are only accessible by motorbike. In general, the longer the distance, the higher the fares, which is logical. However, what appears to be an inconsistency is not, as the level of deterioration of transport infrastructure also has an impact on fares, such as Poli-Tchamba (75 km) and Tchamba-Béka (55 km), which have very similar, if not identical, fares.

Getting from one place to another in the Poli plain is no easy task, as it requires a great deal of sacrifice and expense. Here, we operate in an environment where there are no fixed prices for the same distances and destinations in different climatic conditions. These costs vary according to the season, the customer, whether they are foreigners or Bororo herders, who often demand comfortable seating even in the mud, and even specify the time they want to arrive when travelling. If the latter has no choice because it is the only opportunity to travel, or if there is a case of illness or an emergency where travel is imperative.

Table 2: Means of transport

Means of transport		Frequency	Percentage	Valid percentage	Cumulative percentage
Valid	On foot	359	60,8	60,8	60,8
	Personal motorbike	30	5,1	5,1	65,9
	Motorcycle taxi	201	34,1	34,1	100,0
	Total	590	100,0	100,0	

Source : 2022 field survey

According to the table above, we note that among the means of transport observed in the Poli plain for 590 respondents, 359 people use walking as a means of transport, representing 60.8% of respondents. This is the most common means of transport. This dominance is caused by several factors, including isolation and poverty. As for personal motorbikes, 30 people use their own motorbikes, representing 5.1% of respondents. As for motorbike taxis, 201 people use motorbike taxis, representing 34.1% of respondents (Figure 3). In summary, the majority of people travel on foot, followed by those who use motorbike taxis, and finally, a small proportion use their own motorbikes. Other means of transport, such as canoes and buses, are used periodically, either by preference or necessity, due to the advanced state of deterioration of all modes of transport.

Analyse de la situation dans la plaine de poli

1.1. Testing objective criteria

Assessing the relationship between the sales method and the means of transport will

enable us to determine whether there is a real correlation between these two variables by quantifying the strength and direction of this relationship. Using objective criteria, the test helps to validate or reject hypotheses about the nature of the relationship between the variables. This ensures that the conclusions drawn are based on solid data.

Table 3: Normality tests

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistics	ddl	Sig.	Statistics	ddl	Sig.
sales method	,300	590	,000	,734	590	,000
average transport	,391	590	,000	,642	590	,000

Figure 1:Trace of observation weighted by gender average means of transport

a. Lilliefors significance correction

Significance (Sig.): In both tests, the p-value (Sig.) is 0.000 for both variables, which is well below the usual threshold of 0.05. This indicates that we reject the null hypothesis that the data follow a normal distribution.

- Kolmogorov-Smirnov and Shapiro-Wilk: Both tests show similar results, with statistics indicating a significant deviation

from normality. The statistical values (0.300 and 0.391 for Kolmogorov-Smirnov, and 0.734 and 0.642 for Shapiro-Wilk) reinforce this conclusion, which can be seen in the following figure 2.

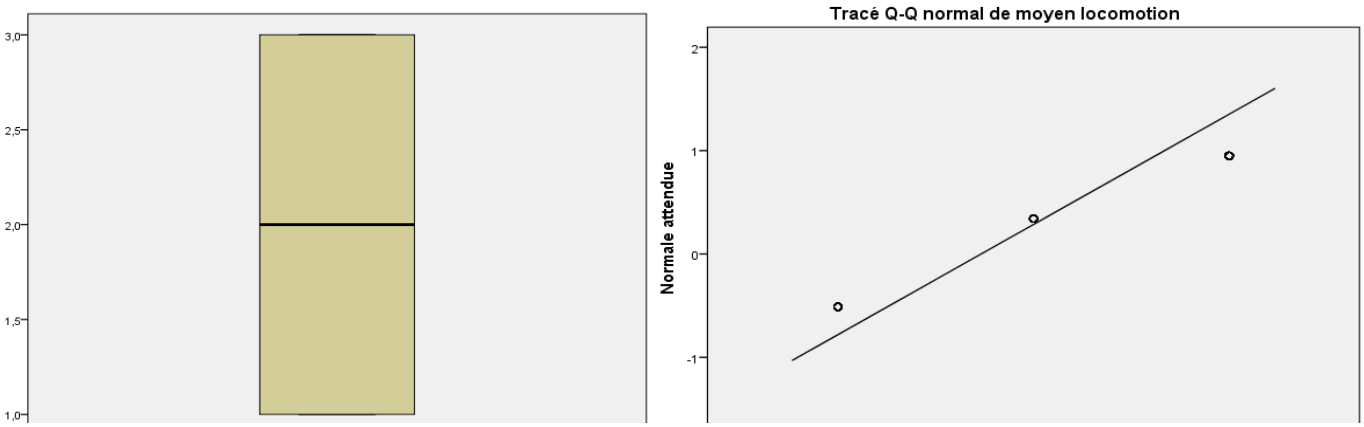

Tableau 2.Trace of observation weighted by gender average means of transport

The results of the Kolmogorov-Smirnov and Shapiro-Wilk tests show that neither the sales method nor the means of transport follows a normal distribution. This may have implications for the statistical analyses we can consider, as many statistical methods assume that the data are normally distributed. It may be necessary to use Pearson's methods to further our verification

Table 4. Correlations between sales method and means of transport

Corrélations		sales method	means of transport
sales method	Pearson correlation	1	,108**
	Sig. (two-tailed)		,008
	Sum of squares and cross-products	478,685	54,003
	Covariance :	,813	,092
	N	590	590
means of transport	Pearson correlation	,108**	1
	Sig. (two-tailed)	,008	
	Sum of squares and cross-products	54,003	517,688
	Covariance :	,092	,879
	N	590	590

**. The correlation is significant at the 0.01 level (two-tailed).

According to Pearson's correlation coefficient, the correlation between the sales method and the means of transport is 0.108. This indicates a weak positive correlation. In other words, there is a slight tendency for variations in the sales method to

be associated with variations in the means of transport, but this relationship is weak.

Significance: The p-value (two-tailed) is 0.008, which is below the threshold of 0.01. This means that the observed correlation is statistically significant, suggesting that we can reject the null hypothesis of no correlation. In other words, it is unlikely that this correlation is due to chance.

Sum of squares and cross-products: Values indicating the variability of the data. For the sales method, the sum of squares and cross-products is 478,685, while for the means of transport, it is 54,003. This shows that the variability is greater for the sales method.

Covariance: The covariance for the mode of sale is 0.813, and for the mode of transport is 0.092. This indicates that the two variables vary together, but the covariance for the mode of transport is relatively low.

Sample size (N): Both variables have a sample size of 590 observations, which is sufficient to ensure the robustness of the results. In summary, although there is a significant positive correlation between the mode of sale and the means of transport, it is weak. This suggests that there may be other factors influencing these variables, and it would be prudent to explore further to understand the nature of this relationship. This variable is a determining factor in the state of road infrastructure.

Characteristics of the river network in the Poli plain

River transport in the Poli plain is essentially limited by the inadequate infrastructure on the largest river in the Faro region. The only structure on the Faro River acts as a link between the two existing municipalities. Its position will require a change in the route of the old trade routes, which pass through the Faro National Park, making the journey longer. This type of transport has become part of everyday life for the local population, a habit linked to their activities around the water. This is why the use of canoes (small, medium and large) and calabashes, which are in high demand depending on the routes and destinations, has become imperative. These activities generate income for young people along these banks (photographic plate 1).

Photographic Plate 1. Mode of transport on the River Faro (2021-2025)

The photographs on Plate 1 depict two periods on the River Faro. The photos taken during the flood period (A) were taken in September 2021. The waters are overflowing onto the banks, making transport long (30 to 40 minutes) and costly. The photos in (B) correspond to the dredging period in December 2021. This makes transport short (5 to 10 minutes) and less costly by pirogue.

Of these two periods, corresponding to the dry and rainy seasons, transport is faster during the flood period, as the time taken to float from one bank to the other depends on the physical abilities of the pirogue operator and the presence or absence of solid particles (dead wood, dead animals, etc.), depending on the direction of flow. This river is a source of income for the surrounding population.

Critical discussion of the results :

The results obtained make several significant contributions : Rare empirical documentation : The data collected (survey of 590 people, field surveys on the condition of roads, bridges and transport costs) provide a solid and up-to-date basis for a region that is often marginalised in academic studies.

Highlighting the impact of infrastructure : The analysis clearly highlights the structuring role of the road and river network in the movement of goods, people and commercial practices. The cost differences between the dry and rainy seasons illustrate in concrete terms how infrastructure conditions the local economy. Quantitative approach supported by statistical testing : The use of normality tests and Pearson's correlation strengthens the scientific validity of the conclusions, even if the observed correlation is weak. This rigorous approach goes beyond simple description and identifies relationships between variablesInfrastructure has a significant impact on the dynamism of the market economy in the Poli Plain, in that it dictates a lifestyle that is unfavourable to the mobility of goods and people.

The main activity of the population of the Poli Plain is agriculture. This activity employs more than 80% of the working population. This corroborates the findings of Aka. E (1993) and Amélie P. E. (2017) because of the importance of commercial food crops in the fight against household poverty in the rural part of the Mavila department in southern Cameroon, where 80% of the working population lives off agriculture. Under these conditions, transport plays a major role in moving produce from plantations to consumption areas. Without viable infrastructure, access to markets would be impossible.

Broader socio-economic perspective: The results are not limited to observing the poor condition of roads, but also analyse the social repercussions (massive reliance on walking, prohibitive costs, adaptation strategies such as the use of canoes). These contributions make the study a useful tool for understanding the dynamics of spatial marginalisation and for informing public policy.

Despite these contributions, several limitations must be highlighted, such as the weak correlation observed. Although significant, the Pearson correlation between sales method and means of transport remains low (0.108). This suggests that other variables not studied (household income, socio-professional status, proximity to markets, extreme weather conditions, etc.) strongly influence mobility, food security and commercial practices. This then implies the availability of food in households. FOFIRI, E.J. ; 2013. The determinants of food supply in cities in northern Cameroon.

The geographical scope of the study is limited to the Poli plain and does not compare the results with other regions facing similar problems. This lack of comparison reduces the generalisability of the conclusions, even though the road problem affects all regions of Cameroon.

As prospects for research and action, the results open up several avenues for reflection and intervention :

Further statistical analysis : Extend the analysis beyond Pearson's correlation using multivariate methods (regressions, factor analyses) to identify the relative weight of each factor (infrastructure, income, seasonality, etc.) in mobility and sales practices.

Longitudinal monitoring : Conduct diachronic surveys to observe changes in mobility and economic dynamics, depending on whether or not infrastructure projects are implemented.

Interregional comparison : Broaden the scope to other isolated areas of Cameroon (Adamaoua, Mayo-Kani, etc.) to analyse similarities and differences and contribute to a national debate on spatial integration.

These results underscore the need for improved infrastructure planning and execution. The implementation of independent monitoring of road construction sites, the prioritisation of strategic routes (such as the P34) and regular maintenance of bridges could reduce the cost of opening up these areas. It also highlights the importance of river transport and motorcycle taxis, showing that populations are developing adaptation strategies. Support policies (training, safety, credit for local transport operators) could transform these informal practices into levers for development. Rising transport costs contribute directly to the high cost of living. Future research could quantify this link and propose regulatory mechanisms (targeted subsidies, storage infrastructure close to production areas in Cameroon's and Africa's agricultural basins).

Conclusion

Ultimately, the isolation of food production areas in the Poli plain is a major obstacle to food security and economic development in the region. These findings highlight that the isolation of the Poli plain is both a symptom and an aggravating factor of socio-economic marginalisation. The empirical and statistical approach is a major asset, but methodological limitations call for the analysis to be supplemented by diachronic, comparative and multifactorial perspectives. This article presents the academic interest of these findings in their ability to inform thinking on socio-spatial inequalities, while their practical usefulness lies in guiding policies for opening up Cameroon's production basins and territorial development. It is imperative to implement concrete measures to overcome these challenges and ensure equitable access to staple foods for all inhabitants. All this is only possible if roads no longer constitute a barrier to economic and social activities in Cameroon's regions, and in the Poli Plain in particular. Collaboration between stakeholders is vital for sustainable infrastructure development.

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