Sustainability of Supply Chain Performance Through Inventory and Collaboration Management: A Case of Transportation Fuel Companies in Harare, Zimbabwe

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Abstract: The study was based on the theory of constraints which acknowledges that bottlenecks are systemic, unavoidable, and affect the performance of the organisational supply chain processes. In the study, poor inventory and collaboration management were identified as bottlenecks in the transportation fuel retail sector. Thus, identifying the indicators of poor fuel supply chain performance can assist the industry in achieving a sustainable performance. In the descriptive design, the researchers distributed objective questionnaires among fuel industry supply chain staff whose roles include inventory and collaboration management decisions which are strategic to supply chain performance. The respondents gave their views on the effect of selected inventory and collaboration management indicators on supply chain performance. The analysed results indicate that there is a positive relationship between both inventory and collaboration management and the fuel supply chain performance. These findings led to the conclusion that, achieving supply chain performance goals of profitability, customer satisfaction, internal process effectiveness and company growth requires management to implement inventory and collaboration management strategies. Therefore, fuel industry supply chain stakeholders including government, fuel companies, fuel suppliers, customers and third party logistics service providers need to cooperate and work together to pull the struggling fuel industry from the doldrums.

Keywords: Bottlenecks, Collaboration, Inventory Management, Supply Chain Performance, Theory of Constraints, Transportation Fuel

1. Introduction

The Zimbabwe transportation fuel sector has been reeling under volatile, uncertain, changing and ambiguous situation over time; a situation which raises questions about sustainability of the sector's supply chain. Supply chain management includes the planning and management of all activities related to sourcing and procurement, conversion, and logistics management. It is also important to coordinate and collaborate with channel partners, who can be suppliers, intermediaries, third-party service providers, or customers. Supply chain management, in essence, integrates supply and demand management within and across companies [1]. The situation of the researched set up could be aggravated by the fact that Zimbabwe has no oil and gas exploration, or refineries and it relies chiefly on refined fuel imports. In that case, effective supply chain performance can be achieved when there is effective inventory and collaboration management among the supply chain members.

Operationally, the overall performance of a supply chain is determined by the weakest link of the supply chain [2]. When the weakest link or process bottlenecks have been identified management effort can focus on removing the bottlenecks to take the supply chain to a new level. In the transportation fuel retail sector where the research was done, inventory and collaboration management are the most critical links in the chain yet they are poorly managed, hence they are the weakest link in the fuel supply chain. The slightest

disturbance to these links tends to affect the performance of the entire supply chain. Researchers posit that planning, organising and controlling of transportation fuel retail activities must concentrate on the critical activities which include inventory and collaboration management among supply chain members [3]. The researchers hypothesise that, poor inventory management and weak collaboration among supply chain members has potential to collapse the entire transportation fuel supply chain. In the study, transportation fuel and fuel will be used interchangeably and their meaning is restricted to diesel and petrol only.

In Zimbabwe, there is a statutory requirement that gives the National Oil Infrastructure Company (NOIC) the sole mandate to ship all fuel imports that come through the Beira - Harare pipeline and to manage all fuel inventories till fuel is handed over to individual companies for inland distribution. NOIC has fuel holding facilities in strategic places such as Harare, Mutare, Beitbridge, and Bulawayo. The supply chain management issue emanating from this arrangement is that fuel retailers have got little say and no control in how fuel inventories are managed up to the point when fuel is distributed to the service stations.

The overall distribution of fuel in the market hinges on collaboration links and strategic partnerships among the different players. Fuel service stations are organised into classifications which include; company owned company operated (COCO), company owned dealer operated (CODO), dealer owned company operated (DOCO), dealer owned dealer operated (DOD) and company leased operations of non-petroleum dealers/or operators (CLDO) [4]. Therefore, stronger inventory and collaboration management have potential to strengthen the fuel supply chain performance. Researchers concur that effective supply chain performance is a prime source of competitive advantage and added value [5-8].

Like most fuel importing countries, Zimbabwe has not been spared by the problems facing the fuel industry which is considered a key driver of the economy. Bimha, Hoque and Munapo highlights that since the attainment of independence in 1980, the fuel industry in Zimbabwe has been problematic because the industry has struggled to attain competitiveness [9]. When management it is faced with supply chain complications, such as in inventory and collaboration management, management challenges, it needs adopt effective strategies to keep pace with the dynamic business environment [10]. This study focused on inventory and collaboration management in selected Harare based transportation fuel companies. Because of its capital city status, Harare has a high concentration of service stations such that the impact of a slight disturbance in the fuel supply system will be immediately felt in Harare. Therefore, the objective of the study was to analyse the effect of inventory and collaboration management in sustaining the supply chain performance among selected transportation fuel companies in Harare.

The article is informed by the theory of constraints (TOC) founded by a physicist-cum business consultant, Eliyahu

Goldratt, in 1984. The TOC's basic argument is that, any management system or organisation faces constraints of some sort. Constraints limit an organisation from achieving higher performance and achieving its objectives. Therefore, the TOC is an approach to management that focuses on whatever impedes progress toward the goal of maximizing the flow of total value added funds or sales [11]. Management focus their efforts on eliminating constraints or bottlenecks through a TOC process which involves identifying the constraints, exploiting the constraints, subordinating everything to the constraint, evaluating the constraints and repeating the process all the time [11]. The same author further explained that, it is advisable to focus on one or two problems at a time as this requires less material, financial and emotional resources than attacking everything at once. Therefore, the research identified inventory and collaboration management as the key constraints of the transportation fuel business. The constraints need to be rectified to bring back normalcy to the fuel industry.

Inventory management is a critical activity that affects the health of the petroleum sector and the balance sheet of many organisations. Petroleum companies are constantly striving to keep stocks in order to meet customer demand and avoid stock outs. In today's business environment, effective inventory management is a critical success factor. Profit margins in business are razor thin, and organizations cannot afford waste and shortages [12]. Inventory management includes activities such as demand management, forecasting models, reviewing safety stock levels, and controlling the maximum and minimum amount of inventory [13]. Inventory management systems should implement collaborative, agile, lean, and ultimately cost-effective supply chains [14]. The ultimate goal of effective inventory management is higher profits through improved customer satisfaction and lower costs of doing business Profits are healthier when cost are controlled and reduced. Cost reduction and value creation are now the available means of widening profit base. With the increased competition in the petroleum sector increasing prices to widen profits is no longer feasible [13]. Strategies generally used to enhance inventory management include lean and agile approaches. The lean approach focuses on supply chain value streams and elimination of waste in the supply chains, using fewer resources to achieve a better performing supply chain and is more suitable in situations of high volumes, variety low and predictable demand which are all relevant for the fuel industry [14]. The country requires about 77 million litres of diesel and 55 million litres of petrol per month. On the other hand agile supply chains are more focused on being responsive to customer needs by exploiting market knowledge to deliver profit in a dynamic market [14].

Another relevant inventory management philosophy that is predominantly used in manufacturing industries, but very relevant in the fuel industry, is the just in time (JIT) concept. The concepts discourage the hoarding of inventory and advocates for ordering inventory that is due for usage or distribution. Eliminating inventory avoids inventory carrying costs such as warehouse rentals, cost of capital, inventory

management costs, staff costs and insurance cost [15]. However, implementing JIT assumes robust, effective and reliable infrastructure and management systems because inventories are kept at insignificant levels or at zero and will only arrive in stock when they are needed for use or for on-ward distribution to customers [13].

Bimha and Dumbu; Neeraji and Neha, identified high pipeline fees, poor infrastructure, and high fuel duties as contributors to supply chain challenges facing the industry [10, 16]. Neeraji and Neha discussed the problem of small industry players facing unfair competition from large companies with issues of fuel cartels dominating the industry to elbow out the small players [16]. The above raises questions on whether JIT can be effectively applied in inefficient markets. For example, foreign currency shortages will prevent importers from placing orders on time or ordering the quantities they want because foreign currency allocation is the central bank's prerogative. While the central bank tried to assists importers to access foreign currency through the auction system some unscrupulous entrepreneurs who have access to cheap foreign currency from the auction will not use the purchased foreign currency to import fuel. Instead, they sell the foreign currency on the black market triggering problems such as fuel shortages and arbitrage trading of the low volumes available [16]. Additionally, Bowersox argues that vendor managed inventory (VMI) has also gained popularity in the fuel industry [17]. VMI allows the vendor to be in charge of stock replenishments and relieves the retailers of the costs of holding inventory, procurement costs and other logistical challenges. VMI works well in well integrated industries hence it requires a lot of ICT connectivity which is a big challenge in Zimbabwe. Sainathan and Groenvelt; Beheshti, Clelland and Harrington notes that VMI opposes the tradition in which the customer decides when and how much to purchase based on his own demand; instead, with VMI, the supplier makes the replenishment decision for the customer based on predetermined performance measures such as inventory turns and customer service levels [18, 19]. In the case under investigation vendors and retailers can enter into VMI arrangements but the inventory will be in NOIC facilities implying there is no total control and ownership on the part of the vendors.

Empirical evidence points to the fact that inventory management affects supply chain performance. A study by Anichebe and Agu, on the effects of inventory management on performance concluded that, there is a strong link between competent inventory management and organisational effectiveness [20]. The study demonstrated that inventory management has an impact on an organisation's productivity. In addition, there was a strong link between excellent inventory management and profitability. Therefore, inventory management was critical to the organisation's performance and growth [20]. Similarly, Koin, Cheruiyot and Mwangangi researched on effective inventory management on organisational performance and their findings revealed that the inventory management system and supplier relationship have a stronger impact on supply chain effectiveness and order and warehouse management have a moderate impact on effectiveness [21].

Chebet et al., researched on the effects of the Systems Application Program (SAP) on just-in-time and economic order quantity, as well as how they affect organisational performance [22]. They concluded that it was critical to conduct a continuous review of JIT in order to improve supply chain effectiveness. In a related study, Chebet et al., looked at the impact of inventory management on the profitability of Cement manufacturing companies in Kenya [23]. The study linked inventory costs, company size, gross profit, return on investment, and inventory conversion using cross-sectional survey data from 1999 to 2014. The study concluded that stock levels were directly related to the firm's size and storage costs. In Ethiopia, Atnafu and Balda examined the effect of inventory management practices on the firm's competitiveness and organisational performance [24]. They concluded that inventory management practices can improve competitive advantage which in turn has direct impact on organizational performance.

Supply chain management is concerned with collaborative relationships of members at different stages of the supply chain who have shared and agreed practices, which will be then performed jointly by one or two or more organizations [25]. Supply chain management, in essence, integrates supply and demand management within and across companies. Therefore, for it to achieve sustainable performance channel members must primarily exude a specific behaviour termed supply chain orientation (SCO). SCO includes commitment, common vision, trust, goals and top management support [26]. The authors add that SCM involves forming networks in sourcing for raw materials, manufacturing goods or delivering service, storage, and distribution of the goods, delivering them to the customers. Therefore, the overall goal of supply chain collaboration is to ensure that all supply chain activities are carried out in a manner that maximises value creation at each stage of the supply chain, which will foster the competitive advantage of the organisation's product offering.

Unethical and illegal activities are very common in the Zimbabwe fuel supply chain, Smuggling, product adulteration, over blending and falsified declarations dominate the under hand activities in the sector [10]. These unethical practices affect the genuine industry players' as they face stiff competition from cheap petroleum products acquired unethically and illegally. The existence of these malpractices is a true reflection of the quality and reliability of collaboration among the supply chain members. Collaboration can be simply defined as working together with any part with the view of achieving a win -win result [12, 27]. Collaboration permits synergy development among partners and promotes real time information sharing which improves the quality of decisions made because the partners do not only share profits, but also the risks involved and promotes mutual benefits [28, 29]. The goal of collaboration is to ensure that all parties achieve their intended goals [31].

It is uncommon for a company to have all the resources necessary to compete as individuals [32]. As a result, the most recent supply chain development points to supply chain competition rather than single firm competition. Additionally, companies are seeking strategic alliances or partnerships with either upstream or downstream supply chain players. Forming supply alliances adds value and create competitive advantages for any organisation while alliances assist partners in developing cutting-edge information and communication technology systems which strengthen information sharing. Building financial strength through alliances with well-resourced partners can result in improved financial positions because the new alliances have access to new lines of credit and increased bargaining power when negotiating discounts and credit terms. Some of the benefits from collaboration include cost reduction through improved visibility, resource coordination and utilisation, effective management of competitive situations, and gaining access to complimentary resources [33].

Panahifar et al., studied supply chain collaboration and firm performance, the critical role of information sharing and trust [31]. The results from the survey were analysed to determine how collaboration enablers affect effective collaboration. The empirical results proved that trust, information readiness and secure information sharing enhance supply chain collaboration. In a related study, Al-Doori studied the impact of Supply Chain Collaboration on Performance in Pakistan Automotive Industry to investigate the possible benefits of supply chain collaboration to achieve operational performance [34]. The study results indicated that information sharing, and joint decision making contribute substantially to operational performance. In addition, technology enhanced systems such as electronic data interchange (EDI) had more meaningful effect on operational performance.

Fundamentally, the goal of performance measurement systems comprises identification of success, monitoring customer satisfaction, identifying bottle necks, waste and opportunities for value addition [35-37]. According to the TOC the key process or organisational performance attributes include throughput, operational expenses and inventory [11].

Madura, Bimha and Bimha pointed out that throughput generally focuses on internal process performance which could be assessed through time taken to complete tasks, waiting time, customer complaints and returns inwards [38]. In the industry under investigation sales are constrained by the inconsistent flow of supplies because of serious foreign currency shortages in the country. As a result of foreign currency shortages, Bimha and Dumbu argue that importers resort to unethical ways of being prioritised in foreign currency allocations which are done by the central bank [10].

Such behaviour has ripple effects like the mushrooming of parallel market, fuel smuggling, and unfair competition. Throughput is also compounded by the concentration of service stations in urban centres, a move that leads to congestion in these centres while the rural areas suffer serious shortages. High-performing organisations generate numerous benefits such as attracting resources, creating wealth, and creating jobs which benefits both the organization and society as a whole [39-41].

An analysis of Zimbabwe's fuel cost breakdown structure revealed that the pricing template has excessive costs in the form of cost of product, shipping and storage costs, import duties, cost of capital and administrative charges [42]. The loaded costs left fuel traders with a thin margin which was also controlled by government in the name of protecting the consumers [43]. This leaves fuel companies with limited opportunity to re-invest the proceeds in developing infrastructure. As the research was being carried out companies alternated the use of United States Dollars and the local currency when conducting business and this complicated the determination of actual costs and also profits.

The issue of inventory has already been reviewed but it is important to reiterate the need for availability of quality product to ensure customer satisfaction all the time. The situation under investigation cannot promise consistency in supplying the right fuel quantities given the logistical challenges already discussed. In that case, you cannot rule out shortages, leakages and the temptation of tinkering around with quality when companies try to increase volumes of the product they will have collected from NOIC depots. Stories related to adding water to diesel and over blending petrol are not unusual in the country's newspapers.

2. Research Methodology

The quantitative approach which favoured the descriptive design was used to gather views of supply chain practitioners from purposely selected focal companies in the fuel industry. The respondents were selected based on the fact that they must be supply chain managers with authority to make inventory management and collaboration decisions in the company. The study focused on selected petroleum companies which hold more than 80% of the market share, this means that the views of small industry players were overlooked. A stratified random sample selection applied to the population of 420 resulted in 201 candidates qualifying to participate in the survey. The survey eventually yielded an 84.08% response rate (see Table 1, below). Statistical analyses based on means, standard deviations and p-values were used to interpret the study results.

Table 1. Targeted Population from 8 Harare based petroleum companies.

Selected Petroleum sector Companies	Target Population	Stratified random sample Ni=n*Ni/ N	Response rate%
Petroleum Company 1	70	34	30 (88.24%)
Petroleum Company 2	60	29	25 (86.21%)
Petroleum Company 3	60	29	26 (89.66%)

Selected Petroleum sector Companies	Target Population	Stratified random sample Ni=n*Ni/ N	Response rate%
Petroleum Company 4	60	29	22 (75.86%)
Petroleum Company 5	50	24	20 (83.33%)
Petroleum Company 6	40	19	17 (89.47%)
Petroleum Company 7	40	19	15 (78.94%)
Petroleum Company 8	40	18	14 (77.78%)
TOTAL	420	201	169 (84.08%)

Source: Author, (2021)

3. Results

The figure of 420 includes managerial staff with supply chain responsibilities. These 8 firms were purposively selected on the basis that they control over 80% of the market share in the petroleum sector of Zimbabwe. Using the Raosoft sample size calculator the sample size at 95^% level of confidence was 201. Pproportional sampling was done to each stratum using the formula Ni=n* Ni/Where ni= Number of member in a sample from strata I where i= 1, 2 3, 4… 8, Ni=Number of members in the population from strata i where i=1, 2, 3, 4…. 8, N= Number of members in the entire population and n= Sample size.

Overall, 169 of the questionnaires were returned giving a response rate of 84.08%. Mungenda and Mungenda, (2003) posits that response rate of 50% is adequate for data analysis, a response rate of 60% is good and a response rate of more than 70% is excellent. The response rate of 84.08% for this study was therefore adequate and was found valid.

The results from the age of respondents indicate that 11.9% are below 25 years, 21.39% are between 25 and 35 years old, 27.86% are between 36 and 45 years, 16.41% between 46 and 45 years only 6.46% are above 56 years. 72.78% of the population were aged less than 45 years meaning the Petroleum industry in Harare is dominated by young and middle-aged people. Of the entire respondents 58.58% were male while 41.42% were female.

From the responses 24.26% of respondents had Diplomas, 46.75% had Undergraduate degrees, 22.49% had Master's degree which was also the highest qualification and the remaining 6.5% represented other qualifications. Therefore, more than 90% of the respondents possessed at least a tertiary qualification confirming that the petroleum industry firms had highly qualified employees. The dynamic nature of the petroleum industry requires highly trained staff which will be able to understand the changes and respond to them appropriately. As asserted by Hamid and Ibrahim and Chima highly trained respondents have the knowledge and capability of conceptualising and providing confident responses on the supply chain management practices under study. All these departments are relevant for handling supply chain management related problems [7, 44].

The respondents were asked to indicate their years of experience in the petroleum industry. Results show that 19.53% not more than 5 years' experience, 36.09% have 6- 10 years' experience, 30.18% have 11-15 years' experience while 14.20% have over 15 years of experience.

The respondents were asked to indicate their respective department and their findings inferred that 30% were from procurement, 21% from Finance, 26% from Marketing and 23% from Distribution. The informants were asked to indicate the operational size of the companies they are working Results showed that 27.22% of the participating companies employed less than 50 employees, 24.85% 50 to 100 and the majority (47.92%) employed 101 to 500 people. Inventory management is a key element in the fuel supply chain; it's a critical success factor which must not be ignored.

Table 2. The importance of inventory management on supply chain performance.

	N	Mean	S/Deviation
Inventory management practices contribute immensely to performance of petroleum companies	169	1.379	0.8990
Inventory management helps in customer order planning and scheduling	169	1.308	0.8092
Using lean practices helps in optimisation of inventory management cost	169	1.349	0.7496
The use of VMI (vendor managed inventory) improves the flexibility and availability of petroleum products	169	1.361	0.7753
Proper economic order quantities contribute to optimal inventory investment	169	1.420	0.9036
Valid N (list wise)	169		

Source: Author, (2021).

The above means show that the evaluated inventory management items are significant and contribute to the organisation's supply chain performance. It also represents the extent to which the respondents agree that inventory management affects performance is high. These findings are consistent with the findings by Lyson and Farrington; Babatunde, Gbadeyan and Bamiduro, 2016; and Ogbo Onekamma, who concur that inventory management is a key element of organisational performance as it improves customer satisfaction and profitability but staff needed to have more skills and organisations needed technology based systems to improve performance [14, 23, 45].

Table 3. *The importance of collaboration on supply chain performance.*

	N	Mean	S/Deviation
The company has long term relationship with suppliers	169	1.527	0.9133
The company implements quality programs with suppliers	169	1.450	0.8585
The company shares demand and forecast information with suppliers	169	1.438	0.7543
Collaboration should be done with suppliers who share same vision and objectives	169	1.515	0.8026
Supplier collaboration has created a unique, hard to imitate competitive advantage to create knowledge and performance	169	1.438	0.7828
The organisation uses joint planning and joint problem solving with suppliers	169	1.503	0.9071
Valid N (list wise)	169		

Source: Author, (2021)

According to the above responses, supply chain collaboration has an impact on organisational performance. Long standing relationships with its suppliers, common vision and joint planning are the major contributors with means above 1.5. Quality programs, demand forecasting and a unique competitive advantage also affect supply chain performance. These findings are consistent with Cao and Zhang who agreed that long-term supply chain relationships can lead to a greater competitive advantage than working in isolation, Panahifar et al., through collaborative planning organisations can stay a step ahead of their competition and can respond to market changes quicker than competition and Lyson and Farrington who suggests that organisations should have coherent position of both company's strategy and their process to deliver competitive advantage [31, 46, 47].

Table 4. *Analysis of the dependant variable supply chain performance.*

	N	Mean	S/Deviation
The company's staff are highly trained and knowledgeable	169	1.527	0.9133
The company's business processes are highly automated	169	1.450	0.8585
The quality of our products has led to customer satisfaction	169	1.438	0.7543
The organisation has been experiencing sales growth	169	1.515	0.8026
The organisation's profitability has continuously improved	169	1.438	0.7828
The organisation is investing in new petroleum infrastructure	169	1.503	0.9071
Valid N (list wise)	169		

Source: Author, (2021)

The issue of staff motivation, training and development which was identified as a key explanatory variable in developing effective supply chain management [9] has also emerged as a key supply chain performance issues with a mean of 1.527 followed by through put (sales growth) as identified by the TOC that underpinned the study [11]. The issue of infrastructure, automated processes, product quality and improved profitability follow in that perking order.

The Pearson correlation was used in the study to determine the level of association between the independent variables (inventory management and collaboration) and the dependent variable (organisational performance). According to Miller and Okongwu, Brulhart and Moncef, a weak association is represented by a correlation coefficient value between 0.10-0.29, a moderate association is represented by a correlation coefficient value between 0.30-0.49, a strong relationship is represented by a correlation coefficient value between 0.50-0.99 and a perfect relationship is represented by a correlation coefficient of 1.0. [48, 49].

At the 0.05 percent level of significance, the two independent variables (inventory management and collaboration) had a positive relationship with the dependent variable of organizational performance. The results are shown in Table 5 below, where SCC stands for supply chain collaboration, IMP for inventory management and OP for Operational performance.

Table 5. *Correlation analysis.*

	SCC	IM	OP
SCC-Pearson correlation	.894	.837	.863
-Sig (2 tailed)	.000	.000	.000
N	169	169	169
IM Pearson correlation	.863	1	.871
-Sig (2 tailed)	.000	-	.000
N	169	169	169
OP Pearson correlation	.860	.871	1
-Sig (2 tailed)	.000	.000	-
N	169	169	169

Source: Author, (2021)
**Correlation is significant at the 0.01 level (2-tailed), ** Correlation is significant at 0.05 levels (2 tailed). SCC=supply chain collaboration, IMP=inventory management practice and OP=organisational performance

On supply chain collaboration, the correlation findings signified a strong significant positive relationship between supply chain collaboration and organisational performance. (n = 169; r = 0.863; p<0.05). The finding validates studies by Okongwu, Brulhart and Moncef on casual linkages between supply chain management practices and performance using a

balance scorecard approach [49]. The results concluded that supplier collaboration improved the performance among supply chain collaborative partners. The results are also in line with studies by Al-Doori, whose results indicated that collaboration in the form of information sharing, and joint decision making contribute substantially to operational performance [34].

Inventory management practices have a positive relationship with organisational performance (n = 169; r = 0.871). This proves that any improvement in inventory management practices in the petroleum sector can lead to improved organisational performance. The hypothesis therefore has a strong positive significant relationship at 5% level of significance. The finding corrobotes with the study findings by Anichebe and Agu on the effect of inventory management on performance of selected manufacturing firms [20]. The finding also supports another research by Koin, Cheruiyot and Mwangangi which concluded that there was a positive relationship between effective inventory management and organisational performance and such relationships impacted supply chain effectiveness [21].

4. Conclusion and Recommendation

The overall goal of every supply chain is to make sure that the individual supply chain members and the entire supply chain achieve their overall aim of making profit, customer satisfaction, effective internal processes, and learning and growth [38, 50]. The study reiterated that both effective inventory management practices and collaborative relationships among supply chain members lead to supply chain performance. Background information of the Zimbabwe petroleum industry revealed that there were glaring weaknesses in the management of fuel supply chain practices in general and inventory management and collaboration in particular. This makes the two practices impediments to the attainment of sustainable operational performance. Therefore, the research offered the following policy, practice and further research recommendations.

The fuel industry's problems have been on the radar since independence in 1980 and no effective policy decisions have been taken till now yet the ordinary motorists and the general population suffer in the form of unreasonable fuel inventory outages, and the lack of collaboration among supply chain members compounds the situation because it leads to unhealthy competitive behaviours which ultimately affect consumers in the form of affordability issues and product quality. Ignoring fuel traders' concerns is like not paying attention to the plight of industry and prolongs the de-industrialisation in the fuel industry when the whole world is moving towards industrialisation.

Government needs to relook its administration of the fuel industry because the different administration structures that have been tried since independence have failed to resolve the fuel industry challenges, particularly inventory related challenges and bringing sanity among fuel supply chain members. Weaning off the fuel industry activities from the Ministry of Energy and Power Development is an option which warrants consideration because the former seems to be overwhelmed by electricity generation and supply, which on its own is a mountain to climb.

Associative organisations such as the Zimbabwe Energy Regulatory Authority and National Oil Infrastructure Company must be empowered, mandated, capacitated and well-resourced to deal with the fuel industry's supply chain without limitations. Poor administration and policy implementation at national level cascades down to fuel traders and consumers hence efficiency and effectiveness must begin at the top. For example, poor management of foreign currency which is critical for fuel imports leads to smuggling of petroleum products, revenue leakages and foreign currency shortages which in turn fuels inventory outages, arbitrage trading and other unethical practices which end up corrupting the entire fuel supply chain. It is pathetic that bonafide dealers will not be able to compete with the smugglers as they endure reduced sales revenues and sometimes they will be forced to reduce margins which are already at their lowest.

Petroleum industry entrepreneurs are business people that made conscious decisions to enter the fuel business to make money. Why should fuel industry entrepreneurs be treated with kid gloves when they are pampered with overprotection and generous government support to make private money? Why does government not focus on strategic reserves and lay off hands from business affairs of the private companies. Industry players must be allowed freedom to trade without many restrictions because when government puts the restrictions the fuel companies ask for support and protection. Liberalising the industry is not a bad strategy to adopt as long as monitoring and control arms are doing their job perfectly.

Industry players compete with each other and in the process some win at the expense of others, sometimes they avoid each other, and sometimes they compromise. Sometimes they win but sometimes they lose, they need to accommodate each other to allow one to win while you lose, but most importantly they need to collaborate and strike a win-win situation [50]. So, industry players need to collaborate, whether they are friends or enemies. The investigated fuel industry lacks a robust, legal and recognised body where entrepreneurs in the fuel industry can meet and deliberate on issues of common interest or concerns and to share business ideas. The Zimbabwe Oil Procurement Consortium (ZOPCO) of the 1980s and the National Procurement Committee (NPC) of the 1990s and early 2000 need to be revisited and reconstituted with appropriate additions and adjustments. The industry needs a formal body were members discuss matters that affect the industry's supply chain issues to find amicable solutions. The ZOPCO and NPC had their loopholes but they gave petroleum companies opportunity to meet and discuss issues. It is better than total silence or the each man for himself mentality.

Instead of having fixed inventory targets throughout the year, rolling targets should be established to streamline logistics operations and reduce transportation costs, which can be reflected in fuel pump prices. Fuel companies can

consider data-driven decision-making, incorporate publicly available data and information into analytics models to forecast demand and sales patterns, and adopt scientific methods and sales forecast models. Instead of gut instinct and market sentiment, formal inventory management models that permit predictive analytics to spot tomorrow's trends today must be used. Additionally, third-party logistics service providers must use automation in their processes to eliminate excessive manual labour. Automating processes and using new technology such as sensors, tank management systems, and telematics, can aid in data availability and accuracy.

Lastly, petroleum players are encouraged to implement supply chain management practices in order to reap the benefits and this should not be limited to inventory management and collaboration only. Each Supply chain activity should be in the hands of professionals who have the requisite knowledge and skill to perform such functions. Continuous training and development on current supply chain innovations will assist in reducing process costs and improve performance.

There have been a number of researches carried out about the petroleum industry on different subjects and issues. However research findings which go unnoticed and unimplemented eventually become moribund. The Ministry responsible is encouraged to track and document all researches done about the industry and create platforms for disseminating information to respective departments and stakeholders. Grey areas in the supply chain need to be identified and prioritised for future studies. Tertiary institutions must be encouraged to adopt and teach oil industry issues in their curriculum to ensure that they train future industry leaders who are equipped with the right skills and knowledge required to deal with petroleum industry supply chain challenges.

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