



SHELL'S SUPPLY CHAIN MANAGEMENT

FUNDEMENTALS OF SUPPLY CHAIN

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Introduction

Shell Pakistan Limited, a subsidiary of Royal Dutch Shell, is recognized as a leading energy company in Pakistan's dynamic landscape. It is the industry standard in the country when it comes to fuel and has marked itself as the go to source for fuel and lubricants in the country.

History and Presence

Since its inception, the company has made significant contributions to Pakistan's energy sector by serving various industries and meeting the energy needs of consumers.

Diversified Product Portfolio

Shell has a wide array of products that include petroleum products, diesel, lubricants and greases.

All of the above products are produced with great caution to meet quality standards and are useable for a wide array of industries from the automobile sector to the industrial applications for the product.

Organizational Structure

Executive Leadership: CEO, Managing Director and other Executives (Overlook holistic company strategy and decision making.)

Functional Departments

- **Supply Chain:** This department manages the flow of goods and services, including procurement, logistics, sales, and inventory management. Within the supply chain there are different departments such as supply planning, transport that deals with logistics, facilities that are warehousing. Each handles specific aspects of the supply chain. All these departments report to GM and some even report back globally. An example of this is the supply planner who reports to the supplier operations manager who reports to the general manager who is the country head.
- **Operations:** In charge of daily activities such as procurement.
- **Marketing and Sales:** Focuses on selling petroleum products, developing marketing strategies, and maintaining customer relationships.
- **Finance and Administration:** In charge of financial transactions, making budgets, accounting purposes, and administration.
- **Human Resources:** Responsible for hiring, training, employee relations, and ensuring compliance with labor laws of the country.
- **Sourcing and Procurement:** Working with suppliers to ensure a steady supply of raw products and negotiating contracts.
- **Logistics and Sales:** Work closely with the procurement department to efficiently handle product transportation and delivery. This includes managing warehouses, coordinating shipments, optimizing distribution networks, and more.
- **Inventory Management:** Works with both procurement and sales to ensure optimal inventory levels and to avoid under or overstocking of product.
- **Information Sharing:** Departments use integrated software systems or platforms to share data and information along the supply chain to facilitate decision-making and ensure everyone is working with accurate, up-to-date information.

- **Cross-Functional Teams:** Projects and initiatives may involve teams of members from different departments to address specific challenges or introduce new strategies. For example, a team might work on a sustainability initiative that involves logistics, operations, and marketing departments.

Collaboration of Different Departments in the Supply Chain

- **Step 1:** Discuss new initiatives or business changes in the geopolitical situations, or changes with respect to currency fluctuations, or new initiatives from your marketing side that can boost your sales.
- **Step 2:** Follow up of Step 1 is done by the sales team where they discuss how much they will be selling on the basis of new initiatives or changes, in essence it is the planning of the upcoming month or in other words forecast for sales.
- **Step 3:** Led by Supply Operations team, in this step new initiatives are talked about such as this is what the business plans to sell, and this is how we plan to procure a product and how that product will be dispatched.
- **Step 4:** Entire leadership sits down and assesses the profitability and competitiveness of all the plans made, and then the leadership judges what sort of help is required from them in fulfilling the desired operations.

Purchasing and Negotiation

Identifying Requirements: Determine the specific needs for a product or service, considering quality, quantity, delivery, and budget constraints.

1. **Supplier Identification:** Research and identify potential suppliers that can meet your requirements. This may include evaluating skills, reputation, pricing, and past performance.
2. **Request for Proposal (RFP) or Request for Quotation (RFQ):** Submit her RFP/RFQ to shortlisted suppliers, outlining your requirements and asking for proposals and quotations.
3. **Negotiation:** Participates in negotiations with suppliers to establish terms such as price, delivery dates, payment terms, quality standards.
4. **Contract Execution:** Draft and finalize contracts that clearly outline agreed terms and conditions, ensuring legal compliance.
5. **Order:** Place order with selected supplier based on negotiated contract terms.
6. **Supplier Performance Evaluation:** Monitor and evaluate supplier performance against agreed metrics to ensure quality and delivery standards are met.
7. **Technology Tools in Procurement: E-Procurement Platforms:** These platforms centralize the procurement process and enable automated RFP/RFQ creation, supplier management, and contract management.

In essence, Shell is a downstream company it only deals with the finished product, and it does not refine product here in Pakistan.

First Shell needs to look into what is the best/optimal mix for them, is it procuring your molecules locally from your refineries or is it you importing. In Pakistan there is always a deficit as your refineries never produce enough to meet your demand, so you must import.

Shell then make a plan of how much they are going to procure locally and how much are they going to procure from the international market. Shell reports this to their advisory body because in Pakistan petroleum is a regulated good and you need to work with the government to sell this product.

Price is not negotiated, you just make the best deal, and it depends on a number of factors such as when are you locking the deal, what are the market dynamics at that time, what are the prices of crude oil at that time

For the refinery product you don't have a choice to negotiate here since it's a regulated industry and the price is already set by your government (for petrol and diesel). For the specialized product that shell sells, it looks at cost factor, how much margin they need to set and then the price is set. For eg marketing campaigns can change the price that is going to be set.

Moreover, tools such as SAP Ariba, Power BI and Crus are often used. Shell makes sure to integrate internally as well as with other business systems for seamless data flow. They streamline and standardize procurement for the entire region by using a centralized purchasing strategy. By ensuring consistency and efficiency, this method reduces coordination issues that could cause delays when using decentralized models. By facilitating thorough planning and negotiation, the centralized approach ensures a dependable and consistent petroleum supply chain throughout the region.

By using a multi-supplier strategy, Shell is able to effectively manage regulatory requirements, maintain a diverse supply chain, and satisfy a range of market demands. The petroleum market is regulated, in contrast to the FMCG industry. Remarkably, 40% of the products are sourced locally, and the remaining sixty percent are imported.

Locally, the petrol can be procured only from the 5 refineries listed below:

- Attock Refinery Limited (ARL)
- National Refinery Limited (NRL)
- Pakistan Refinery Limited (PRL)
- Pac-Arab Refinery Limited (PARCO)
- Cnergyico Pk Limited (CPL)

But Shell only purchases goods from the first four refineries, leaving out CPL, since it does not meet global standards. With six different channels to choose from for product procurement, each potentially offering a variety of product types, Shell has more options thanks to this diversified sourcing strategy.

Supplier Relationship

Evaluation Process

Evaluation of suppliers is necessary to guarantee compliance with international standards. Shell Pakistan evaluates the approved suppliers once a year in accordance with international evaluation standards. The assessment procedure adheres to global standards that have been predetermined, guaranteeing uniformity in the evaluation parameters. It is noteworthy, nevertheless, that Shell Pakistan follows the international evaluation standards and does not carry out extensive supplier evaluations on its own. Some the criteria include:

- Product Specifications - Guaranteeing quality, adhering to international standards
- Ethical Sales – Ensuring transparent and ethical practices in product marketing and sales
- Corporate values - Supplier actions are consistent with Shell's core values and principles

Strategies for Maintaining Supplier Relationships

Shell places a high priority on maintaining good supplier relationships by using standardized procedures. Frequent communication and monthly trips to refineries create a solid rapport that promotes transparency and comprehension. Strategic alignment is ensured by taking part in forums that address future refinery strategies and consumer demand. Furthermore, Shell's dedication to prompt payments highlights dependability and moral business conduct, fostering supplier cooperation and trust.

Procure to Pay (P-to-P) Processes

Overview

Shell Pakistan's Procure-to-Pay (P-to-P) procedure encompasses a thorough monthly planning and execution cycle from supplier to company. The product demand for the following month is agreed upon with each refinery at the end of each month. Pakistani prices fluctuate on a fortnight basis, so products are strategically chosen to fit the needs of the market. Fortnightly closures and daily monitoring guarantee that committed quantities are fulfilled.

Shared schedules allow efficient refineries, like ARL, to simplify receipt planning. In situations where schedules are not set in stone, proactive communication becomes essential. Products are kept in tanks after they are received, and invoices are paid every two weeks. Refineries have different payment cycles; PRL requires payment after seven days, while NRL operates on a fortnightly cycle.

For PARCO, where transportation involves pipelines, a request is made in advance to schedule the pipeline's receipt, and then the product is transported by tanker truck. Within the P-to-P framework, this structured process ensures that cycles related to procurement, storage, and payment are completed effectively and on schedule.

The procurement process in this process is started by the requisition document, and the finance department processes the refinery invoices that detail the products received and their associated costs after receiving approval.

P-to-P Process for Maintenance, Repair, and Operations Supplies (MROs)

The Contracts and Procurement (CP) department oversees the P-to-P process and procurement for MROs at Shell. CP is in charge of managing the company's broad range of procurement needs, which range from office supplies to other necessary equipment.

Employees inform CP of their needs, and if the requests are covered by the budget, CP moves forward with the procurement procedure. Excessive or unfeasible requests are checked for sense in order to avoid needless expenditures. CP makes sure that the products are acquired at the most competitive prices, giving safety and compliance with Shell's specifications top priority. Every procurement requires the release of Purchase Orders (POs), which require approvals, especially for high-value POs that require approval from higher levels of the organizational hierarchy.

MRO procurement can take place as often as needed or once a month, depending on the situation. Because of its adaptability, Shell is able to modify its procurement strategy in response to changing conditions, ensuring that maintenance, repair, and operational requirements are met effectively and on time while respecting organizational and financial constraints.

Forecasting and Production

Forecasting Product Demands at Shell: An Integrated Approach

Shell uses a variety of methods to forecast demand for its products and integrates various elements to arrive at accurate forecasts.

The basis of their forecasting processes is a detailed analysis of specific market conditions and historical data, including seasonal demands. For example, it is recognized that demand for diesel fuel increases during the harvest season due to use of heavy machineries, indicating that historical patterns are important in predicting product demand. This feedback is obtained through knowledge of the marketing industry. Regular business-wide meetings provide insight into the business environment and into the future needs. During these sessions, the entire industry supply chain collaborates, deliberates, and collectively justifies the demand for the next month through their forecasts. Through this collaborative effort Shell ensures a thorough awareness of the market landscape, ultimately improving the forecasting precision.

To further refine their predictions, Shell leverages advanced forecasting models that incorporate a range of variables, from economic indicators to geopolitical events, improving the accuracy of future demands. Furthermore, to enhance the efficiency of their decision making, they make use of tools such as Excel and Power BI, which assists them in analyzing and visualizing data making it easier to identify trends,

A significant shift occurred in market dynamics after the advent of COVID-19, made it necessary to make some adjustment in forecasting strategies. The disparity between pre-COVID and post-COVID market conditions underscores the importance of adaptability in forecasting models, reflecting Shell's commitment to staying ahead of market fluctuations. This comprehensive approach ensures that Shell is equipped to navigate through the complexities of the market, delivering accurate and informed product demand forecasts.

Managing Forecasting Discrepancies in Petroleum Industry: Striking the Balance

In the intricate realm of petroleum forecasting, grappling with the challenges of over forecasting and under forecasting is a real challenge.

Over forecasting, or excessive commitment often leads to a surplus of products, posing significant financial risks. This situation forces the companies to execute some strategic measures such as reducing the volumes and purchases, avoiding picking up products from refineries, and subsequently causing dissatisfaction among refinery stakeholders since they are the ones closing at loss. To minimize the impact, companies may opt for several different strategies. They can either negotiate with the retailers, offering discounted products, or carry over the excess stock to the following month. On the other hand, under forecasting, where the demand exceeds supply indicates that your pumps are left dry and this jeopardizes your market share and customer loyalty, since some other company is benefiting from it.

The government often leans towards over forecasting since they fear shortage of the product. However, this is all about finding the right mix. Striking the right balance between predicting too high demand or too low demand is crucial, emphasizing the need for accurate demand forecast.

In this rapidly changing market demands, companies must be cautious, and carefully approach forecasting for demands that considers historical data, market trends, and emerging factors. The oil industry is inherently unstable and requires stable chains and a delicate balance to ensure financial

stability. The process involves constant refinement and adaptation, making forecasting a critical aspect of making strategic decision in the ever-evolving petroleum landscape.

Ensuring Product Quality at Shell: The Collaborative Effort of Specialized Teams

To ensure the quality of its products, Shell needs the collaboration of a team with the Product Quality Team that is based in Singapore. This Product Quality team plays a key role in maintaining the standards of Shell's products. Every product that comes out of the manufacturing process is accompanied by a Certificate of Quality (COQ), a comprehensive document that outlines the specifications and standards to which the product complies.

COQ serves as an important checkpoint, and any violations in the product specifications outlined on the certificate are immediately flagged. If these deviations are minor, then the responsible team member notify the Product Quality (PQ) lead for further guidance. However, if these discrepancies are significant, then to maintain product integrity, Shell will use alternative procedures.

Due to stringent standards for quality, the entire supply chain is subject to multiple inspections. As products are withdrawn from the refinery, they are inspected to ensure they meet the standards required by the facility. A further check is carried out upon delivery to ensure that the product maintains its quality during delivery. Finally, when the product reaches the pump, it undergoes strict inspection completing the end-to-end quality assurance process.

Through their approach of ensuring product quality throughout the entire process, Shell is committed to delivering products that either meet or exceed industry standards. Integration of the product quality team and various inspection points throughout the product chain to ensure that all products entering the market are supported by quality assurance.

Distribution and Logistics

Optimizing Efficiency: Shell's Strategic Distribution Network

Shell's distribution network is a well-coordinated system designed to move quality products from the source to end users, including petrol pumps and other facilities such as Plants. The journey begins with Shell taking the product into its tanks. From ordering to shipping, the order-to-delivery department plays a key role in coming up with a daily plan that determines the best time to dispatch the product to various destinations which , includes both plants and petrol pumps using tank lorries.

The daily planning process is dependent on the supply department, since they are the ones who communicates the volume that is required and needs to be delivered. Based on this information, the order-to-delivery team ensures that the appropriate number of tank lorries is made available. In cases where demand exceeds the capacity of available tank lorries, the team uses other methods to meet customer needs in a timely manner.

The success of Shell distribution lies in the integration of different areas, strategic planning of daily activities and adaptation to different needs. This ensures that products are delivered to their destination on time and meet the needs of retailers and manufacturers. The distribution network's relationship strategy demonstrates Shell's commitment to quality and customer satisfaction , ultimately reflecting the company's leading position in the energy industry power.

Timely and Efficient Transportation

Shell's transportation consists of 350 tank lorries which are owned by six dedicated suppliers. The team works diligently to maintain daily communication to ensure these trucks are ready and available when

needed. The lorries are stationed outside terminals, depots, and warehouses. In case of any anomalies, the discussion of how to further improve the delivery process is brought up in the monthly meeting sessions.

The Order-to-Delivery (OTD) team plays an extremely important role in making sure that 92% of orders are delivered on time. Successfully reaching this target will lead to recognition and rewards for the entire team.

In addition to this, Shell's commitment to safety and health standards is associated with strict procedures and protocols. The working hours of delivery drivers are limited to 12 hours, eliminating the concept of overtime to prioritize their well-being. A culture of safety is maintained through daily training sessions on how the product should be handled. These measures follow industry standards and reflect Shell's commitment to protecting its assets and employees.

Major Transportation and Logistic Strategies

Shell's journey to efficiently manage the movement of its products begins by importing the desired products through ship vessels. Once they reach the shore these products are then transferred to and stored in tanks or pipelines. Tank lorries are then used to transport the required product from Karachi to other cities.

There are two key pipeline networks that play an extremely crucial role in the transportation infrastructure: The White Oil Pipeline, stretching from Port Qasim to Shikarpur to Mehmodkot, and the Mehmodkot Faisalabad Machikai Pipeline (MFM Pipeline).

Previously, these pipelines were used for transporting diesel exclusively, however after some recent development in December 2021 they became multi graded which means now they could also be used for transportation of gas. This strategic development not only enhances the versatility but also the efficiency of these transportation methods.

Furthermore, Shell also leverages the Inland Freight Equalization Margin (IFEM) system. This is being done to ensure uniform fuel rates across the country, since customers pay Shell for the transportation of products. This approach not only makes fuel transportation more straightforward but also contributes to reducing expenses while improving the performance for both Shell and its customers.

Importantly, pipeline transportation emerges as a notably economical option for fuel movement, offering advantages in terms of both cost and reduced exposure. The deployment of these various transportation methods underscores Shell's commitment to a diversified and cost-efficient logistics infrastructure, ensuring a reliable and economical supply chain for its products across the country.

Safety and Health Protocols

Shell's commitment to prioritizing the well-being of both its employees and the communities it serves can be seen from the following few protocols:

1. Strict Driver Work Hours:

Shell eliminates the concept of working overtime by limiting the work hours of the drivers to 12 hours. This policy ensures that these drivers are not fatigued and remain focused throughout their shifts.

2. Daily Product Handling Training:

Training sessions for product handling equips these drivers who have little to no knowledge how dangerous these products can be if mishandled, with the necessary knowledge, skills, and techniques on how these products safely and responsibly.

Warehousing and Inventory Management

Band-Based Inventory Management

Shell's Strategic warehousing and inventory management system is based on a banding strategy to ensure inventory control. The system acts as an early warning system by detecting the inadequacy of work if the stock falls below 9 days (indicating the possibility of being out of stock) or exceeds 13 days (indicating a dangerous overstock). Shell is able to proactively control procurement risks within a tolerable 10-20% range thanks to the ideal inventory cover range, which is intentionally maintained between 9 and 13 days. While these grades are subject to change, strict safety regulations and specific trade restrictions prevent significant changes in inventory.

Analyzing sales patterns every day is an important step to prevent stock outs and possible outages. However, due to multiple safety rules, logistical challenges, and the volatile nature of petroleum products, the implementation of Just-in-Time (JIT) inventory techniques remains impractical within the petroleum sector. Although the JIT approach incorporates efficiency in many sectors, its applicability in the oil sector is quite limited.

Operational Teams within Warehouses

Three major teams coordinate smooth logistics throughout Shell's storage operations. The Dispatch Team oversees outgoing inventory, the Receive Team is in charge of arriving stock, and the Administration Team is in charge of obtaining permissions from regulatory agencies such as the FIA, port, and customs. Additionally, the engineering team is constantly working to improve operational capabilities, demonstrating Shell's commitment to continuous improvement and efficiency.

Technologies and Systems

OMEGA and G-SAP

G-SAP and OMEGA are two critical systems in Shell's technology infrastructure. The OMEGA system precisely maintains inventory by recording dispatch amount data, guaranteeing real-time insights into inventory dynamics.

Integration between OMEGA and G-SAP

It is tightly integrated with SAP. Simultaneously, Enterprise Resource Planning (ERP) systems installed across 9-10 terminals strategically located around Pakistan serve as decision-making powerhouses, enabling educated and data-driven supply chain initiatives. By communicating the efforts of each terminal, it ensures uninterrupted and flawless work in coordination with other terminals. that are functioning in tandem with one another.

JIT-Inventory Practice

While JIT inventory practices are not possible in Shell's working environment due to certain industry constraints, the company's use of a band-based inventory system, as well as the integration of advanced technological solutions such as G-SAP and ERP systems, ensures operational stability and accuracy.

Shell's dedication to maintaining appropriate inventory levels, combined with its powerful technology infrastructure, provides balance between operational efficiency and industry-specific restrictions. This

holistic strategy strengthens Shell's resilience within the complex and dynamic petroleum supply chain, maintaining integrity in the face of many challenges.

Shell's Key Performance Indicators

A number of key performance indicators are used by Shell for monitoring and evaluating various aspects of their operations and performance. Here's an explanation of a few:

Cash Flow Position

Shell's cash flow project measures cash inflows and outflows over a specific period and is crucial in assessing whether the company has the ability to satisfy short-term obligations. For Shell, having a positive cash flow is essential since it directly impacts on the company's ability to fund ongoing operations and achieve strategic goals. Sustaining a strong cash flow is also crucial for its long-term growth and stability, especially considering the industry's volatility in the oil and gas sector.

OTIF (On Time – In Full)

OTIF refers to the percentage of consumers who receive their orders fully and on time. This metric is used to assess how well Shell's logistics and supply chain are working together. Achieving high OTIF rates through constant monitoring is the essence of efficient supply chain management, ensuring customer satisfaction and minimizing disruptions. Shell aims for full and on-time delivery to build brand loyalty and maintain its competitive advantage; this helps Shell to satisfy market needs efficiently and improve the overall performance of its logistics operations.

Quality

Shell places a high focus on ensuring the quality of its products because its reputation and customer trust are directly related to the quality of its products. Rigorous inspections throughout the supply chain, supported by the Product Quality team in Singapore, helps in the delivery of products that meet or exceed industry standards. Shell products come with a COQ (Certificate of Quality) to prove that they meet stringent standards of quality. Their products go through various stages of inspection, from purchase at the refinery to dispatch at the pump. These quality audits are necessary to ensure quality control, product quality and the integrity of the Shell's brand.

Days Cover

Days Cover determines how long Shell's existing inventory can meet demand, providing information on inventory management and supply chain resilience. By maintaining an optimal day's cover, they can ensure the relationship between supply and demand, avoiding out-of-stocks and overstock. In the oil and gas industry, reducing costs, operational efficiency and meeting changing business needs depend on this KPI.

Demurrage

Demurrage refers to the costs incurred when a vessel or cargo is held longer than the agreed-upon time for loading or unloading, and it is an important measure of Shell's logistics and transportation efficiency. Minimizing demurrage is critical for Shell's cost management and supply chain efficiency, as it can cost the company approximately \$42,000 per day. Shell wants to lower demurrage by encouraging better coordination and communication among supply chain participants and developing more accurate schedules.

Employee Health & Safety – No Harm, No Danger

Shell's "No Harm, No Danger" Key Performance Indicator (KPI) focuses on attaining zero fatalities and injuries in the workplace and demonstrates the company's commitment to safety and risk reduction. For

Shell, employee safety is one of the core objectives, and they go beyond regulatory compliance to protect employees, boost morale, and protect the company's name. The goal of "no harm and no danger" is consistent with Shell's responsibility to protect the health and safety of its employees, service workers and the communities in which it works. Shell's overall commitment to maintaining a safe and secure working environment is exemplified by the construction of rest houses for drivers. Additionally, they conduct frequent training sessions to improve employee competency in security protocols and provide them with the knowledge and abilities to effectively handle hazardous situations.

Environment Safety

Safety for the environment is consistent with Shell's commitment to CSR. In a world moving toward sustainability, creating and sustaining a positive reputation with stakeholders necessitates demonstrating responsible environmental practices. This particular KPI is crucial for Shell since it guarantees both regulatory compliance and a favorable company reputation. Shell strives to mitigate its environmental impact by minimizing its greenhouse gas emissions. This KPI reflects the company's steadfast commitment to sustainability and highlights their dedication to eco-friendly practices.

Major Challenges:

Refinery limitations and Port challenges

The supply chain of oil and gas companies operating in Pakistan faces considerable obstacles due to the limited capacity of refineries and the sole reliance on Karachi Port and Port Qasim for imports. Any constraints on the production capacity of refineries can make it difficult for oil businesses to supply the rapidly increasing demand for petroleum products in a market where all of the oil firms buy from the same refineries. Consequently, this scenario compromises the timely and continuous availability of products, thus affecting the ability of corporations like Shell to satisfy market demands seamlessly.

Furthermore, the concentration of import activities at only two ports creates delays. The dual-port system requires the movement of a large volume of imports through these specific points, resulting in increased traffic and congestion. This congestion can cause delays in the unloading and transportation of petroleum products, increasing Shell's demurrage costs and affecting Shell's overall efficiency and cost-effectiveness of the supply chain.

Regulatory constraints

Pakistan's oil and gas industry is heavily regulated. The industry's strict regulations limit companies' flexibility, making it difficult for them to quickly adapt to changing market conditions. It can be damaging to a company's ability to respond quickly to shifts in supply and demand in an industry where quick adjustments to market dynamics are essential.

Additionally, Pakistan's political instability and constant regulatory changes pose a challenge for companies like Shell in terms of long-term planning and decision making. This uncertainty makes it difficult to manage the supply chain and establish a reliable and efficient system for the transportation and distribution of petroleum products.

Companies have no control over refinery product prices because the government determines the prices, particularly for gasoline and diesel. This lack of pricing autonomy limits their ability to optimize profit margins and control losses.

Economic uncertainty

The gas and petroleum sector is dealing with the issues of constant economic uncertainty, which is reflected in currency fluctuations, inflation, and broader economic downturns. It is very difficult to

maintain a strong and efficient supply chain when companies operate in an unpredictable environment. This creates the need to regularly review the operational plans to maintain flexibility and resilience.

Currency fluctuations and inflation create uncertainty into operational costs, thereby harming a company's financial stability. The economic downturns add unpredictability in product demand, demanding flexible supply chain methods to quickly modify production levels. Furthermore, currency exchange risks complicate international transactions and affect the price of imported materials.

Lack of Accurate Forecasting Capability

Accurate forecasting is a vital part of supply chain management, and the lack of advanced techniques restricts the company's ability to accurately predict changes in demand, which might have unfavorable outcomes.

The lack of forecasting tools not only limits the industry's ability to foresee market changes, but it also limits its ability to optimize inventories effectively. Inaccurate forecasting leads to operational difficulties and cost inefficiencies. Overestimating demand locks up capital in excess inventory and raises storage expenses. On the other hand, if demand is underestimated, stockouts may occur, endangering Shell's ability to satisfy customers' needs on time and causing it to lose market share.

Although Shell utilizes techniques to estimate demand, fluctuations and uncertainties make it difficult to forecast accurately.

Logistical Challenges

Multiple logistical issues in Pakistan have a major effect on Shell's supply chain operations' effectiveness. One of the main challenges is the prevalent issue of poor infrastructure. The ineffective roads and transportation systems obstruct the smooth flow of important oil and gas products. This shortcoming makes things more difficult, especially when it comes to delivering products on time.

Furthermore, bad weather conditions pose additional logistical difficulties. Heavy rainfall damages the roads, making some routes inaccessible for big. Smog, e.g. in Lahore, further contributes to the logistical delays. Logistical complexity is further increased by delivery windows that are restricted in certain cities, such as Islamabad, where deliveries must be made within a 6-hour window. Due to this limitation, logistical tasks must be completed in a limited amount of time and require careful planning and execution. This complicates the delivery schedule synchronization for Shell and maintaining timely customer service becomes challenging.

Lack of Controls on Smuggled Products

In Pakistan, there is a significant lack of effective control mechanisms for preventing the flow of illicit products. Since smuggled petroleum products avoid taxes and regulatory compliance, they can reach the market at much reduced prices. Smuggling becomes an appealing option for those wanting to save costs and increase profit margins. Smugglers that operate outside of government-fixed rates are able to offer products for a lower rate than permitted, attracting the cost-conscious customers. For legitimate businesses, this creates an atmosphere of unfair competition. and puts their market share and profitability at risk.

Recommendations for Improvement

Advanced Forecasting Tools Implementation

Shell Pakistan currently utilizes SAP and other tools for forecasting; however, to enhance accuracy and efficiency, the integration of advanced, AI-driven forecasting tools is recommended. These tools can

leverage historical data, market trends, and sophisticated algorithms to provide more accurate predictions of product demands. By adopting cutting-edge technology in forecasting, Shell can mitigate the challenges associated with overestimating or underestimating demand, improving overall supply chain efficiency.

Some of the benefits of using AI-driven forecasting tools are:

- They can handle complex and dynamic data sets, such as weather, seasonality, customer behavior, and market fluctuations, and adjust the forecasts accordingly.
- They can learn from past patterns and outcomes and improve their accuracy and reliability over time.
- They can provide insights and recommendations for optimal decision making, such as inventory planning, pricing, and promotions.
- They can reduce human errors and biases and increase transparency and accountability in the forecasting process.

Some of the examples of AI-driven forecasting tools are:

- IBM Planning Analytics, which uses machine learning and predictive analytics to automate and optimize the planning, budgeting, and forecasting process.
- Amazon Forecast, which uses deep learning and neural networks to generate accurate forecasts based on multiple data sources and variables.
- Google Cloud AI Platform Forecasting, which uses TensorFlow and BigQuery to build and deploy scalable and customizable forecasting models.

Enhanced Storage Facilities

Improving storage facilities is crucial for optimizing inventory management and ensuring a seamless supply chain. Shell should consider investing in state-of-the-art storage infrastructure, incorporating modern technologies for inventory tracking and management. Some examples could include implementing automated systems for real-time monitoring, ensuring that inventory levels align with demand, and reducing the risk of overstock or stockouts etc. Upgrading storage facilities will not only efficiently manage costs, but also lead to better demand fulfillment, and increased overall supply chain resilience.

Some of the benefits of using modern technologies for inventory tracking and management are:

- Providing real-time visibility and control over the inventory status and location and alert the stakeholders of any issues or deviations.
- Enabling data-driven decision making, such as optimizing inventory levels, replenishment, and allocation, based on demand forecasts and historical trends.
- Improving inventory accuracy and quality, and reducing inventory shrinkage, waste, and obsolescence.
- Enhancing safety and security and compliance with environmental and regulatory standards.

Some of the examples of modern technologies for inventory tracking and management are:

- RFID (Radio Frequency Identification), which uses radio waves to identify and track inventory items and can store and transmit more information than barcodes.
- IoT (Internet of Things), which connects inventory items and devices to the internet, and enables remote monitoring and control of inventory operations.

- Blockchain, which creates a secure and transparent ledger of inventory transactions and facilitates traceability and verification of inventory origin and quality.

Optimization of Product Transportation Mix

Shell operates both tank lorries and pipelines for the transportation of oil and petrol across cities and regions. To enhance efficiency, it is recommended to analyze and determine the most optimal mix for product movement to better utilize resources, save costs, and improve overall transportation logistics. This involves evaluating the cost-effectiveness, environmental impact, and speed of delivery for both tank lorries and pipelines. Regular reviews and adjustments based on evolving market conditions should be integral to this optimization strategy.

Some of the factors to consider for the analysis are:

- The volume and frequency of product demand and supply, and the variability and uncertainty of demand and supply patterns.
- The distance and accessibility of the product's origin and destination, and the availability and reliability of the transportation infrastructure and network.
- The capital and operating costs of the transportation modes, and the trade-offs between fixed and variable costs.
- The environmental and social impacts of the transportation modes, such as greenhouse gas emissions, air pollution, noise pollution, road congestion, and safety risks.

Some of the methods to conduct the analysis are:

- Linear programming, which uses mathematical models to optimize the transportation mix, subject to constraints such as capacity, demand, and cost.
- Simulation, which uses computer models to mimic the behavior and performance of the transportation system, and test different scenarios and outcomes.
- Multi-criteria decision analysis, which uses a structured approach to evaluate and compare the transportation alternatives, based on multiple criteria and preferences.

Continuous Improvement Culture

Shell is recognized as a market leader in continuous improvement, and maintaining this status is imperative. Encouraging a culture of innovation and efficiency within the organization can lead to the identification of new opportunities for improvement. Establishing platforms for employees to contribute ideas, providing training on emerging technologies, and fostering a mindset of continuous improvement will ensure that Shell remains at the forefront of advancements in supply chain management. Regular assessments of industry best practices and the adoption of relevant innovations will contribute to sustained excellence.

Some of the benefits of creating a continuous improvement culture are:

- It can increase customer satisfaction and loyalty, by delivering high-quality products and services that meet or exceed customer expectations.
- It can enhance employee engagement and retention, by empowering employees to participate in improvement initiatives, and rewarding them for their contributions and achievements.
- It can boost operational performance and productivity, by eliminating waste, reducing costs, and increasing efficiency and effectiveness.

- It can foster innovation and competitiveness, by stimulating creativity, experimentation, and learning, and enabling faster and better adaptation to changing market conditions.
- Some of the examples of creating a continuous improvement culture are:
- Implementing a structured methodology, such as Lean, Six Sigma, or Kaizen, to guide and standardize the improvement process, and applying relevant tools and techniques, such as value stream mapping, root cause analysis, and 5S.
- Establishing a feedback and suggestion system, such as an online platform, a suggestion box, or a regular meeting, to collect and evaluate ideas from employees, customers, and other stakeholders.
- Developing a recognition and reward system, such as a certificate, a bonus, or a promotion, to acknowledge and appreciate the employees who demonstrate continuous improvement behaviors and outcomes.

Collaboration with Technology Partners

To stay at the forefront of technological advancements, Shell should consider forming strategic partnerships with technology companies specializing in supply chain solutions. Collaborating with technology partners can provide access to the most modern, cutting-edge tools, systems, and expertise in supply chain optimization. By staying on top of the latest advancements in technology, Shell can ensure that its supply chain operations remain agile, responsive, and aligned with industry best practices and modern times.

Some of the benefits of collaborating with technology partners are:

- They can offer customized and integrated solutions that suit the specific needs and goals of Shell's supply chain and complement Shell's existing capabilities and resources.
- They can provide technical support and guidance, that help Shell implement and maintain the technology solutions, and troubleshoot any issues or challenges that arise.
- They can facilitate knowledge sharing and learning, that enables Shell to acquire new skills and competencies, and leverage the best practices and experiences of the technology partners.
- They can create synergies and opportunities that enhance Shell's competitive advantage and enable Shell to explore new markets and customers.

Some of the examples of collaborating with technology partners are:

- Shell has partnered with IBM to use its Planning Analytics tool, which uses machine learning and predictive analytics to automate and optimize the planning, budgeting, and forecasting process.
- Shell has partnered with Amazon to use its Forecast tool, which uses deep learning and neural networks to generate accurate forecasts based on multiple data sources and variables.
- Shell has partnered with Google to use its Cloud AI Platform Forecasting tool, which uses TensorFlow and BigQuery to build and deploy scalable and customizable forecasting models.

Reducing Environmental Impact

Shell Pakistan is committed to delivering energy in a responsible way, helping the world move towards a future in which the energy used causes minimal impact on the planet. However, there is always room for improvement, and Shell Pakistan can take further steps to reduce its environmental impact and support the transition towards a lower-carbon future. Some of the possible actions are:

- **Increasing Energy Efficiency in Operations:** Increasing energy efficiency can help reduce greenhouse gas emissions, lower operating costs, and improve competitiveness. Shell Pakistan should strive to

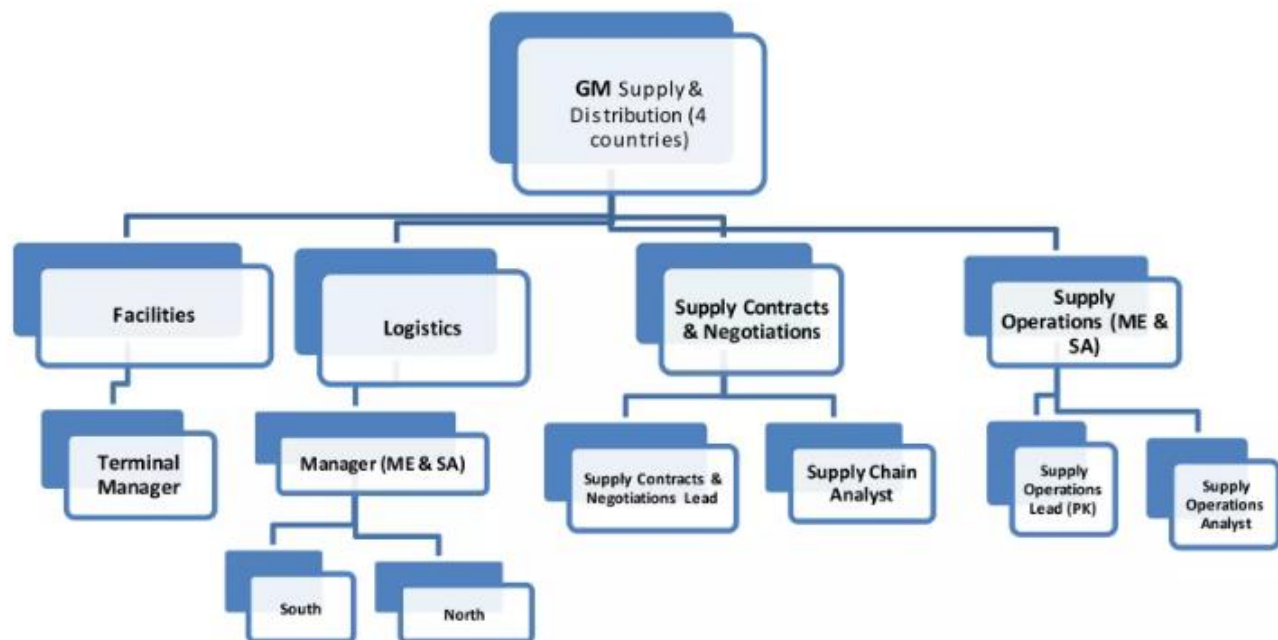
increase its energy efficiency in its operations, by using less energy to produce the same number of products. This can be achieved by implementing best practices, such as optimizing equipment performance, reducing flaring, venting, and minimizing energy losses.

- **Adopting Renewable Energy Sources:** Shell Pakistan should consider adopting renewable energy sources, such as solar, wind, and biogas, to power its operations and facilities. This can help reduce the reliance on fossil fuels, lower carbon footprint, and diversify the energy mix. Shell Pakistan can also explore the potential of producing and supplying renewable energy to its customers and partners, creating new business opportunities, and contributing to the energy transition.
- **Promoting Cleaner Fuels and Products:** Shell Pakistan should continue to promote cleaner fuels and products, such as Shell V-Power, Shell Fuel Save, and Shell Helix, that can help customers reduce their emissions and improve their fuel efficiency. Shell Pakistan can also invest in research and development to create new and innovative solutions, such as low-carbon biofuels, hydrogen, and electric mobility, that can meet the changing needs and preferences of customers and society.

Enhancing Environmental Management and Reporting

In conclusion, Shell Pakistan should enhance its environmental management and reporting, by setting clear and measurable targets, monitoring and disclosing its environmental performance, and engaging with stakeholders on environmental issues. Shell Pakistan should also comply with all relevant environmental regulations and standards, and apply its own stringent environmental requirements, wherever it operates. Enhancing environmental management and reporting can help Shell Pakistan demonstrate its commitment to sustainability, improve its reputation, and reduce its environmental risks and liabilities.

Appendix



PERFORMANCE INDICATORS

These indicators enable management to evaluate Shell's performance against our strategy and operating plans during the year. These are also used as part of the determination of Executive Directors' remuneration. See "[Directors' Remuneration Report](#)".

Financial delivery

Click the box for more information.

Cash flow from operating activities
(\$ million)

45,104

2020: 34,105

Free cash flow
(\$ million)

40,343

2020: 20,828

Return on average capital
employed
(%)

8.8

(2020: 6.8)

Total shareholder return
(%)

33.1

2020: (32.7)

Operational excellence

Click the box for more information.

Upstream controllable availability
(%)

87.8

2020: 89.2

Midstream availability
(%)

87.3

2020: 92.3

Refinery and chemical plant
availability
(%)*

95.6

2020: 95.5

Project delivery on schedule
(%)*

87.0

2020: 48.0

Project delivery on budget
(%)

104.0

2020: 103.9

Progress in energy transition

[Click the box for more information.](#)

Upstream and Integrated Gas
greenhouse gas (GHG) intensity
(tonnes of CO₂ equivalent/tonne of
hydrocarbon production available
for sale)

0.172
2020: 0.16

Refining GHG intensity
(tonnes of CO₂ equivalent/UEDC™)

1.05
2020: 1.05

Chemicals GHG intensity
(tonnes of CO₂ equivalent/tonne
petrochemicals produced)

0.95
2020: 0.98

GHG abatements
(thousand tonnes of CO₂
equivalent)

279
2020: N/A

Safety

[Click the box for more information.](#)

Serious injury and fatality
frequency
(cases per 100 million working
hours)

6.9
2020: 6.0

Number of operational Tier 1 and 2
process safety events

102
2020: 103

