



Navigating Supply Chain Challenges and Elevating Quality Control in Ford Motor Company through Advanced Information Systems



California State University, Long Beach

Management Information Systems IS 610

Dr. Santos Galvez



Group Members

Akshaya Chhaban Tonde

Antariksh Ramesh

Gaurav Salvi

Hari Haran Dhulipala

Rishitha Kandibyalla

Vishwanath Bhatt Padukudru



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1. The organization or Industry

Founded by Henry Ford in 1903, Ford Motor Company is a pioneering American automaker with a profound impact on the automotive industry. Notable milestones include the introduction of the assembly line in 1913, making automobiles affordable with the Model T, and the global expansion of operations. The company's innovation extended to social initiatives, such as the introduction of the \$5 per day wage in 1914.

During World War II, Ford contributed to the war effort by producing military equipment. In the post-war era, the company experienced a surge with popular models like the F-Series trucks and the iconic Ford Mustang in the 1960s. Facing challenges in the 1970s, Ford underwent significant restructuring.

In recent decades, Ford focused on sustainability and innovation, introducing hybrid and electric vehicles. The company's strategic shift in the 2020s emphasizes electric vehicles, autonomous driving, and smart mobility solutions, reflecting its commitment to shaping the future of transportation. Through a dynamic history marked by challenges and successes, Ford remains a global automotive leader.

Mission and Vision: Ford Motor Company's mission is to become the world's most trusted company, designing smart vehicles for a smart world. Their vision emphasizes innovation, sustainability, and customer satisfaction, aiming to be a leader in electrification, autonomy, and mobility solutions.

SWOT Analysis:

Strengths:

- **Strong Brand Recognition:** Ford has a rich history and is a globally recognized brand, contributing to consumer trust and loyalty.
- **Global Presence:** Operating in various markets worldwide provides the company with diverse revenue streams and market insights.
- **Diverse Product Portfolio:** Ford offers a wide range of vehicles, from trucks to electric vehicles, catering to different consumer preferences.

Weaknesses:

- **Overreliance on Specific Segments:** Ford's heavy reliance on trucks and SUVs makes it vulnerable to shifts in consumer preferences and market dynamics.
- **Vulnerability to Supply Chain Disruptions:** The complexity of the global supply chain exposes Ford to risks arising from natural disasters, geopolitical tensions, or supplier inconsistencies.
- **Challenges in Electric Vehicle Adoption:** While making strides in electrification, Ford faces challenges in catching up with competitors in the rapidly growing electric vehicle market.

Opportunities:

- **Growing Electric Vehicle Market:** The increasing demand for electric vehicles presents an opportunity for Ford to expand its presence in this segment.
- **Strategic Partnerships:** Collaborations with technology companies and strategic alliances can enhance Ford's capabilities in emerging technologies.
- **Advancements in Technology:** Investing in advanced technologies, such as autonomous driving and connectivity, can differentiate Ford's offerings in the market.

Threats:

- **Intense Competition:** The automotive industry is highly competitive, with numerous global players vying for market share.
- **Geopolitical Uncertainties:** Political and economic uncertainties in key markets can impact Ford's operations and profitability.
- **Rapid Technological Changes:** The industry's rapid technological advancements require continuous innovation to stay competitive.

Porter's Five Forces Analysis:

Threat of New Entrants:

- **Moderate:** The automotive industry has high entry barriers due to substantial capital requirements, brand loyalty, and the need for extensive research and development.

Bargaining Power of Buyers:

- **High:** Consumer preferences and demands strongly influence the industry. Buyers have abundant choices and can easily switch between brands.

Bargaining Power of Suppliers:

- **Moderate to High:** While there are a few dominant suppliers, their influence is significant. A disruption in the supply chain can impact production.

Threat of Substitutes:

- **Moderate:** Emerging technologies and alternative transportation options, such as ridesharing, pose a moderate threat to traditional vehicle ownership.

Intensity of Competitive Rivalry:

- **High:** The automotive industry is characterized by intense competition, with numerous global competitors offering similar products.

Value Chain Analysis:

Inbound Logistics:

- Ford can enhance supply chain resilience by diversifying its supplier base, implementing risk mitigation strategies, and adopting a flexible sourcing approach.

Operations:

- Investment in manufacturing flexibility and the adoption of agile practices can improve the company's ability to respond to changing market conditions.

Outbound Logistics:

- Optimization of distribution channels, coupled with data analytics for efficient transportation, can improve overall logistics efficiency.

Marketing and Sales:

- Communicating Ford's commitment to quality and innovation can positively influence consumer perceptions, contributing to brand loyalty.

Service:

- Streamlining recall and maintenance processes ensures a seamless customer experience, contributing to long-term customer satisfaction.

Ford Motor Company's mission and vision, coupled with a comprehensive SWOT analysis, Porter's Five Forces analysis, and a Value Chain analysis, provide valuable insights into the organization's strengths, weaknesses, opportunities, and threats. Addressing challenges in supply chain management and embracing technological advancements will be crucial for Ford's sustained success in the ever-evolving automotive industry.

2. Business Problem

Ford Motor Company, a venerable name in the automotive industry, is grappling with multifaceted challenges that threaten to undermine its operational efficiency and brand reputation. Two critical areas demanding immediate attention are the intricacies of supply chain management and the stringent quality control measures inherent in the production process.

The contemporary automotive landscape is marked by a globalized and intricate supply chain that, while fostering efficiency, is susceptible to disruptions. These disruptions, stemming from natural disasters, geopolitical tensions, or supplier inconsistencies, can potentially reverberate across the entire production cycle, leading to delays, increased costs, and diminished customer satisfaction.

Furthermore, the automotive industry is perennially haunted by the specter of quality control issues. In an era where consumer expectations for flawless products are at an all-time high, any compromise in the quality of vehicles poses not just a financial risk through recalls but also a significant threat to the brand's reputation.

1. Supply Chain Management:

Problem: Disruptions in the supply chain can impact production schedules.

The sprawling and intricate supply chain of Ford Motor Company, like that of its counterparts, is susceptible to external shocks that can precipitate disruptions. Unforeseen events, be they natural disasters or geopolitical upheavals, can hamper the timely procurement of raw materials and components, leading to cascading delays in production schedules.

Elaboration on the Problem: Disruptions in the Supply Chain

The supply chain of Ford Motor Company is a vast and interconnected network, encompassing suppliers of raw materials, components, and sub-assemblies spread across the globe. The seamless functioning of this supply chain is crucial for maintaining efficient production schedules and ensuring timely delivery of vehicles to the market.

Complexity and Globalization: Ford's supply chain is characterized by its complexity and globalization. The company sources components and materials from various suppliers located in different regions, each playing a vital role in the production process. This complexity increases the susceptibility to disruptions as it introduces dependencies on diverse factors, including geopolitical stability, transportation networks, and local regulations.

External Shocks and Unforeseen Events: The automotive industry is inherently vulnerable to external shocks and unforeseen events that can disrupt the supply chain. Natural disasters such as earthquakes, floods, or hurricanes can impact suppliers' operations, disrupt transportation routes, and lead to delays in the delivery of critical components. Additionally, geopolitical tensions, trade disputes, or economic downturns in key regions can further complicate the reliable flow of materials.

Supplier Reliability and Variability: Ford relies on a multitude of suppliers for various components, and the reliability of each supplier is paramount. Variability in supplier performance, whether due to quality issues, financial instability, or production bottlenecks, can disrupt the smooth flow of materials. This variability can be challenging to predict and manage without a robust system in place.

Inventory Management Challenges: In the absence of effective supply chain management, Ford may encounter difficulties in maintaining optimal inventory levels. Overstocking can tie up valuable resources and increase holding costs, while understocking can lead to production delays and missed market opportunities.

Impact on Production Schedules: When disruptions occur at any point in the supply chain, the ripple effect can be felt throughout the production process. Delays in the delivery of critical components can halt or slow down assembly lines, leading to missed production targets and potential financial losses. This, in turn, can affect Ford's ability to meet customer demand and maintain a competitive edge in the market.

2. Quality Control:

Problem: Ensuring the quality of vehicles is crucial; any defects can lead to recalls and damage the brand's reputation.

Quality control stands as a linchpin in Ford's pursuit of delivering impeccable vehicles. Any lapse in quality assurance not only exposes the company to the financial ramifications of recalls but also imperils its hard-earned brand reputation, eroding consumer trust.

Elaboration on the Problem: Ensuring Vehicle Quality and its Impact on Brand Reputation

Consumer Expectations and Brand Perception:

In the highly competitive automotive industry, consumers have high expectations regarding the quality and reliability of vehicles. Ford's brand reputation is closely tied to its ability to consistently deliver products that meet or exceed these expectations.

Any compromise in vehicle quality can erode consumer trust, leading to a negative impact on the brand's perception. Consumers may become skeptical about the reliability and safety of Ford vehicles, potentially turning to competitors.

Financial Implications of Defects:

Defects in vehicles can have severe financial consequences for Ford. Product recalls, initiated to address safety or quality issues, incur substantial costs related to the repair or replacement of defective components.

Recalls can lead to a significant financial burden, affecting the company's profitability and shareholder confidence. The costs associated with handling defects and recalls may include not only direct expenses but also indirect expenses such as legal fees, compensation, and damage to the brand's market value.

Legal and Regulatory Consequences:

Quality issues in vehicles may attract legal challenges and regulatory scrutiny. If defects lead to accidents or injuries, Ford could face lawsuits, regulatory fines, and damage to its reputation in the eyes of both consumers and regulatory bodies.

Non-compliance with safety standards and regulations can result in legal consequences that further tarnish the brand's standing. Ensuring strict adherence to safety standards is not just a matter of ethical responsibility but also a crucial aspect of safeguarding the company's legal position.

Brand Loyalty and Customer Retention:

Repeat business and brand loyalty are essential for sustaining long-term success in the automotive industry. Customers who have a positive experience with a vehicle are more likely to become repeat buyers and advocates for the brand.

On the contrary, if defects and quality issues become recurrent, customer loyalty is at risk. Dissatisfied customers may share their negative experiences through word-of-mouth, social media, or online reviews, influencing potential buyers and damaging Ford's reputation.

Market Competitiveness:

In a market where consumers have numerous alternatives, maintaining a reputation for high-quality products is a competitive advantage. Defects can undermine Ford's competitiveness, allowing rivals to gain market share by positioning themselves as more reliable and trustworthy alternatives.

Strategic Implications:

The reputation of Ford as an innovator and industry leader is closely tied to its ability to produce cutting-edge and reliable vehicles. Quality issues can undermine this perception, affecting the company's strategic positioning in the market.

Maintaining a strong brand image is crucial for attracting partnerships, collaborations, and maintaining credibility in the eyes of investors and other stakeholders.

In conclusion, ensuring the quality of vehicles is not only a matter of meeting industry standards but a critical element in preserving Ford Motor Company's brand reputation. Defects can have far-reaching consequences, impacting financial stability, legal standing, customer loyalty, and overall market competitiveness. Implementing stringent quality control measures and leveraging advanced information systems for real-time monitoring and analysis are imperative to proactively identify and address potential issues, safeguarding the brand's integrity and long-term success. Disruptions in the supply chain for Ford Motor Company pose a significant threat to the company's production schedules. The interdependence among global suppliers, combined with the unpredictable nature of external events, underscores the need for a comprehensive and proactive approach to supply chain management. Addressing this problem requires strategic initiatives, technological advancements, and a resilient

supply chain strategy to mitigate risks and ensure the continuous and efficient flow of materials for production.

3. Information System or Technology

Problem: Navigating Supply Chain Challenges and Elevating Quality Control in Ford Motor Company through Advanced Information Systems

Proposed Information System:

Blockchain-enabled Supply Chain and Quality Management System

Type of Information System:

Blockchain Technology Integration for End-to-End Visibility. It is a distributed, decentralized digital ledger technology that securely and robustly records transactions across several computers. It is kept up to date by a network of nodes, or computers, who use a consensus mechanism to agree on the authenticity of transactions. Each block in the chain contains a list of transactions.

Explanation:

Ford's supply chain and quality management systems will be integrated with blockchain technology as part of the suggested solution. Blockchain provides an immutable and tamper-resistant ledger for recording transactions and quality-related data, ensuring transparency and security. An information system that improves visibility, permits proactive disruption management, and automates quality control checks is created when blockchain technology is combined with Internet of Things (IoT) devices for real-time monitoring. Improved cooperation, increased quality control, and a competitive edge through a more robust and effective supply chain outweigh the implementation difficulties and related expenses.

Functionality:

1. Transparent and Secure Supply Chain:

Blockchain Implementation:

- Utilize a decentralized, distributed ledger for recording transactions and events across the entire supply chain.
- Smart contracts ensure that predetermined norms and standards are followed by automating and enforcing agreements.

2. Real-time Monitoring and Data Sharing:

IoT Devices and Sensors Integration:

- Install sensors and IoT devices to track supply chain operations in real time.
- The blockchain securely stores IoT data, offering a transparent, unchangeable record of each movement and transaction.

3. Blockchain's Role in Predictive Analysis:

- By transparently documenting transactions, blockchain ensures the immutability and integrity of previous data, offering a secure basis for predictive analysis.
- Predictive analytics algorithms can be used to historical data held on the blockchain, guaranteeing accuracy, transparency, and decentralized trust. This is made possible via smart contracts, consensus mechanisms, and decentralized oracle services.

4. Quality Control Assurance:

Blockchain for Quality Management:

- On the blockchain, keep track of certificates, inspections, and quality-related data.
- When incoming components meet predetermined specifications, smart contracts can automatically verify their quality.

Costs:

Initial Implementation:

- The expenses related to creating and incorporating blockchain technology.
- Investment in sensors and IoT devices.
- Employee instruction on the new system.

Maintenance and Upkeep:

- Ongoing costs for maintaining and updating the blockchain network.
- Costs related to the continuous monitoring and maintenance of IoT devices.

Advantages:

Enhanced Visibility:

- Ford and its stakeholders will have greater visibility thanks to blockchain, which offers an unchangeable and transparent record of each transaction in the supply chain.

Proactive Disruption Management:

- Early interruption detection is possible with real-time monitoring via IoT devices.
- In the event of an interruption, smart contracts could immediately initiate backup plans, guaranteeing prompt action.

Quality Control Assurance:

- Quality-related data integrity is guaranteed by the temper-resistant nature of blockchain.
- Human error is decreased through the automation of quality inspections by smart contracts.

Improved Collaboration:

- Blockchain makes it easier for Ford and its suppliers to collaborate securely and guarantees that quality requirements are fulfilled through the supply chain.

Disadvantages:

Implementation Complexity:

- Requiring adjustments to current systems and procedures, the integration of blockchain and IoT technologies might be challenging.

Resource Intensive:

- Blockchain networks have the potential to require large amounts of energy and processing capacity.

Standardization Challenges:

- In the automotive sector, standardizing blockchain protocols could be difficult to establish.

Conclusion:

In conclusion, the suggested information system, "Blockchain-enabled Supply Chain and Quality Management System," gives Ford Motor Company a transformative solution to enhance the transparency, security, and efficiency of its supply chain and quality control procedures. The company can create an immutable, decentralized ledger that guarantees data integrity by using blockchain technology. This system creates a comprehensive framework for proactive disruption management and strong quality assurance by utilizing smart contracts, automatic quality checks, and real-time monitoring through IoT devices. Ford is in a competitive position to deliver high-quality products to the market thanks to enhanced visibility, supplier engagement, and continuous improvement culture, despite obstacles like implementation difficulty and ongoing maintenance.

4. Security and Control

For Ford, or any other automotive company, implementing a Blockchain-enabled Supply Chain and Quality Management System includes several security and control measures to guarantee the integrity, transparency, and effectiveness of operations. Here are some key considerations to remember.

SECURITY MEASURES

1. Cryptography:

Securing data and transactions on the blockchain requires the use of robust cryptographic algorithms. This entails offering safe access restrictions and protecting the privacy of sensitive data.

2. Control of Access:

Implementing strong access control measures in place to limit who can read from or write to the blockchain. This guarantees that some information can only be accessed by those who are authorized.

3. Consensus Mechanism:

To validate transactions, pick a safe consensus method (such as Proof of Work or Proof of Stake). This preserves the integrity of the data on the blockchain and aids in the prevention of harmful activity.

4. Networks of Private Blockchains:

Consider utilizing a blockchain network that is private or permissioned, allowing only authorized users to join. For sensitive supply chain and quality management data, this is especially crucial.

5. Encryption of Data:

Protect data from unwanted access by encrypting it both on and off the blockchain. Ensuring the confidentiality of sensitive information requires doing this.

6. Safe Smart Contracts:

Make sure smart contracts are properly examined for security flaws before implementing them. It is important to create smart contracts that can only carry out authorized operations and shield against unauthorized modification.

7. Continual Evaluations:

To find and fix blockchain system vulnerabilities, conduct routine security audits. This covers audits that are both procedural and technical.

CONTROL MEASURES

1. Onboarding and Screening of Suppliers:

Create a reliable onboarding and screening procedure for vendors on the blockchain network. Make sure that the network comprises only dependable and trustworthy vendors.

2. Intelligent Contracts for Quality Requirements:

Use smart contracts to automate and enforce requirements for quality. Transactions can be automatically validated and approved by these contracts based on pre-established quality standards.

3. Tracking in real-time:

Utilize the blockchain's transparency to trace products and components in real-time across the supply chain. This improves visibility and makes it possible to react quickly to any inconsistencies.

4. Traceability:

Make an unchangeable, transparent record of each stage in the supply chain by using the blockchain. This promotes traceability, which makes it simpler to locate the origin of any quality problems and carry out remedial measures.

5. Cooperative Governance:

Create a cooperative governance framework with the participation of important supply chain players. This guarantees that choices regarding the blockchain system are decided upon collaboratively, considering the interests of all involved parties.

6. Robotic Compliance Verifications:

Create automatic checks in the blockchain system to make sure that internal quality standards and legal obligations are being followed. This lowers the possibility of non-compliance problems.

7. Incident response plan:

Create a thorough incident response plan to quickly handle any disruptions or security breaches. Procedures for locating, containing, eliminating, recovering from, and learning from occurrences should all be part of this plan.

8. Awareness and Training:

Teach partners and staff members how to use the blockchain technology safely. Raise awareness of the significance of safety and regulation measures.

It is vital to acknowledge that the execution of a Supply Chain and Quality Management System enhanced by Blockchain necessitates cooperation between manufacturers, suppliers, and additional stakeholders. Furthermore, to handle changing threats and difficulties, security measures must be continuously monitored and adjusted.

5. Key Performance Indicators (KPI)s

Using KPIs (Key Performance Indicators), describe why the process needs to be improved.

1. Supplier On-Time Delivery (OTD) Performance:

- **KPI Definition:** The percentage of orders delivered by suppliers on or before the agreed-upon delivery date.

- **Significance:** A decrease in supplier OTD performance could indicate disruptions in the supply chain, leading to production delays and potential financial losses. Improving this KPI is crucial for maintaining production schedules and meeting customer demand.

2. Inventory Turnover Rate:

- **KPI Definition:** The number of times inventory is sold or used in a given period.

- **Significance:** A low inventory turnover rate may suggest overstocking, tying up valuable resources, and increasing holding costs. Improving this KPI is essential for optimizing inventory levels, reducing holding costs, and enhancing overall supply chain efficiency.

3. Supplier Risk Score:

- **KPI Definition:** An assessment of the potential risk posed by each supplier to the supply chain.
- **Significance:** A high supplier risk score may indicate a higher likelihood of disruptions due to factors such as financial instability or production bottlenecks. Improving supplier risk management processes can help mitigate these risks and ensure a more reliable supply chain.

4. Lead Time Variability:

- **KPI Definition:** The degree of variation in lead times for critical components.
- **Significance:** High lead time variability can lead to production uncertainties and delays. Improving this KPI involves streamlining processes and enhancing communication with suppliers to reduce lead time variability and enhance overall supply chain predictability.

5. Production Schedule Adherence:

- **KPI Definition:** The percentage of production schedules adhered to without delays.
- **Significance:** A decrease in production schedule adherence may indicate disruptions in the supply chain, impacting Ford's ability to meet market demand. Improving this KPI involves addressing issues promptly to minimize delays and ensure consistent production schedules.

6. Supply Chain Risk Exposure:

- **KPI Definition:** The quantification of potential risks and their financial impact on the supply chain.
- **Significance:** A high supply chain risk exposure suggests vulnerability to external shocks and unforeseen events. Improving risk management strategies and implementing contingency plans can help minimize the impact of disruptions on Ford's supply chain.

7. Order Fulfilment Cycle Time:

- **KPI Definition:** The time taken from order placement to delivery of finished products.
- **Significance:** Increased order fulfillment cycle time can lead to customer dissatisfaction and missed market opportunities. Improving this KPI involves optimizing processes to reduce cycle times and enhance overall responsiveness to customer demand.

8. Supplier Quality Performance:

- **KPI Definition:** The percentage of delivered components meeting the required quality standards.
- **Significance:** Poor supplier quality performance can lead to production issues and rework, causing delays and additional costs. Improving this KPI involves working closely with suppliers to ensure consistent quality and reliability.

By focusing on these KPIs, Ford can identify specific areas within its supply chain that require improvement. Whether it's enhancing supplier relationships, optimizing inventory management, or implementing robust risk management strategies, addressing these key performance indicators will contribute to a more resilient and efficient supply chain for Ford Motor Company.

Why the proposed improvement is good?

The proposed improvement based on the identified KPIs is beneficial for Ford Motor Company for several reasons:

1. Enhanced Operational Efficiency:

- By improving Supplier On-Time Delivery (OTD) Performance, Ford can ensure a consistent and timely supply of components. This reduces the risk of production delays, enhances operational efficiency, and helps in meeting production schedules.

2. Optimized Resource Utilization:

- Improving the Inventory Turnover Rate is essential for optimizing inventory levels. This ensures that resources are not tied up unnecessarily in excess stock, leading to cost savings and more efficient resource utilization.

3. Risk Mitigation and Resilience:

- <https://dl.acm.org/doi/fullHtml/10.1145/3316481>

4. Predictability and Planning:

- Streamlining Lead Time Variability contributes to improved predictability in the supply chain. This allows for better planning and reduces uncertainties in production schedules, contributing to smoother operations.

5. Consistent Production Schedules:

- Improving Production Schedule Adherence ensures that Ford can consistently meet market demand. This is crucial for customer satisfaction, maintaining a competitive edge, and avoiding financial losses associated with missed production targets.

6. Customer Satisfaction and Market Responsiveness:

- Reducing Order Fulfillment Cycle Time is directly linked to customer satisfaction. Faster order fulfillment enhances customer experience, responsiveness to market demands, and can contribute to increased market share.

7. Quality Assurance and Cost Reduction:

- Addressing Supplier Quality Performance ensures that the delivered components meet the required standards. This reduces the likelihood of production issues, rework, and associated costs, contributing to overall cost reduction and product quality improvement.

8. Improved Supplier Relationships:

- The proposed improvements necessitate collaboration and communication with suppliers. This can lead to stronger relationships, better understanding of mutual expectations, and collaborative problem-solving, fostering a more reliable and efficient supply chain ecosystem.

In summary, the suggested improvements based on the identified KPIs are good for Ford Motor Company as they collectively contribute to a more resilient, efficient, and customer-centric supply chain. By addressing these key areas, Ford can enhance its competitive position, reduce costs, and improve overall operational performance.

What KPI will change? How?

Let's examine how each proposed improvement is expected to impact specific Key Performance Indicators (KPIs) for Ford Motor Company:

1. Supplier On-Time Delivery (OTD) Performance:

- **Change:** Increase in Supplier OTD Performance.
- **How:** By implementing measures to enhance communication, collaboration, and risk management with suppliers, Ford can expect an improvement in the percentage of orders delivered on or before the agreed-upon delivery date.

2. Inventory Turnover Rate:

- **Change:** Increase in Inventory Turnover Rate.
- **How:** Optimizing inventory levels through effective supply chain management, demand forecasting, and streamlined processes will result in a higher turnover rate as inventory is sold or used more frequently within a given period.

3. Supplier Risk Score:

- **Change:** Decrease in Supplier Risk Score.

- **How:** Proactively assessing and addressing potential risks associated with each supplier, such as financial stability or production bottlenecks, will lead to a reduction in the overall risk score.

4. Lead Time Variability:

- **Change:** Decrease in Lead Time Variability.
- **How:** Streamlining processes, improving communication with suppliers, and implementing strategies to reduce uncertainties will result in a more consistent and predictable lead time for critical components.

5. Production Schedule Adherence:

- **Change:** Increase in Production Schedule Adherence.
- **How:** Addressing issues promptly, improving coordination with suppliers, and implementing measures to minimize disruptions will lead to a higher percentage of production schedules adhered to without delays.

6. Order Fulfillment Cycle Time:

- **Change:** Decrease in Order Fulfillment Cycle Time.
- **How:** Optimizing processes, improving coordination with suppliers, and implementing efficient order fulfillment strategies will result in a faster cycle time from order placement to delivery of finished products.

7. Supplier Quality Performance:

- **Change:** Increase in Supplier Quality Performance.

- **How:** Working closely with suppliers, providing clear quality standards, and implementing quality assurance measures will lead to a higher percentage of delivered components meeting the required quality standards.

8. Improved Supplier Relationships:

- **Change:** Strengthened Supplier Relationships.

- **How:** Increased collaboration, communication, and problem-solving with suppliers will foster stronger relationships, creating a more reliable and efficient supply chain ecosystem.

In summary, the proposed improvements are expected to bring about positive changes in specific KPIs by addressing key aspects of the supply chain. The changes include improvements in on-time delivery, inventory turnover, risk management, lead time predictability, production schedule adherence, order fulfilment speed, supplier quality, and overall supplier relationships. These changes collectively contribute to a more resilient, efficient, and customer-centric supply chain for Ford Motor Company.

6. Literature Review

Case Study: IBM Food Trust and Walmart's Blockchain-Enabled Food Supply Chain

Introduction

With multiple parties involved, including farmers, producers, processors, distributors, retailers, and consumers, the global food supply chain is sophisticated and complex. For industry, maintaining traceability, efficiency, and openness across this intricate network is a major challenge. Food supply chains have historically relied on manual procedures and paper-based records, which can cause delays, data mistakes, and a lack of visibility.

IBM and Walmart, a major worldwide retailer, worked together to create IBM Food Trust, a blockchain-enabled food supply chain platform, as a solution to these difficulties. Blockchain technology is being used by IBM Food Trust to establish a transparent and safe network for tracking food goods from farm to table.

Problem:

Several obstacles must be overcome by the food supply system, including:

Lack of Transparency: Transparency is lacking in traditional food supply chains, which makes it challenging to trace the origin and flow of food items. This lack of openness may make it more difficult to find and fix problems with food safety.

Inefficiencies: Manual procedures and paper-based records can cause supply chain inefficiencies that result in higher expenses and delayed product delivery.

Food Safety Concerns: Public health is significantly threatened by foodborne infections. By offering a tamper-proof record of the provenance and handling procedures of food, blockchain technology can contribute to the assurance of food safety.

Solution:

By offering a blockchain-enabled platform for tracking food goods along the supply chain, IBM Food Trust tackles these issues. The platform creates a visible and unchangeable record of food transactions by utilizing distributed consensus, immutability, and security features inherent to blockchain technology.

Key Features

To address the issues with the food supply chain, IBM Food Trust provides the following important features:

Traceability: Food goods can be tracked from their point of origin to their destination, offering important information on how they are handled and moved.

Transparency: Collaboration and transparency are ensured by the fact that all parties involved in the supply chain have access to the same data.

Efficiency: Many operations are automated and streamlined using blockchain technology, which lowers the time and expense of supply chain management.

Food Safety: Blockchain improves food safety by offering a safe, unchangeable record of the provenance and handling procedures of food.

Benefits

Walmart and its supply chain partners have reaped numerous benefits from the deployment of IBM Food Trust.

Enhanced Traceability: Walmart has attained 99% traceability for its food items, making it possible to identify potential problems with food safety more quickly and precisely.

Decreased Costs: Walmart and its suppliers have seen cost savings because of process automation and simplification.

Improved Food Safety: Walmart is now better equipped to guarantee food safety and avert foodborne diseases thanks to blockchain-enabled traceability.

Enhanced Customer Confidence: Customers are now more assured of the safety and caliber of Walmart's food goods because of IBM Food Trust's transparency and traceability.

Conclusion:

The potential of blockchain technology to address the issues facing the food sector is demonstrated by the integration of IBM Food Trust into Walmart's food supply chain. Blockchain can save costs, increase consumer confidence, and improve food safety by offering a transparent, safe, and effective platform for tracking food goods. The food supply chain is anticipated to be increasingly impacted by blockchain technology as it develops, further altering how we produce, distribute, and consume food.

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