Project Report - Part 2

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About the Company

The company's mission is to ensure the quality of water for people worldwide. Their aim is to improve water analysis through customer partnerships, educated professionals, and dependable, user-friendly solutions. They want to make water analysis faster, easier, greener, and more informative.

The company provides a large selection of water analysis products. This includes wastewater surveillance solutions, chemistries, spectrophotometers, colorimeters, and turbidimeters. Additionally, they offer portable lab instruments including, titration systems, portable samplers, and benchtop instruments. They also offer online instrumentation, prepared reagents, easy-to-use methodologies, and professional assistance in an effort to streamline analysis.

The company provides water quality analysis services to a wide variety of industries. Industrial facilities and municipalities, around the globe, employ their products. These products are used in boiler water, cooling towers, water conditioning, wildlife conservation, and water and sewage treatments.

The company offers industry-leading chemicals, devices, and software tools so that water quality specialists worldwide can perform at their highest potential. Additionally, they provide a software solution - [redacted] which features process management, instrument management, and data management capabilities. With the help of these systems, operators and managers feel more confident about their decisions to increase energy efficiency, maintain compliance, reduce waste, enhance quality, and improve utility management.

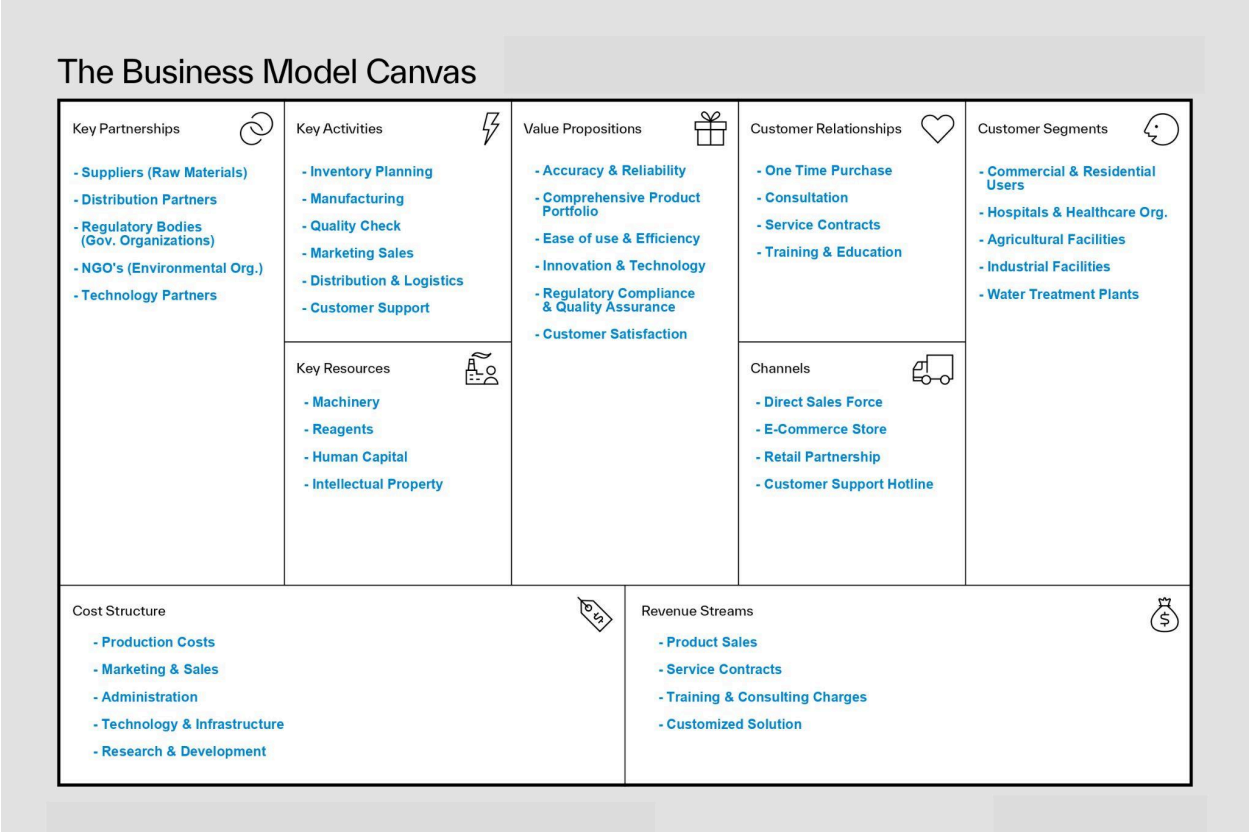
In conclusion, the organization has a strong commitment and rich history to maintaining water quality globally. They have significantly advanced water analysis with their extensive variety of product ranges and are consistently at the forefront of innovation.

Executive Members

In our endeavor to enhance operational efficiency, our group will be closely collaborating with the process owner. This collaboration aims to gain an in-depth understanding of the existing (As-Is) processes. We will also work with the Continuous Improvement Leader and the Director of Operations. Their profound knowledge and insights about the process will be invaluable in our brainstorming sessions. These sessions will focus on identifying potential areas of improvement and devising innovative solutions to optimize the process. This collaborative approach will ensure that we have a comprehensive understanding of the process, thereby enabling us to suggest significant improvements.



Business Model Canvas



Key Partnerships: They play a crucial role in the successful operation of a business. These partnerships include suppliers who provide the essential raw materials needed for production. Distribution partners ensure the efficient delivery of products to the market. Regulatory bodies, such as government organizations, ensure compliance with laws and regulations, thereby maintaining the business's legitimacy. Non-Governmental Organizations (NGOs), particularly environmental organizations, collaborate with the business to ensure sustainable practices. Lastly, technology partners provide innovative solutions that enhance productivity and efficiency. These partnerships collectively contribute to the business's value proposition, making it competitive and sustainable.

Key Activities: These are the critical tasks that a company must carry out to succeed. These activities include inventory planning, which ensures the business has the necessary resources to meet demand. Manufacturing is the process of converting raw materials into finished goods. Quality checks are essential to maintain the standards of the products. Marketing and sales activities are crucial for promoting the products and

driving revenue. Distribution and logistics ensure that the products reach the customers efficiently. Lastly, customer support is vital for maintaining customer satisfaction and loyalty. These activities collectively form the backbone of a business, driving its growth and success.

Key Resources: These are the assets that a company leverages to create and deliver value. These resources include machinery, which is vital for manufacturing processes. Reagents play a crucial role in product development. Human capital, encompassing the skills, knowledge, and experience of the workforce, is a critical resource in any business. Intellectual property, such as patents, trademarks, and copyrights, provides a competitive edge and protects the company's unique products and services. These resources are fundamental to the operation and success of a business.

Value Proposition: This is the unique mix of products and services that a business offers to meet its customers' needs. It includes accuracy and reliability, ensuring that the products or services perform consistently and meet the promised specifications. A comprehensive product portfolio allows the business to cater to a wide range of customer needs and preferences. Ease of use and efficiency ensure that customers can utilize the products or services without unnecessary complications, thereby saving time and effort. Innovation and technology differentiate the business from its competitors, offering cutting-edge solutions that keep pace with evolving market trends. Regulatory compliance and quality assurance demonstrate the business's commitment to meeting industry standards and delivering high-quality products or services. Lastly, customer satisfaction is a crucial aspect of the value proposition, as it reflects the business's success in meeting or exceeding customer expectations.

Customer Relationships: This component outlines how a business interacts with its customers. Customer Relationships include one-time purchases, where customers buy a product or service without any further obligations. Consultation involves providing expert advice to customers to help them make informed decisions about their purchases. Service contracts represent ongoing agreements between the business and its customers, ensuring the provision of services over a specified period. Training and education is offered to customers to enhance their understanding and usage of the products or services. These diverse forms of customer relationships cater to different customer needs and preferences, contributing to a comprehensive and customer-centric business model.

Channels: This component signifies the various means through which a business reaches its customers. Direct sales force refers to a team that sells products or services directly to customers, often through face-to-face interactions. An e-commerce store

represents an online platform where customers can browse and purchase products at their convenience. Retail partnerships involve collaborations with retail stores to sell products, thereby expanding the business's reach. Lastly, a customer support hotline provides a direct line of communication for customers to resolve queries or issues. These diverse channels enable a business to cater to a wide range of customer preferences and enhance its market presence.

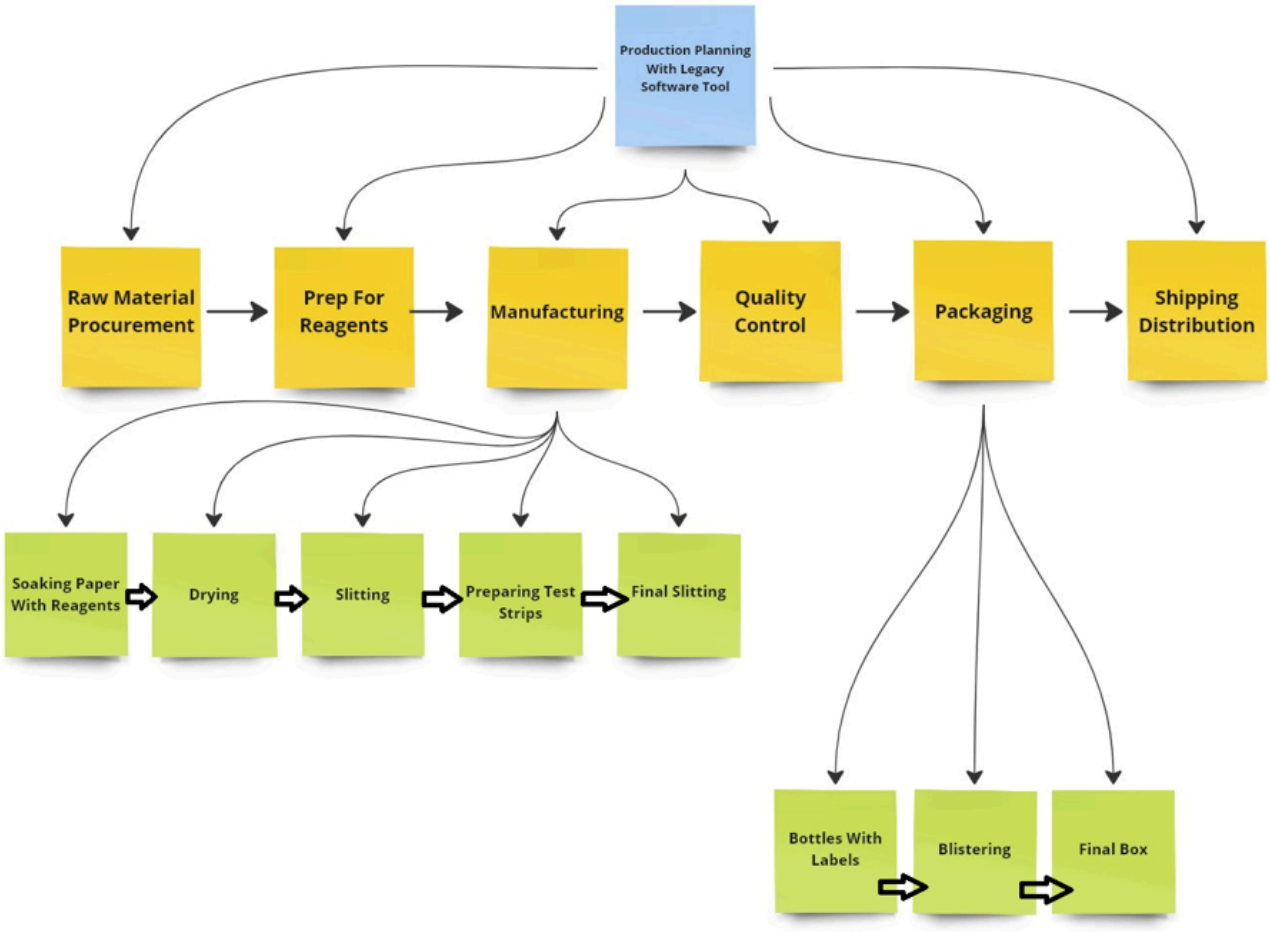
Customer Segments: The customer segments encompass commercial and residential users, hospitals and healthcare organizations, agricultural facilities, industrial facilities, and water treatment plants. A direct sales force entails a dedicated team that directly sells products or services, often engaging in face-to-face interactions with customers. An e-commerce store serves as an online platform where customers can conveniently browse and purchase products. Retail partnerships involve collaborative efforts with retail stores to extend the reach of the business's offerings. Lastly, a customer support hotline serves as a direct communication channel for resolving queries or issues. These diverse channels not only cater to various customer preferences but also bolster the business's market presence.

Cost Structure: The cost structure consists of several essential components. Production costs constitute expenses related to the manufacturing or procurement of goods or services, including raw materials, labor, and equipment. Marketing and sales expenses cover promotional activities, advertising campaigns, and salesforce salaries aimed at attracting and retaining customers. Administration costs pertain to general overhead expenses such as office rent, utilities, and administrative staff salaries. Technology and infrastructure expenses involve investments in software, hardware, and IT infrastructure necessary for business operations. Research and development costs represent investments in innovation, product development, and technological advancements to maintain competitiveness and drive future growth. By carefully managing these cost elements, a business can optimize its financial performance and sustain long-term success.

Revenue Streams: These delineate the various avenues through which a business generates income. Product sales represent revenue derived from the direct sale of goods to customers, whether tangible products or digital offerings. Service contracts entail recurring revenue streams from ongoing service agreements with clients, providing continuous support and maintenance. Training and consulting charges involve fees levied for specialized knowledge transfer, educational programs, or advisory services rendered to customers seeking guidance or expertise. Customized solutions represent revenue generated from tailored offerings or bespoke services tailored to meet specific client needs, often commanding premium pricing. By diversifying revenue

streams and leveraging these different sources of income, a business can foster sustainable growth and profitability over time.

Overview of the Manufacturing Process



Narrative for Manufacturing Process -

The production of test strips is a crucial process that requires meticulous planning and execution to ensure high-quality products reach the market. In the below narrative, we delve into the production planning process in detail which uses a legacy software tool for a company specializing in test strip manufacturing.

Raw Material Procurement:
The process begins with the procurement of raw materials such as paper, reagents, bottles, labels, and packaging materials. The legacy software tool helps in managing inventory levels, supplier information, and procurement schedules to ensure uninterrupted supply chains.

Preparation for Reagents:
Once the raw materials are procured, the next step involves preparing the reagents that will be used in the test strips. This includes mixing and testing the reagent solutions to meet quality standards and specifications.

Manufacturing:
The manufacturing phase is a multi-step process that starts with soaking the paper with reagents. The legacy software tool aids in scheduling and tracking each manufacturing step, ensuring efficient use of resources and adherence to production timelines. After soaking, the paper undergoes drying to remove excess moisture, followed by slitting to create strips of the desired width. The strips are then prepared with additional components before undergoing final slitting to achieve the precise dimensions required for testing.

Quality Control:
A dedicated team manages quality control throughout production, conducting inspections and tests to ensure test strips meet high standards. They use advanced equipment, follow strict protocols, and take corrective actions as needed, ensuring consistent quality and reliability.

Packaging:
Once the test strips pass quality control checks, they proceed to the packaging phase. Bottles along with printed labels are filled with the test strips, and blister packaging is applied to ensure product protection and user convenience. The legacy software tool along with planning lead manages packaging specifications, batch tracking, and labeling requirements for regulatory compliance.

Shipping & Distribution:
Transportation of test strips is carefully managed, starting with order processing and packaging for safe transport. The company works with reliable shipping partners to optimize routes and ensure timely delivery. Tracking is used, and any issues are

promptly addressed. Continuous improvements are made to enhance efficiency and customer satisfaction.

The Primary Process for the As-Is and To-Be study:

Production Planning Process:

Production planning is a critical process in manufacturing that involves setting production goals, determining resource requirements, and developing a plan to meet those goals in the most efficient way possible. Below is an overview of the activities involved:

- Forecasting Demand: This involves analyzing historical data, market trends, and capacity planning to accurately forecast future demand.

- Creating a Production Schedule: This schedule determines what and how much work needs to be done.

- Determining Resource Requirements: This includes identifying the raw materials, labor, and equipment needed for the production process.

- Coordinating Activities: All activities involved in the production process are coordinated to ensure smooth operations.

- Monitoring: The process involves continuous monitoring to ensure that production is aligned with demand, so that goods are produced in the right quantities, at the right time, and at the right cost.

Importance of Production Planning

Production planning is crucial for any manufacturing organization. It helps organizations with the regular and timely delivery of their goods. Furthermore, it allows manufacturing businesses to increase their plant's efficiency and reduce production costs. Mapping out all the processes, resources, and steps involved in production, helps companies build realistic production schedules, ensure production processes run smoothly and efficiently, and adjust operations when problems occur. A well-designed production plan can help companies increase output and save money by developing a smoother workflow and reducing waste.

For our project, we are focusing on the production planning process. It is the backbone of manufacturing operations, directly impacting the efficiency, cost-effectiveness, and overall success of the production line. By optimizing this process, we can ensure that resources are used appropriately, products and services are high-quality, and nothing goes over budget.

The company we visited has a production process that is a comprehensive system that ensures the delivery of high-quality water analysis solutions.

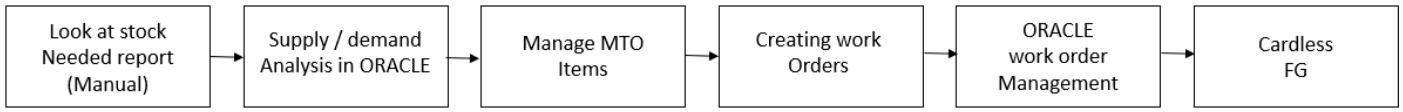
Abbreviations:

MTO: Made To Order
OTS: On Time Ship
MTS: Made To Stock
FG: Finished Good
ESD: Earliest Ship Date
BOM: Bill Of Materials
WO: Work Order

As-Is Production Planning Process:

[redacted]

Level 1 Classification



In the manufacturing operation, process planning serves as the backbone for efficient production. This narrative outlines the step-by-step procedure the company follows to ensure seamless operations and timely delivery of goods to customers.

Step 1: Stock Needed Report Analysis

This step involves manually reviewing/adjusting a report that details the current stock levels of materials needed for manufacturing test strips. It helps in assessing the availability of raw materials and planning for procurement if required.

Step 2: Supply/Demand Analysis in ORACLE

In this phase, the company uses Oracle software to analyze supply and demand. This includes evaluating the demand for test strips based on orders and forecasting, and matching it with the available supply of materials and resources.

Step 3: Managing Make-to-Order (MTO) Items

Made to Order orders are specific to customer requirements. This step involves managing these orders within the Oracle system, ensuring that customer specifications are met and that production is aligned with customer demand.

Step 4: Work Order Creation

Work orders are generated based on the demand analysis and MTO orders. These orders specify the tasks, materials, and resources required to manufacture the test strips according to the production plan.

Step 5: ORACLE Work Order Management

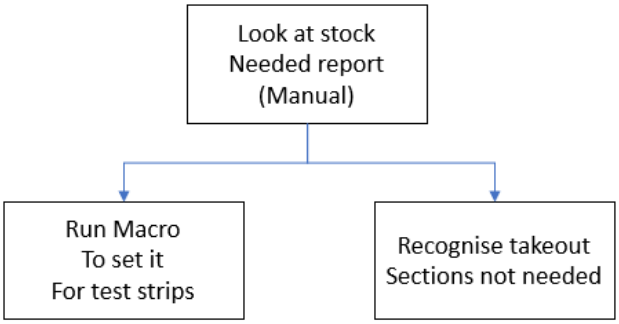
Once work orders are created, they are managed using Oracle's Work Order Management module. This includes tracking the progress of each work order, scheduling production activities, and coordinating resources to meet production targets.

Step 6: Cardless Finished Goods (FG)

This refers to the production of finished test strips without using physical cards or tags for identification. Instead, electronic management within the Oracle system is used to streamline inventory management and improve efficiency in handling finished goods.

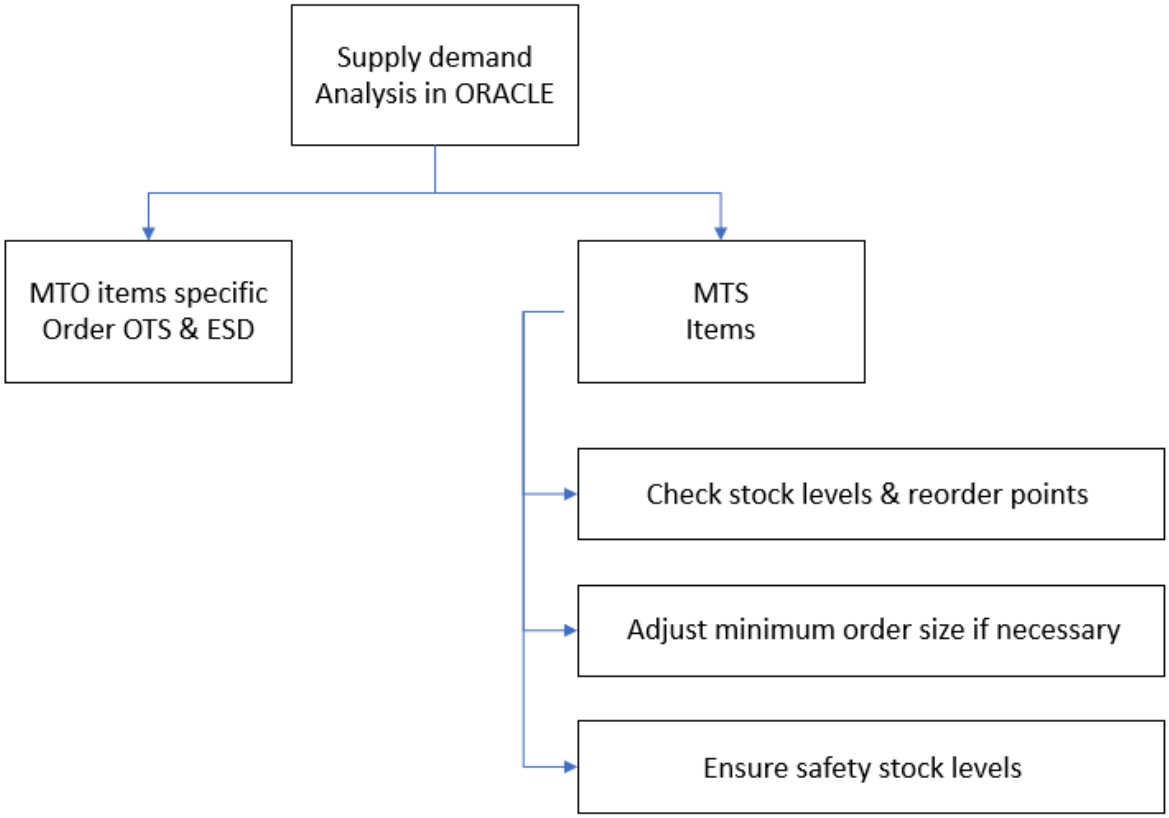
Level 2 Classification

Step 1: Stock Needed Report Analysis



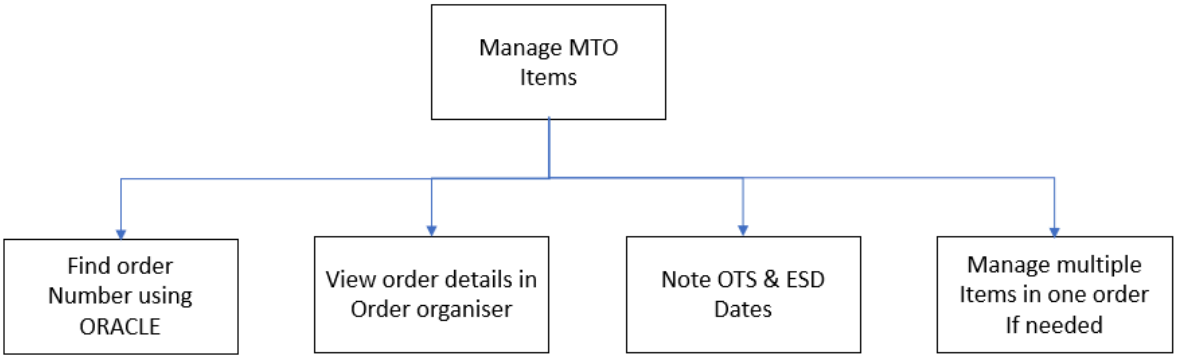
In the initial step of the company's process planning, the company meticulously analyzes the Stock Needed Report using their legacy software tool and Excel to gauge inventory requirements accurately. This involves running a macro designed specifically for test strips, which assists in filtering out extraneous data and focusing solely on the critical items essential for production activities. Furthermore, the process owner identifies and disregards sections within the report that are not relevant to current production needs, thus streamlining the analysis process and allowing the process owner to concentrate efforts on the most pertinent inventory elements.

Step 2: Supply/Demand Analysis in ORACLE



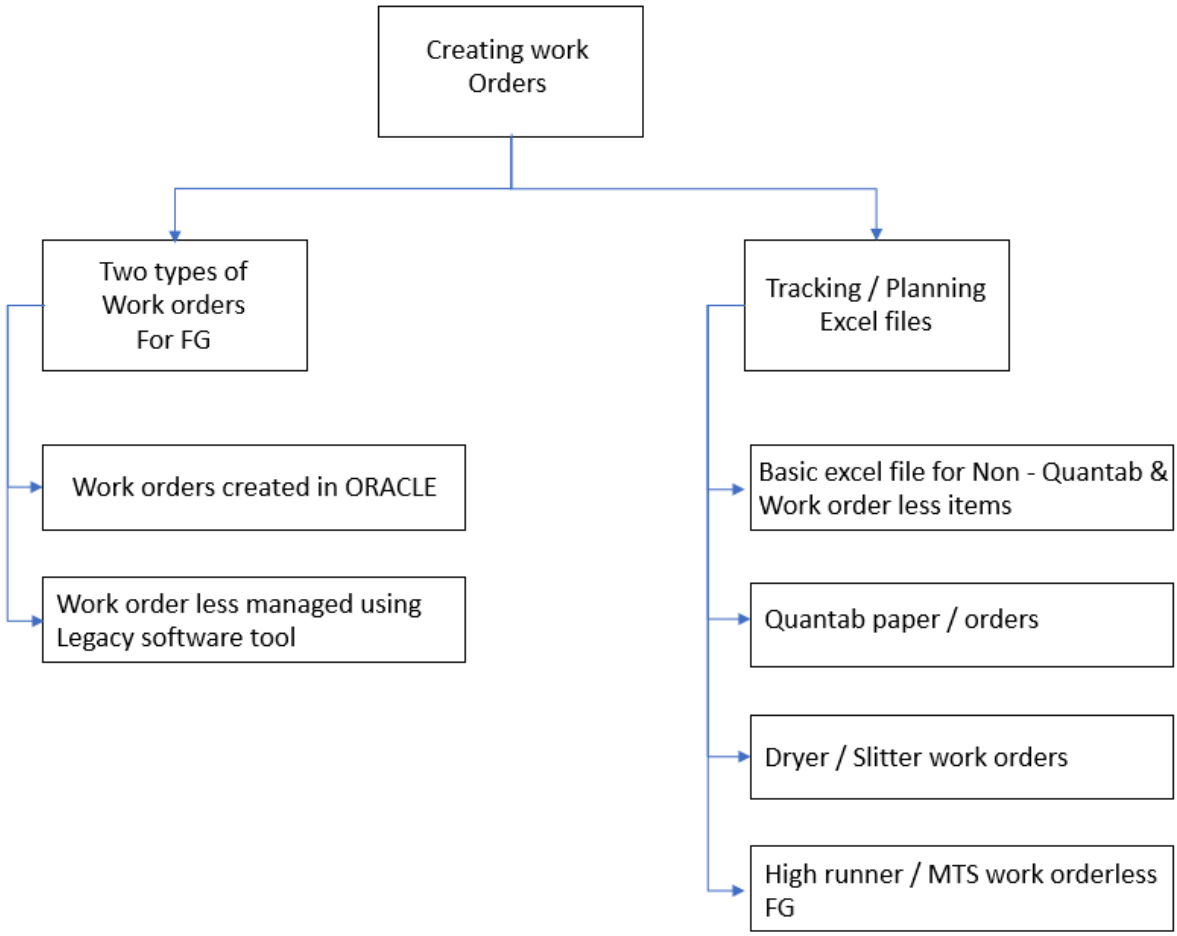
Following the assessment of the stock report, the company transitions to ORACLE to conduct a thorough examination of our supply and demand dynamics. For Make-to-Order (MTO) items, the company prioritizes orders based on their On-Time Shipments (OTS) and Estimated Ship Date (ESD), ensuring the production schedule aligns precisely with customer requirements. Simultaneously, for Make-to-Stock (MTS) items, the company meticulously monitors stock levels against reorder items, making necessary adjustments to minimum order sizes and safety stock levels to maintain optimal inventory levels and fulfill market demands effectively.

Step 3: Manage MTO Items



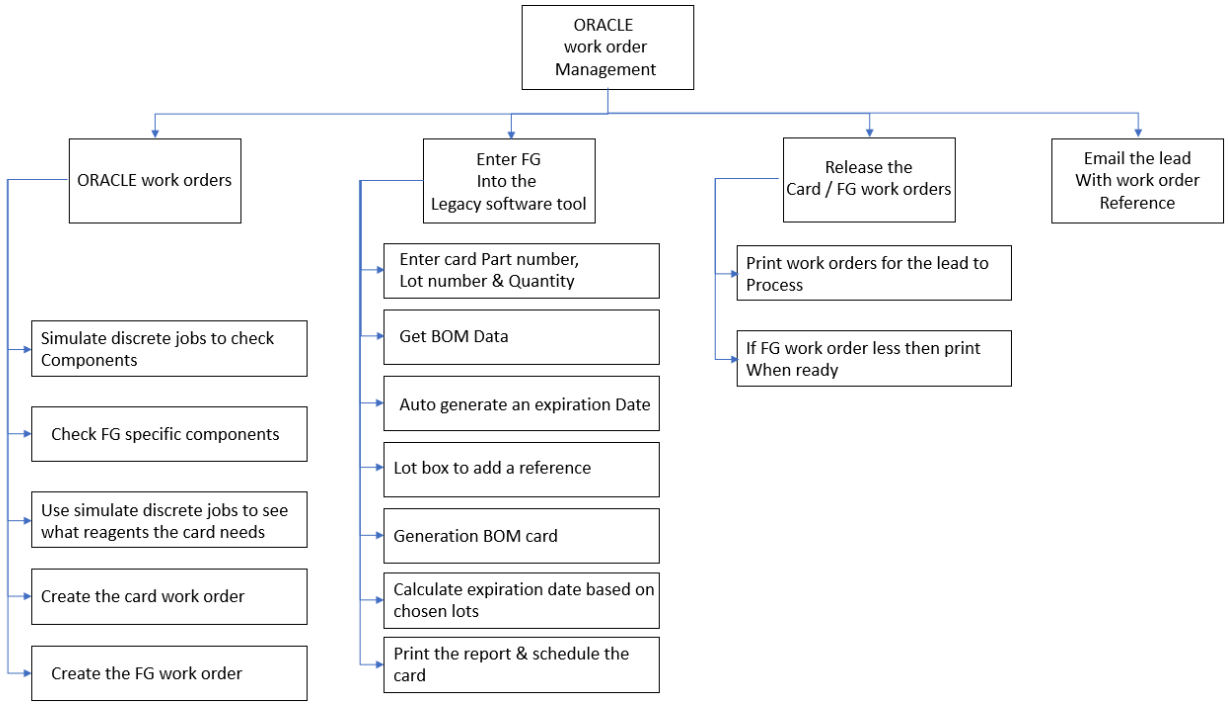
In this crucial step, the company focuses on efficiently managing the production process for Make-to-Order (MTO) items. The company begins by identifying and locating specific order numbers using ORACLE, which grants access to detailed order information through the Order Organizer module. This facilitates the noting of critical dates such as OTS and ESD, which are instrumental in scheduling and coordination efforts. Additionally, the company adeptly manages multiple items within a single order when necessary, optimizing production efficiency and resource allocation to meet customer demands effectively and efficiently.

Step 4: Creating Work Orders



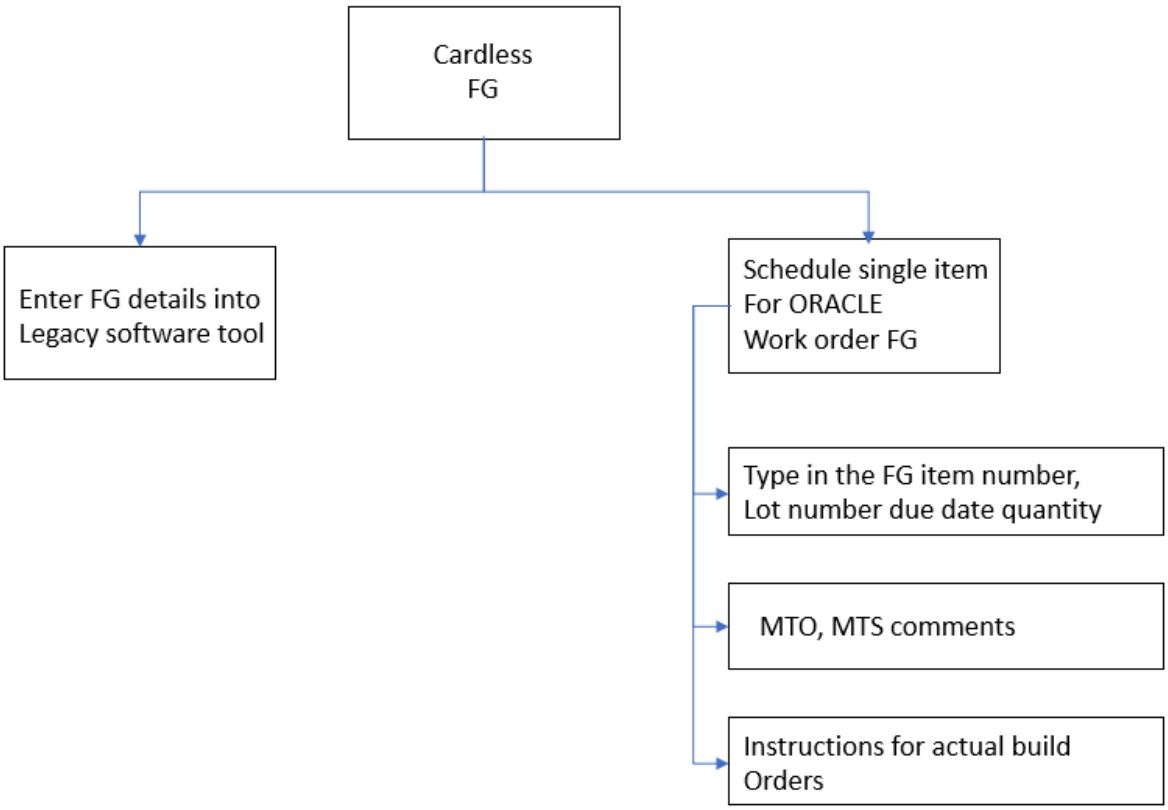
The work order creation process encompasses a diverse array of approaches tailored to accommodate various production scenarios. For finished goods (FG), the company employs two distinct methods: directly creating work orders within ORACLE and managing work orderless production using a specialized test strip module in the legacy software tool. Additionally, the company relies on tracking and planning Excel files from the system to manage different aspects of production, ranging from basic non-quantitative items to specific operations like dryer and slitter work orders. This comprehensive approach ensures meticulous oversight and organization throughout the production process, facilitating smooth execution and timely delivery of goods to customers.

Step 5: ORACLE Work Order Management



The creation and management of work orders within ORACLE are pivotal aspects of the production planning process. The company meticulously simulates discrete jobs to validate component availability and production feasibility, particularly for complex items such as BOM cards. Once validated, the company then enters finished goods (FG) details into the legacy software tool, generating BOM cards and scheduling production runs with precision. Work orders are promptly released, with detailed instructions provided to production leads via email, ensuring seamless execution and adherence to schedule commitments.

Step 6: Cardless FG



Finally, the company addresses the unique requirements associated with cardless finished goods. By inputting FG details into the legacy software tool, the company ensures comprehensive visibility and traceability throughout the production process. For FG items requiring ORACLE work orders, the company meticulously schedules production runs, inputting essential details such as item numbers and lot numbers. Clear instructions, including Make-to-Order (MTO) and Make-to-Stock (MTS) comments, guide the actual build orders, facilitating efficient and accurate production execution. This meticulous approach ensures that cardless finished goods are produced and delivered to customers with precision and reliability.

Strengths & Weaknesses for As - Is Process:

Strengths

Detailed Reports and Analysis: The process begins with a meticulous analysis of the Stock Needed Report, utilizing specialized macros to filter and focus on critical inventory items. This detailed analysis provides crucial insights into inventory requirements, enabling proactive measures to balance stock levels effectively.

Efficient Production Collaboration with Technology Integration:
Utilizing ORACLE and specialized systems streamlines production planning and execution, enabling seamless creation and management of work orders. This integrated approach fosters collaboration between departments like sales, customer service, and production, ensuring clear instructions, task allocation, and optimal production scheduling aligned with customer requirements.

Monitoring and Tracking: The process includes real-time monitoring and tracking of work orders through ORACLE, enabling quick identification and resolution of production bottlenecks or deviations. This enhances operational transparency and allows for timely adjustments to meet production goals.

People and Team Collaboration: The process leverages the expertise and collaboration of cross-functional teams, including production, sales, customer service, and IT. This collaboration fosters a shared understanding of customer requirements, production capabilities, and market dynamics, leading to informed decision-making and effective production planning.

Weaknesses

Overcoming Legacy System Integration Hurdles: The challenge arises from legacy systems' which is [redacted] incapacity to integrate seamlessly with ORACLE, leading to issues in data synchronization and workflow coordination. Integrating multiple systems, encompassing both legacy and modern technologies introduces complexity and necessitates substantial customization efforts. This complexity may impede smooth communication and data sharing between systems, resulting in inefficiencies and data discrepancies.

Manual Work for Analysis and Communication: The reliance on manual analysis and communication processes introduces the potential for errors and delays. Manual data

entry and reporting may also increase the workload for teams, affecting overall efficiency.

Limited Knowledge of Legacy System: The lack of knowledge about the legacy system, which was created ages ago, poses a risk in terms of maintenance, troubleshooting, and scalability. This can lead to dependency on a few individuals who understand the legacy system, creating a single point of failure.

To - Be Production Planning Process:

[redacted]

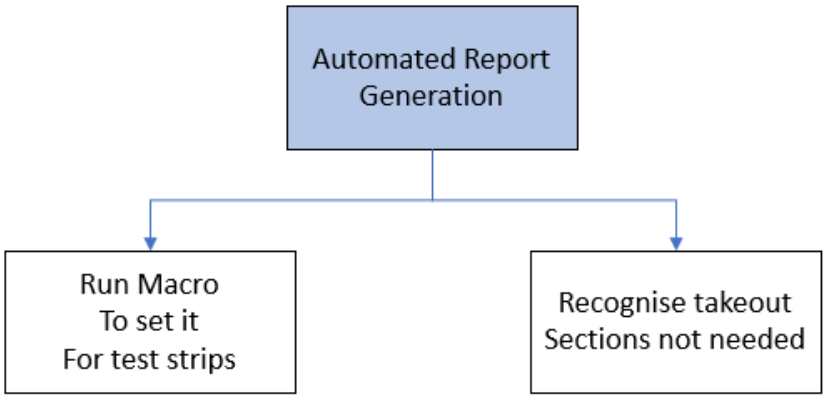
Level 1 Classification



To improve the accuracy and efficiency of demand forecasting for manufacturing test strips, we recommended collaborating with a dedicated team specializing in demand forecasting within the organization. This collaborative approach eliminates the need for manual planning by the process owner and leverages the team's expertise in advanced forecasting techniques, data analysis, and market insights. By working together, the company can generate more precise forecasts, respond swiftly to changes in demand, optimize inventory levels, and enhance overall supply chain efficiency. This initiative aims to streamline forecasting processes, improve decision-making, and deliver superior outcomes for manufacturing operations.

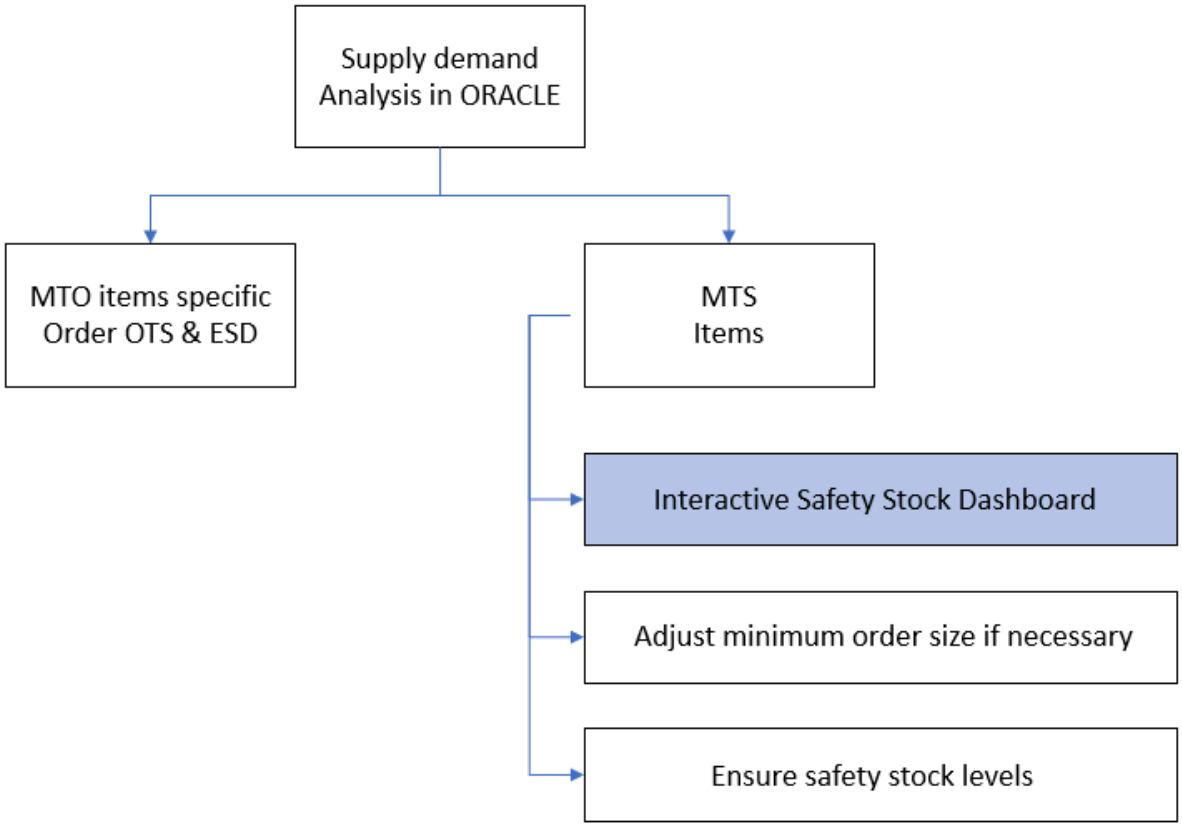
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Step 1: Automated Report Generation



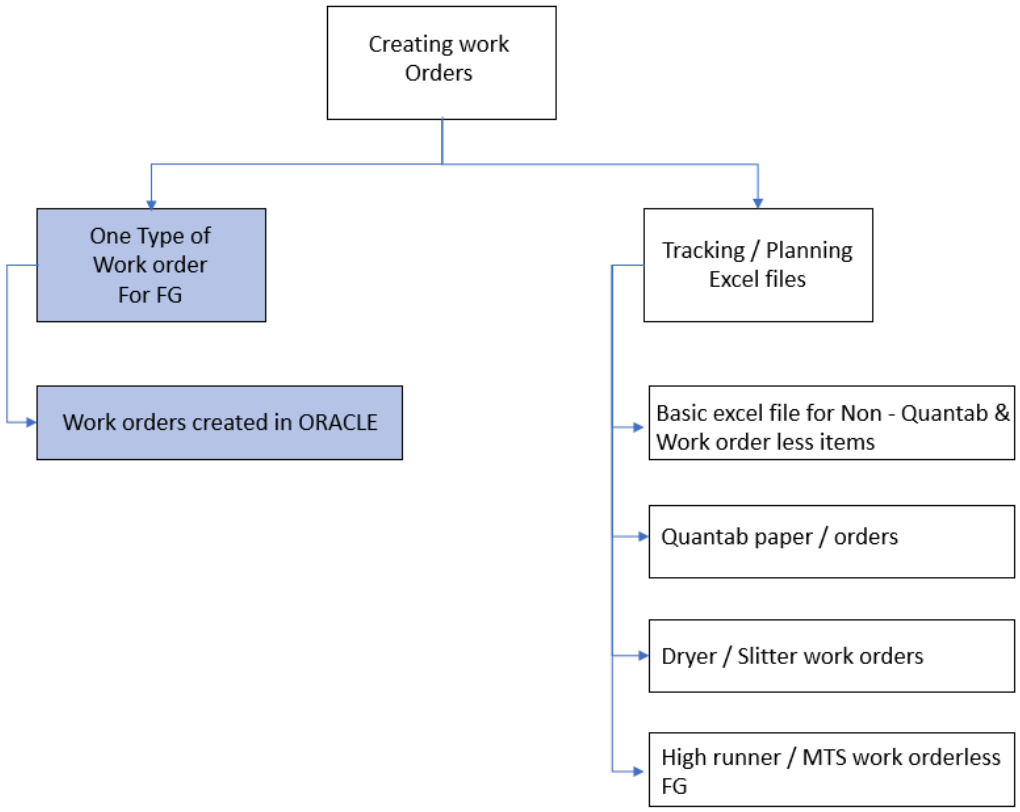
To enhance the efficiency and accuracy of the Stock Needed Report analysis for manufacturing test strips, we propose implementing an automated report generation system. This improvement eliminates the need for manual analysis by the process owner, as the report would be automatically generated in the required format without requiring any intervention. The automated system would use predefined criteria and algorithms to filter out extraneous data, focus on critical inventory elements, and present the analysis in a clear and actionable format. This enhancement streamlines the analysis process, reduces manual effort, and ensures that the process owner can dedicate their time and efforts to more strategic tasks, ultimately improving overall productivity and decision-making in inventory management.

Step 2: Supply/Demand Analysis in ORACLE



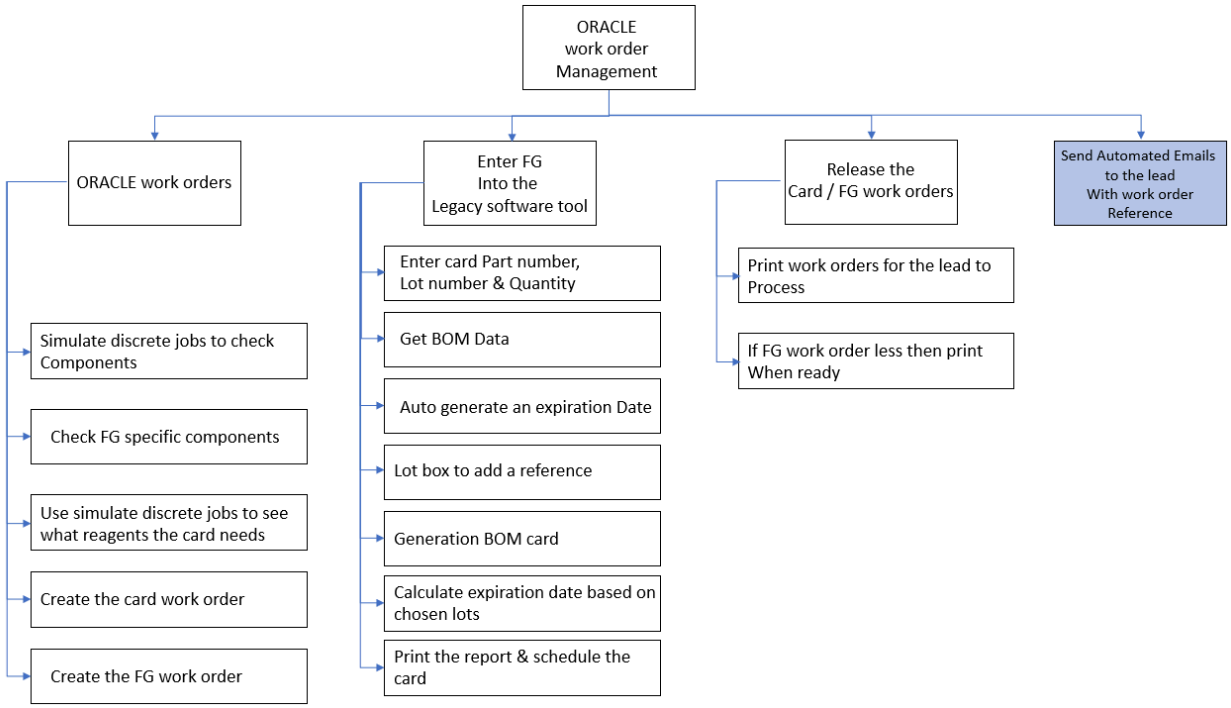
To enhance the visibility and control over the planning process, we recommend implementing a real-time dashboard accessible to the process owner and leadership. This dashboard provides a comprehensive view of ongoing activities, including the status of Make-to-Stock (MTS) items, inventory levels, production schedules, customer orders, and market demands. By having a centralized and up-to-date dashboard, the process owner and leadership can monitor key metrics, track progress, identify potential bottlenecks or risks, and make informed decisions promptly. This improvement streamlines communication, enhances transparency, and enables proactive management of resources and priorities, ultimately optimizing the planning process and improving overall operational efficiency.

Step 4: Creating Work Orders



To streamline the work order creation process for finished goods (FG), we recommend consolidating the creation of work orders solely within Oracle instead of using both Oracle and the legacy tool. Since all information ultimately integrates into Oracle, this approach saves time and effort by avoiding redundant steps. Work orderless entries, which are manually entered into the legacy system, should align with the data in Oracle, ensuring consistency and accuracy across platforms. This improvement enhances efficiency, reduces complexity, and improves data integrity within the production workflow

Step 5: ORACLE Work Order Management



To enhance efficiency and communication in work order management, we proposed implementing automated email notifications within Oracle. Instead of manually emailing detailed instructions to required personnel, Oracle can automatically generate and send these emails based on predefined criteria and workflows. This improvement streamlines the communication process, ensures consistency in information dissemination, and reduces the risk of errors or delays associated with manual emailing. By leveraging automated emails, the company can enhance productivity, facilitate quicker decision-making, and improve overall coordination in production planning and execution.

Other Improvements:

An Integration or Middleware Solution: To enhance operational efficiency and streamline communication between Oracle and the legacy software tool, we proposed implementing a middleware software solution. While it requires initial investment in terms of time and resources for installation and setup, the middleware serves as a bridge, enabling seamless integration and data exchange between the two systems. This integration eliminates manual data entry and reduces the risk of errors associated with manual handling. The middleware software facilitates real-time communication, data synchronization, and workflow automation, leading to improved productivity and

operational agility. Despite the initial investment, the long-term benefits in terms of operational efficiency and streamlined processes make it a valuable addition to our technology infrastructure.

Standardization: To streamline and standardize the communication process in production planning, we recommended implementing drop-down options for comments/notes in Oracle or any other system used. This improvement enables the process owner to select predefined options from a dropdown menu, significantly reducing the time spent on typing comments and ensuring consistency in communication across departments. Additionally, including an 'Other' option caters to special needs or specific requirements that may not be covered by the predefined options. This standardized approach not only saves time but also enhances clarity, accuracy, and efficiency in conveying information, ultimately improving collaboration and decision-making within the production planning workflow.

Back Up option: While the process owner is currently a sole individual responsible for production planning, we recommended having a backup to cover [redacted] leaves or absences. Having a backup ensures continuity and prevents disruptions in the production planning process, especially during critical periods or unexpected events. The company's perspective is that a team may not be necessary, citing [redacted]. Additionally, considering the seasonal nature of their business, where workload fluctuations are expected, a backup plan may still be beneficial to mitigate risks and maintain operational stability during peak seasons or the process owner's absence.

Oracle Fusion: To drive digital transformation and enhance operational efficiency, we proposed a phased approach to consolidate all production processes within Oracle, eliminating the need for a separate legacy software tool. This initiative aims to create a standardized global platform for order management, ensuring a consistent format and seamless integration across locations worldwide. By centralizing everything in Oracle, from work order creation to production scheduling and inventory management, manual work is minimized, and the entire order management process becomes streamlined and automated. This transformation enables end-to-end visibility and control, reduces complexities, and enhances data integrity, ultimately leading to improved productivity and operational excellence under one unified system.

New Learnings

The business world often borrows strategies and methodologies from various cultures to enhance productivity and efficiency. Among these, several Japanese techniques have gained global recognition for their effectiveness. These include the Gemba Walk, Kaizen, Kanban, and Kamishibai. Each of these techniques offers unique approaches to business management and continuous improvement, reflecting the Japanese culture's emphasis on diligence, harmony, and respect for processes.

A Gemba Walk is a workplace walkthrough that aims to observe employees, ask about their tasks, and identify productivity gains. Derived from the Japanese word "Gemba" or "Gembutsu," which means "the real place," it is often defined as the act of seeing where the actual work happens. This lean management practice allows leaders to see work processes in context, fostering a better understanding of the workforce and driving changes with a lasting positive impact. It's a way to gather information through observation and interaction with workers, and it's not a time to find fault, quickly implement a change on the spot, or disregard employee input. Developed by Toyota, Gemba Walks can empower organizations to sustain continuous improvement efforts. Kaizen is a Japanese term meaning "change for the better" or "continuous improvement". It's a business philosophy that promotes the idea that small, incremental changes can lead to significant long-term benefits. Kaizen involves all employees, from the CEO to the assembly line workers, in improving operations. The concept was introduced to the Western world over 30 years ago by Masaaki Imai, the founder of the Kaizen Institute4. Today, Kaizen is recognized worldwide as an essential pillar of an organization's long-term competitive strategy. It's used in conjunction with other methodologies like Six Sigma and Lean, and it's also used with other analytical frameworks such as SWOT. The implementation of Kaizen in the workplace requires a commitment from management and employees alike.

Kanban is a popular framework used to implement agile and DevOps software development. It's built on a philosophy of continuous improvement, where work items are "pulled" from a product backlog into a steady flow of work. The framework is applied using Kanban boards, a form of visual project management. In a Kanban board, tasks, represented as cards, move through stages of work, represented as columns. This allows team members to see the state of every piece of work at any time.

Kanban was developed by Taiichi Ohno, a Toyota engineer from Japan, in the late 1940s. He realized he could improve the Toyota Production System by incorporating elements of lean manufacturing. This transitioned the Toyota manufacturing process from a “push” process (products are pushed into the market) to a “pull” process (products are created based on market demand). This meant that Toyota could have a lower inventory level while still being a competitive player in the market.
Kanban helps teams balance the work they need to do with the available capacity of each team member. It requires real-time communication of capacity and full transparency of work. It’s especially popular with product, engineering, and software development teams. But it can be used by any team that’s interested in building a more dynamic, flexible workflow.

Kamishibai, which literally means “paper drama” in Japanese, is a form of storytelling that originated in Buddhist temples in Japan in the 12th century. It was popular during the Great Depression of the 1930s and the post-war period in Japan until the advent of television during the mid-20th century.
In a Kamishibai performance, a narrator, known as a kamishibaiya, uses a set of illustrated boards, placing them in a miniature stage-like device. The narrator tells the story by changing each image and reading the corresponding text. This form of storytelling is highly interactive and dramatic, making it suitable for group settings.
In addition to its traditional use, Kamishibai has also been adapted as a method of process confirmation in the Toyota Production System. In this context, Kamishibai cards serve as work instructions for auditing a process. This system helps detect slipping standards and prevent breakdowns of the Lean management system.

Is the process Science or Art?

In the production planning process, certain parts or steps can be considered more scientific in nature, while others may involve elements of artistry or subjective decision-making. Here is a breakdown of how different aspects of the production planning process can be categorized:

Science:

Forecasting Demand: The process of analyzing historical data, market trends, and capacity planning to forecast future demand is more scientific. It involves data analysis, statistical modeling, and quantitative techniques to predict future requirements based on past patterns and current market conditions.

Determining Resource Requirements: Identifying the raw materials, labor, and equipment needed for the production process can be considered a scientific aspect. It involves calculations based on production capacity, material specifications, and resource availability to ensure that the necessary resources are allocated efficiently.

Art:

Creating a Production Schedule: While creating a production schedule involves some scientific inputs such as capacity constraints and demand forecasts, there is an element of artistry in balancing various factors like production efficiency, resource utilization, and customer priorities. It often requires judgment calls and trade-offs to optimize the schedule.

Coordinating Activities: Coordinating activities in the production process can be seen as more of an art form. It involves interpersonal skills, communication, and decision-making to ensure that different departments and teams work together harmoniously towards common production goals.

Monitoring: While monitoring production progress involves data analysis and performance metrics, the interpretation of this data and the decision-making based on it can be considered an art. It requires experience, intuition, and adaptability to make real-time adjustments and optimize production outcomes.

Overall, the production planning process is a blend of science and art. While certain aspects rely heavily on data-driven analysis and quantitative methods (science), other aspects involve creativity, judgment, and human interaction (art) to effectively plan and execute production activities.

Conclusion:

- Production planning is a critical process in manufacturing, influencing efficiency, cost-effectiveness, and overall success.
- The production process observed involves meticulous steps from raw material procurement to distribution, emphasizing quality control and efficiency.
- Each stage, from manufacturing to packaging, is executed with precision to ensure high-quality, reliable products.
- There's a clear focus on maximizing plant uptime, efficiency, and compliance throughout the entire production cycle.

- However, there's room for improvement and optimization in the production planning process to enhance efficiency further, reduce costs, and streamline operations.

Future Direction:

- We aim to re-engineer the production planning process to address current inefficiencies and optimize resource utilization.
- Our focus will be on developing a streamlined, data-driven approach to forecasting demand and resource allocation.
- Implementation of automation to improve coordination and monitoring of activities.
- Enhancing communication channels and collaboration among departments to ensure smooth operations.
- Continuous improvement and flexibility in adjusting operations to meet evolving market demands while maintaining high standards of quality and efficiency.

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