



MASTERING ENTERPRISE-WIDE FAST-MOVING CONSUMER GOODS (FMCG) OPERATIONS

Managing production, quality, and supply chains for enhanced efficiency

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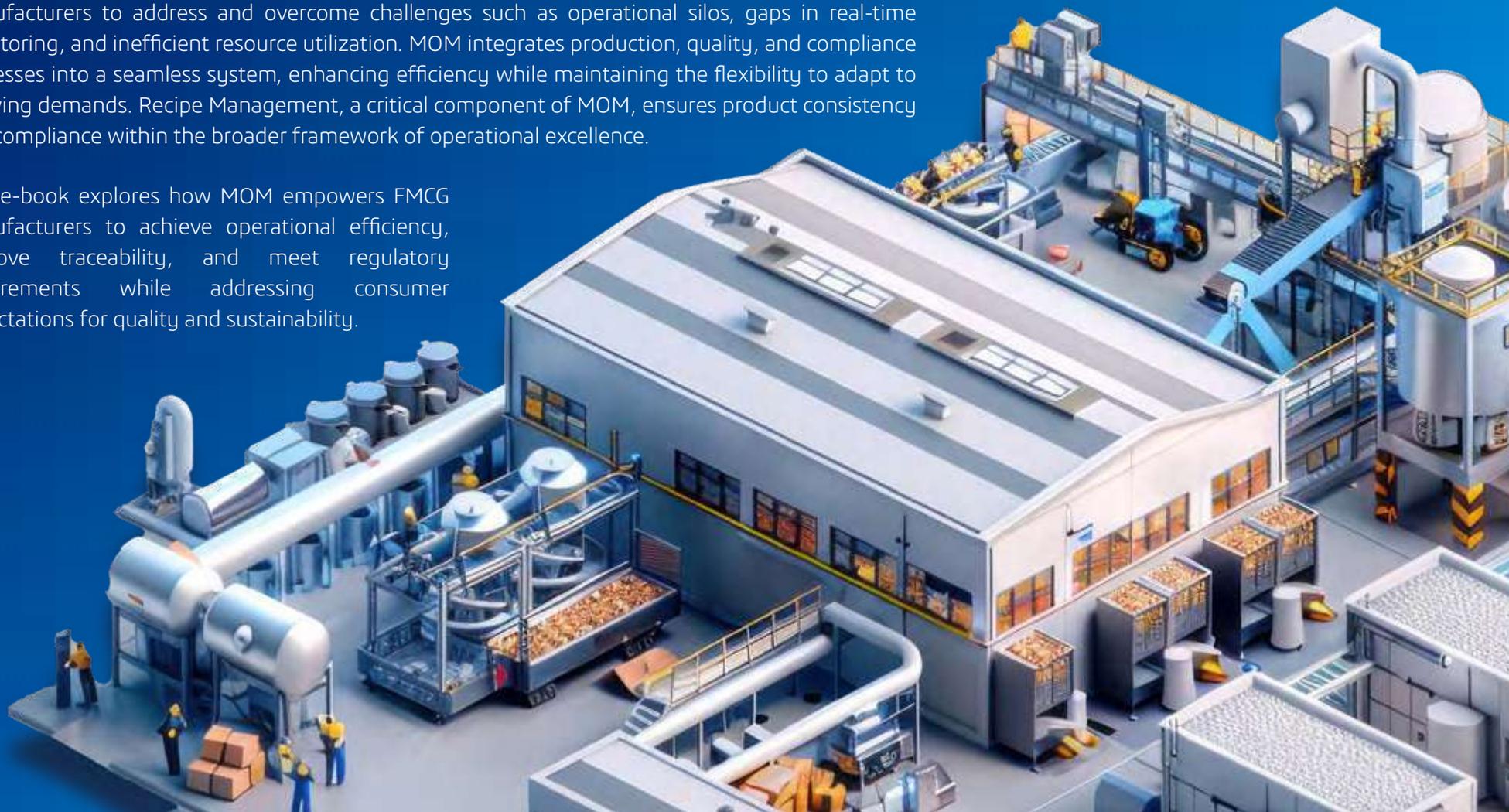
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Introduction

The Fast-Moving Consumer Goods (FMCG) industry is characterized by its diverse product range, rapid turnover, and high competition. Ensuring product quality, safety, and regulatory compliance is crucial in this dynamic environment—not just to meet legal obligations but to build customer trust and protect brand integrity. Rising consumer awareness of health, safety, and sustainability adds further complexity, compelling manufacturers to align quality and operational goals with sustainability and profitability. As a result, supply chains in the FMCG sector are among the most complex to manage, with uncertainties, a vast network of global suppliers, logistical challenges, and lead time concerns.

Manufacturing Operations Management (MOM) provides a comprehensive solution, enabling FMCG manufacturers to address and overcome challenges such as operational silos, gaps in real-time monitoring, and inefficient resource utilization. MOM integrates production, quality, and compliance processes into a seamless system, enhancing efficiency while maintaining the flexibility to adapt to evolving demands. Recipe Management, a critical component of MOM, ensures product consistency and compliance within the broader framework of operational excellence.

This e-book explores how MOM empowers FMCG manufacturers to achieve operational efficiency, improve traceability, and meet regulatory requirements while addressing consumer expectations for quality and sustainability.



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01

Challenges in FMCG Quality Management

The FMCG industry operates at a breakneck pace, driven by the constant demand for products that must meet stringent quality, safety, and compliance standards to be fit for human consumption. The sector's inherent complexities—ranging from managing perishable goods to navigating diverse regulatory landscapes—pose significant challenges for manufacturers.

Manufacturers operate under immense pressure to balance speed, cost-efficiency, and quality. Unlike durable goods, the rapid turnover of FMCG products demands flawless supply chain coordination, accurate demand forecasting, and consistent production efficiency.

FMCG Manufacturers must also contend with volatile consumer preferences, shrinking profit margins, and the complexities of managing diverse product portfolios while ensuring regulatory compliance. The urgency to consistently deliver fresh, high-quality products—combined with increasing expectations for customization and sustainability—has made the need for robust quality management systems essential to achieving enterprise-wide operational success.

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Rapid production cycles present both opportunities and challenges for brands seeking to capture and retain market share. Balancing fast production with the need for consistency and traceability remains a persistent challenge, requiring advanced strategies to uphold quality at every stage of the supply chain.

Key Challenges



Production Consistency

Product Consistency (Recipes)

Maintaining consistent product quality is crucial, particularly in recipe formulation. Even small deviations can significantly affect the taste, texture, and appearance, jeopardizing brand integrity.

Real-Time Quality Monitoring

Without real-time monitoring systems, issues such as contamination or incorrect product weight may go undetected until the final product reaches the consumer, risking brand reputation and regulatory violations.

Traceability and Recall Management

Effective traceability is critical for identifying and addressing contamination or safety issues quickly. Inadequate traceability systems slow down recalls, increase costs, and damage consumer trust.



Regulatory Compliance and Sustainability

Regulatory Compliance

Adapting to evolving regional regulations is complex but necessary. Failure to comply with safety, labeling, or ingredient regulations can lead to fines, recalls, and reputational damage.

Consumer Expectations

With rising consumer demand for sustainable, high-quality, and affordable products, manufacturers are under pressure to balance these expectations amidst inflation and reduced spending power.

Margin Pressure

Inflation and rising input costs are squeezing industry margins. Short-term measures like shrinkflation offer relief but are not sustainable solutions.

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Supply Chain Complexities

Ensuring Freshness and Managing Shelf Life

Managing freshness and shelf life is especially critical for perishables. Poor inventory control and storage conditions can result in waste, lost sales, and brand reputation.

Supplier Management

Inaccurate ingredient measurements or poor-quality materials from suppliers can compromise the final product's quality. Effective supplier management is required to ensure product consistency.

Packaging and Labeling

Errors in packaging and labeling, such as mislabeling ingredients or allergens, can lead to health risks, legal issues, and costly recalls.

Supply Chain Volatility

Global disruptions, including climatic, sanitary, and geopolitical factors, create supply chain uncertainties. Manufacturers need to build resilient supply chains by leveraging local suppliers and diversifying sourcing strategies to ensure smooth operations.

Production Complexity

Mass personalization and localized production require specialized machines and processes, adding operational strain.

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Operational and Process-Specific Challenges

Operational Silos

Communication gaps between departments delay quality issue resolution and reduce overall efficiency.

Limited Collaboration

Inadequate training and collaboration result in employee errors that compromise quality and safety.

Non-Adherence to Processing Parameters

Deviations in time, speed, or pressure negatively affect product stability, leading to inconsistencies.

Lack of Equipment Maintenance

Neglecting routine maintenance causes equipment breakdowns, downtime, and quality degradation.

Temperature Control Problems

Improper temperature management can lead to spoilage or compromised quality, particularly for perishable goods.

Ingredient Sequencing Errors

Incorrect sequencing or proportions of ingredients can trigger unexpected reactions, compromising product consistency and safety.

CHAPTER

02

Role of MOM in FMCG Production

Manufacturing Operations Management (MOM) is a cornerstone of operational excellence in FMCG manufacturing. It serves as a centralized system that coordinates and optimizes all aspects of production, from raw material sourcing to packaging and distribution. By bridging gaps across departments and enabling real-time data sharing, MOM enhances operational efficiency, ensures regulatory compliance, drives continuous improvement, and facilitates quality management with a focus on sustainability.

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Key Benefits



Traceability and Real-Time Monitoring

Real-Time Quality Monitoring

MOM ensures consistent product quality by detecting and correcting deviations immediately, which is critical for maintaining high standards and meeting consumer expectations in FMCG.

Batch Traceability

Tracks the origin and movement of product batches, enabling swift identification and resolution of contamination or defects, essential for ensuring quality and brand reputation.

Temperature Control and Stability

Real-time monitoring prevents spoilage and ingredient degradation by ensuring optimal production conditions, particularly for perishable goods.

Improving Consistency and Traceability

Detailed documentation enhances product consistency and builds consumer trust through transparent traceability, supporting quick responses in case of product issues.



Recipe Management and Consistency

Enhanced Mixing Consistency

Guarantees uniform formulations, preventing variability in texture, flavor, and nutritional distribution, which is vital for maintaining brand consistency across batches.

Accurate Ingredient Management

Reduces human error in managing raw materials and ensures timely coordination with suppliers, preventing quality issues and improving overall consistency.

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Integrating with Supply Chain Planning and Optimization Solutions

Facilitates communication and collaboration with suppliers to ensure timely delivery of raw materials, avoiding production delays and maintaining compliance with product specifications and schedules.

Enhancing Supply Chain Visibility

Provides insights into production and inventory, helping to prevent bottlenecks and ensuring smooth operations that align with sustainability goals.

Quality Management with a Sustainability Focus

Ensures sustainable practices are implemented throughout production by reducing scrap, rework, and energy consumption, minimizing overall waste.



Compliance and Sustainability Tracking

Compliance Monitoring

MOM enables adherence to stringent regulatory requirements with detailed audit trails, which is essential in FMCG to maintain consumer trust and avoid fines or penalties.

Integrating Packaging and Labeling with ERP Systems

Ensures accurate and compliant product packaging, which is critical for maintaining consumer trust and meeting regulatory standards.

Managing Electronic Batch Records (EBRs)

Enhances documentation and consistency in production, reducing compliance risks and ensuring that all processes meet regulatory expectations.



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Operational Efficiency

Preventive Maintenance Management

Reduces the risk of unexpected equipment breakdowns, ensuring uninterrupted production and consistent quality throughout manufacturing processes.

Breaking Down Information Silos

Fosters collaboration across departments by enabling seamless data sharing and communication, which speeds up decision-making and effectively resolves quality issues.

Training and Skill Development

Ensures that employees are equipped with up-to-date knowledge and skills, minimizing operational errors, maintaining high-quality standards, and improving overall productivity.

Overall Efficiency and Productivity

Streamlined operations reduce waste, optimize resource usage, and improve production cycles, which is crucial in FMCG where speed and efficiency are paramount.



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Batch Production and Process Optimization

Batch production in FMCG involves manufacturing goods in defined quantities, with each batch completing the production process before the next begins. This method offers flexibility for producing multiple product variants and ensures consistent quality by enabling thorough checks at each stage. It optimizes resource utilization by aligning production volumes with demand while minimizing waste.

Batch production also supports traceability by linking raw materials and process parameters to specific batches, streamlining regulatory compliance and recall management. Although it requires managing challenges like changeover times and batch consistency, advanced tools such as MOM systems and automated recipe management mitigate these issues by standardizing processes and maintaining precise control over tolerances.

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Benefits



1



Flexibility in Production

Enables manufacturers to easily switch between product variants, catering to diverse consumer demands, seasonal trends, or limited-edition offerings.

2



Consistency and Quality Control

Facilitates uniformity across batches by allowing thorough quality checks at each production stage, ensuring adherence to predefined standards.

3



Resource Optimization

Aligns production volumes with market demand, reducing overproduction, minimizing waste, and optimizing the use of raw materials and equipment.

4



Enhanced Traceability

Links each batch to its raw materials and production parameters, simplifying compliance with regulatory requirements and enabling efficient recall management when needed.

5



Cost Efficiency for Small Runs

Reduces costs for producing smaller quantities of goods compared to continuous production, making it suitable for niche products or market testing.

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Challenges

Despite its advantages, batch production poses several challenges:

✔ **Changeover Delays**

Transitioning between batches involves equipment cleaning, reconfiguring equipment, and recalibrating processes, causing downtime and reducing productivity.

✔ **Inconsistencies Across Batches**

Variations in raw materials, process parameters, or operator performance can result in deviations in product quality.

✔ **Process Complexity**

Managing diverse formulations and equipment parameters for different products increases operational complexity.

✔ **Traceability and Compliance**

Maintaining detailed records for each batch can be time-intensive without automation.



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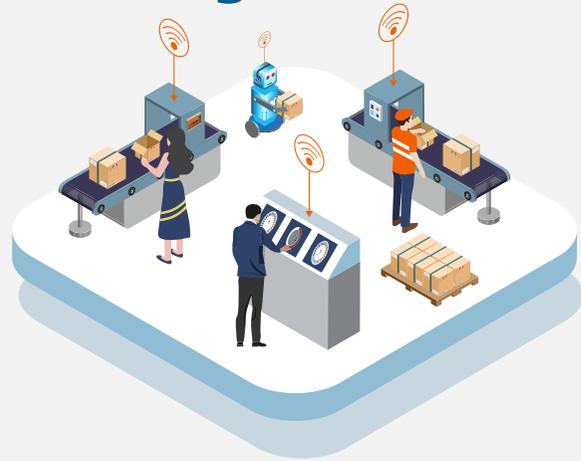
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MOM as a Solution for Batch Production Challenges



Batch production relies heavily on precise recipe management, ensuring that each batch of products meets the established quality standards. Standardized recipes, process steps, and equipment requirements are critical for maintaining product quality across production runs. MOM systems and digital recipe management systems help maintain this consistency by ensuring that every batch is produced according to the same specifications, with real-time monitoring to detect any deviations from the prescribed process

Importance of Process Tolerances in Quality Control

Controlling process tolerances—acceptable variations in parameters like ingredient proportions, mixing speeds, or cooking temperatures, is critical for efficient batch production. In FMCG, due to the nature of the products being manufactured, it is vital to control these tolerances closely to ensure that each batch remains consistent and adheres to stringent quality standards.

Modern MOM systems offer tools to manage and monitor process tolerances in real time, allowing manufacturers to track deviations and make adjustments before products fall outside of acceptable quality parameters.

1 Digital Recipe Management

Centralizes process parameters and integrates recipes into production workflows, ensuring adherence to quality standards.

2 Real-Time Monitoring

Uses sensors and IoT-enabled devices to continuously track critical parameters, such as temperature, pressure, and mixing times, against predefined tolerances to prevent deviations.

3 Automated Process Adjustments

Adjusts production settings within tolerance limits to maintain consistency and triggers notifications or process adjustments when parameters approach or exceed set tolerances.

4 Statistical Process Control (SPC)

Analyzes trends using predictive analytics and SPC tools to identify potential issues and enables corrective actions before deviations exceed tolerances

5 Efficient Changeovers

Streamlines changeover processes by automating equipment calibration and maintaining detailed records for quicker transitions.

For a deeper dive into recipe management, read our [e-book](#).

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Advanced Applications of MOM in FMCG

MOM goes beyond basic production support to tackle advanced challenges in FMCG manufacturing. Comprehensive solutions like DELMIA MOM and Recipe Management provide significant advantages by unifying workflows, standardizing operations, and streamlining collaboration across production lines and facilities. This enables manufacturers to optimize processes, enhance traceability, and adapt to dynamic market demands.

Through automated recipe updates, precise monitoring of process tolerances, MES functionalities, and seamless integration with ERP systems, MOM helps manufacturers reduce waste, downtime, and time-to-market while ensuring compliance with regulatory standards. With the scalability and flexibility to meet evolving demands, these tools make it possible for manufacturers to maintain consistent quality, boost operational efficiency, and achieve a competitive edge in an increasingly complex industry.



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To stay competitive, FMCG manufacturers should prioritize the following MOM capabilities, which are critical for keeping operations on track:



Unified Recipe and Tolerance Management

Centralized Recipe Repository

MOM systems store recipes in a centralized digital location, ensuring consistency and accuracy across production batches by providing real-time access to the latest version.

Precise Ingredient Control

Automated systems manage ingredient measurements and sequencing, reducing human error and maintaining product quality.

Version Control and Updates

MOM facilitates easy updates to recipes while maintaining detailed version histories to ensure only validated and tested recipes are used.

Managing Tolerances

MOM defines and monitors acceptable ranges for critical parameters, such as mixing times, temperatures, and ingredient proportions, ensuring product consistency and minimizing variability.

Enhanced Mixing Consistency

Precise control over mixing parameters eliminates variability and guarantees uniform quality across batches.



Ensuring Freshness and Shelf Life

Temperature Control

Real-time monitoring systems ensure optimal storage and production conditions to prevent spoilage.

Inventory Optimization

Tracks product age and facilitates FIFO or FEFO protocols, ensuring timely rotation of goods to reduce waste.

Shelf-Life Simulations

Advanced analytics simulate production conditions to determine optimal shelf life and improve processes.

Expiration Date Tracking

Automatically tracks expiration dates for all products and sends alerts when items are nearing their shelf life.

Supplier Integration

Ensures timely delivery of fresh raw materials that meet quality standards.

Packaging Integration

Maintains packaging specifications to prevent environmental exposure, helping to extend product freshness.

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3



Unified Recipe and Tolerance Management

Automated Packaging Systems

Reduces errors and increases efficiency through automated workflows.

Real-Time Labeling Verification

Ensures accurate labeling of ingredients, allergens, and expiration dates to meet compliance standards and build consumer trust.

ERP Integration

Synchronizes packaging and labeling data with enterprise platforms, ensuring seamless compliance and operational accuracy.

4



Real-Time Compliance Monitoring

Audit Trails

Generates detailed logs of production data to help verify compliance and support inspections.

Automated Reporting

Reduces manual tracking efforts by automating compliance documentation.

Sustainability Tracking

Tools for monitoring energy usage, emissions, and waste contribute to meeting environmental goals.

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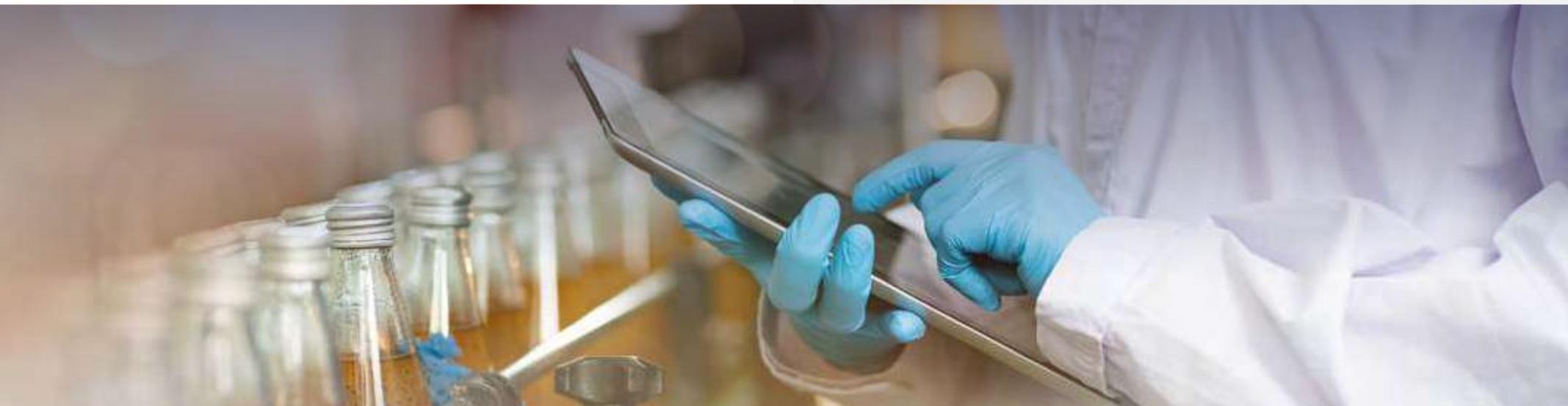
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5 Traceability and Recall Management

Ingredient Traceability

Tracks raw materials and production parameters throughout the supply chain, enabling swift identification of affected batches.

Automated Batch Containment

Reduces the scope of recalls by isolating defective batches quickly.

Data-Driven Root Cause Analysis

Analyzes data to identify the root causes of issues, allowing for preventative measures to avoid future occurrences.



6 Advanced Analytics and Continuous Improvement

MOM leverages advanced analytics and automation to drive continuous improvement in FMCG manufacturing:

Predictive Analytics

Identifies potential quality issues and recommends corrective actions proactively.

Statistical Process Control (SPC)

Tracks production variations and identifies trends for improvement to ensure consistent quality.

Real-Time Dashboards

Provide actionable insights into production performance for informed decision-making.

Simulations and Modeling

Test and refine production scenarios virtually to minimize disruptions before full-scale implementation.

Improved Cleaning and Hygiene

Automated cleaning protocols minimize cross-contamination risks, particularly during product switches.

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Case Studies and Real-World Applications

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L'Occitane: Scaling for Growth with MOM

L'Occitane, a global leader in natural cosmetics, faced the challenge of maintaining product quality while managing the volatility of raw materials and scaling operations to meet growing demand.

MOM leverages advanced analytics and automation to drive continuous improvement in FMCG manufacturing:

- ✓ **Enhanced Production Planning**
Real-time analytics enabled accurate forecasting and seamless production scheduling, even amidst fluctuating raw material availability.
- ✓ **Improved Traceability**
End-to-end visibility allowed precise tracking of raw materials and finished products, supporting robust quality assurance and recall management.
- ✓ **Waste Reduction**
Identifying quality issues early in the production cycle halved waste rates.
- ✓ **Increased Productivity**
Optimized workflows enabled uninterrupted production and empowered employees with real-time data access.
- ✓ **Operational Excellence**
Industrial performance improved by over 10% annually for the first three years after implementation.

L'Occitane leveraged DELMIA Apriso, a state-of-the-art MOM software, to fully transition to a paperless system by digitizing KPIs, operator updates, and workflows. These advancements laid the foundation for a digital factory initiative, allowing virtual pre-testing of production setups to minimize disruptions.

To find out more about how other cosmetics producers are transforming their operations, read our case study on L'Oréal: <https://www.3ds.com/insights/customer-stories/loreal-and-delmia-aprison>

“

Thanks to DELMIA's real-time KPIs, the quality of execution and our capacity to better manage our resources improved our industrial performance. Moreover, we've reduced disruption to our supply chain and slashed the rate of non-quality and waste by 50%.”

RICHARD VINARDI, Industrial Director, Laboratoires M&L, L'Occitane Group

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Harmonizing Operations Across Multiple Sites

A leading European sugar producer faced the challenge of unifying operations across 20 production sites, each with distinct processes and technologies.

Using DELMIA MOM, the company implemented a Conversion Execution System (CES), which delivered substantial benefits:

- ✓ **Consistency Across Sites**
CES standardized workflows, technologies, and data collection, creating a unified system for production, warehousing, planning, and shipping.
- ✓ **Operational Efficiency**
Advanced tools like barcoding and touchscreens streamlined production and warehouse operations, reducing downtime.
- ✓ **Best Practices**
Centralized data allowed the replication of successful strategies across sites, improving product quality and lowering costs.
- ✓ **Empowered Workforce**
The CES Training Factory ensured employees were proficient in the new systems, enabling smooth adoption and ongoing operational excellence.

By harmonizing operations with DELMIA Apriso, a cutting-edge MOM solution, the company modernized its processes, improved traceability, and strengthened its foundation for continuous improvement and sustainable growth.

“

The screens ensure that we can see what's happening on our production lines and/or in our warehouse at any given moment. Instantly, we can find out where the problems are situated and which actions need to be taken. NPI will assist us in creating reports and enable us to find the root cause of our problems, allowing us to take appropriate action. This way, we will be able to improve operations and overall excellence moving forward.”

Production Manager

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Conclusion

In the fast-paced and highly competitive FMCG industry, maintaining consistent product quality, meeting regulatory requirements, and exceeding consumer expectations demand more than traditional operational practices. Manufacturers must navigate increasingly complex supply chains while ensuring efficiency, sustainability, and adaptability. Manufacturing Operations Management (MOM) offers a robust framework to address these challenges and achieve operational excellence.

MOM integrates production, quality control, and compliance processes into a unified system, empowering manufacturers to streamline workflows, reduce waste, and enhance traceability. By automating recipe management, monitoring real-time production parameters, and ensuring compliance, MOM supports both operational efficiency and sustainability goals. Furthermore, its capacity to foster cross-departmental collaboration and drive continuous improvement makes it an essential tool in today's dynamic manufacturing landscape.

The transformative potential of MOM is exemplified by organizations like L'Occitane and Europe's leading sugar producer. By adopting DELMIA Apriso, an advanced MOM solution, they achieved significant improvements in productivity, traceability, waste reduction, and operational efficiency. These case studies demonstrate how MOM enables manufacturers to adapt to evolving market demands, maintain a competitive edge, and drive sustainable growth.

As the FMCG sector continues to evolve, leveraging MOM systems is not merely an advantage but a necessity. For manufacturers aiming to achieve operational excellence and meet the demands of a sustainability-driven future, MOM provides a strategic path forward.

Discover how leading FMCG companies are transforming enterprise-wide operations—managing production, quality, and supply chains with innovative solutions. Explore the case studies here:

<https://www.3ds.com/products/delmia/consumer-packaged-goods-retail>

Trusted by Our Customers:



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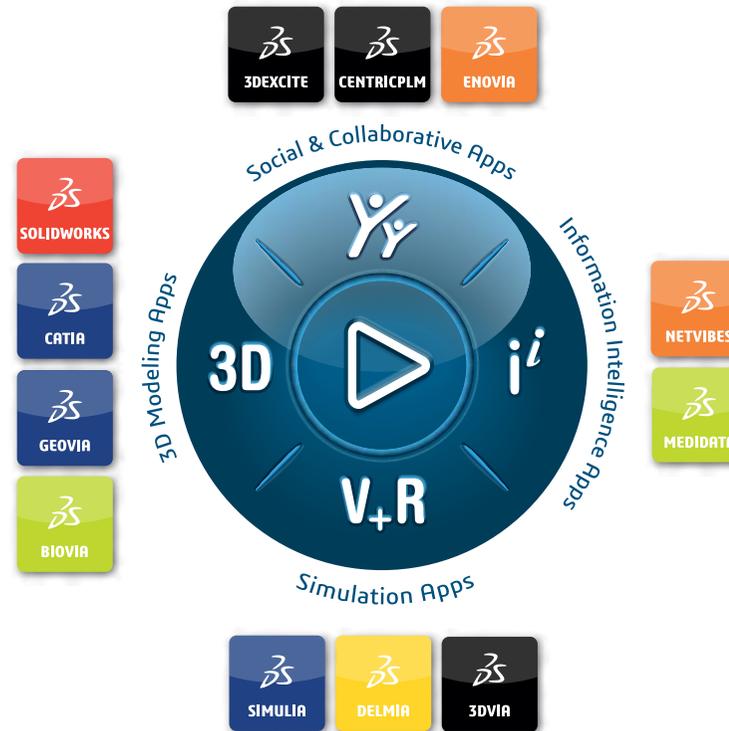
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Our **3DEXPERIENCE®** platform powers our brand applications, serving 12 industries, and provides a rich portfolio of industry solution experiences.

Dassault Systèmes, the **3DEXPERIENCE** Company, is a catalyst for human progress. We provide business and people with collaborative virtual environments to imagine sustainable innovations. By creating virtual twin experiences of the real world with our **3DEXPERIENCE** platform and applications, our customers can redefine the creation, production and life-cycle-management processes of their offer and thus have a meaningful impact to make the world more sustainable. The beauty of the Experience Economy is that it is a human-centered economy for the benefit of all –consumers, patients and citizens.

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