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# A Study on Optimizing the Production Planning and Control at Renault Nissan Automotive India Pvt Ltd, Oragadam, Chennai

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**ABSTRACT:** This study investigates strategic integration of Excel macros to automate the MS No 4 process within Renault Nissan Automotive India Pvt Limited's production planning and control framework. Excel macros, renowned for their versatility in automating repetitive tasks, are employed to optimize various aspects of the MS No 4 process, thereby enhancing operational efficiency. The implementation of macros enables the company to streamline data management, report generation, and task scheduling, leading to significant time and resource savings. Furthermore, by ensuring data accuracy and consistency, the macros contribute to improved decision-making processes within the organization. Through a comprehensive case study, this research elucidates the specific functionalities and applications of Excel macros in the context of production planning and control. By leveraging Excel macros to automate the MS No 4 process, Renault Nissan Automotive India Pvt Limited not only enhances operational efficiency but also fosters a culture of continuous improvement and innovation. This research underscores the significance of embracing technological advancements to meet the evolving demands of the industry and achieve sustainable growth. Through the successful deployment of Excel macros, the company demonstrates its commitment to leveraging cutting-edge tools to drive excellence in production planning and control, positioning itself as a leader in the automotive manufacturing landscape.

## I. INTRODUCTION

The automotive industry is experiencing rapid evolution driven by technological advancements, changing consumer preferences, and increasing competition. In this dynamic landscape, production planning and control play a critical role in ensuring efficient utilization of resources, meeting customer demand, and maintaining competitiveness. Renault Nissan Automotive India Pvt Ltd (RNAIPL) operates in this challenging environment, where optimizing production processes is essential for sustainable growth and profitability. This study aims to investigate the current state of production planning and control at RNAIPL and propose optimization strategies tailored to its specific needs and challenges. Through a combination of literature review, data collection, and analysis, this research seeks to identify opportunities for improvement and enhance production efficiency, ultimately contributing to RNAIPL's competitiveness in the automotive market.

In today's fast-paced automotive industry, characterized by dynamic market demands and technological advancements, efficient production planning and control are crucial for manufacturers to stay competitive. Renault Nissan Automotive India Pvt Ltd (RNAIPL) operates within this challenging landscape, where effective management of production processes is essential for meeting customer expectations, optimizing resource utilization, and maximizing profitability. However, like many automotive companies, RNAIPL faces various challenges such as fluctuating demand, supply chain complexities, and operational inefficiencies. Therefore, this study aims to delve into the intricacies of production planning and control at RNAIPL, examining current practices, identifying areas for improvement, and proposing tailored optimization strategies. By enhancing production processes, streamlining operations, and leveraging technology, RNAIPL can strengthen its position in the automotive market, meet evolving customer needs, and achieve sustainable growth in the long term.

automotive industry is characterized by intense competition, rapidly evolving consumer preferences, and global market dynamics. In this context, efficient production planning is essential for automotive manufacturers to meet customer demands while minimizing costs and optimizing resources. Supply chain integration, which involves the seamless

alignment of processes, information, and activities among various partners in the supply chain, has emerged as a critical strategy for enhancing production planning efficiency.

## OVERVIEW FOR THE PRODUCTION PLAN:

The "production plan" operations is to create the production plan based on production requests from sales team and calculate the necessary staffing and parts requests, to submit tentative and official part Orders, and to reflect this in directions given to manufacturing.

## CHARACTERISTICS:

1.  At Nissan, call the production plan the master schedule. Depending on the appropriate timing, there are four types, the master schedules No. 1 - 4. The monthly production plan uses a rolling plan covering three months.
2.  Orders from dealerships are taken in daily, and added to the production plan on a daily basis based on the daily production unit control frame (Order Control Frame). (Domestic cars)
3.  They give a delivery reply for each order.
4.  Export cars are determined either daily or weekly. Model change is possible based on the daily production units control frame (Order Control Frame). (Export cars)

Characteristic one is that we call the production plan the master schedule, and depending on when the plan is set, we have four types from No. 1 through No. 4. The second characteristic is that we take orders from domestic dealerships on a daily basis and reflect that in the daily production plan. The third is that we give delivery responses via the dealerships to the customer orders received daily. The fourth characteristic is that for the production plan for export cars, there are those that are determined daily or with the No. 3 weekly plan, and those for which model change is possible with the No. 4 daily plan. However, changes are not unlimited for anyone, and production is levelled by setting a control frame.

## OPERATIONS OVERVIEW:

1.  Orders... receive sales requests and reflect them in the production plan.
2.  Create production plan...make the monthly frame and daily production plan based on the sales requests.
3.  Create sequence plan...make the sequence production plan based on the daily plan.
4.  Control production progress...perform progress control to ensure that production proceeds according to the production plan that was created.

For the production plan operations overview, it is mainly divided into four processes.

(1) For orders, The production control department receives requests from the sales group regarding how many of Model A with whatever specifications they want made in whichever month.

Step (2) is the preparation of the monthly production plan, which is the main operation. This is split into consideration of the Monthly six month plan the total units produced per model and the monthly/weekly/daily production Plan per specification When we say per specification, that means this. For instance, when buying a car at a dealership and determining the final specifications to buy, first you determine the model. Next you choose which Engine specification you want, then what options you want, and the paint colour and interior colour. This is coded into an 18-digit code which is called the end item.

A single model is expressed in the 18. Digit code. When exterior and interior colour are added, it comes up to 22 points to finally determine One car. That is called the end item. The end item-based plan is made for the monthly, weekly, and Daily plan.

Then step (3) is the sequence plan. For instance, if we plan to produce 100 MARCH model cars in One day, we create a detailed plan on what order we will send them down the production line. This is The sequence plan.

Step (4) is not the preparation of the production plan, but covers control of performance and progress. After production is started, we manage whether vehicle production is proceeding according to plan. Thus, production plan operations include this progress control.

## II. INDUSTRY PROFILE

The car business incorporates an extensive variety of organizations and associations required in the outline, advancement, and fabricate, promoting and offering of engine vehicles. It is one of the world most vital financial parts of income. The car business does exclude ventures committed to the support of cars taking after conveyance to the end client.

The Indian automotive industry is one of the biggest on the planet with a yearly creation of 4.125 million traveller and business vehicles and 18.5 Million cars delivered FY 2015. It is the 6th biggest car producing nation on the planet after China, USA, Japan, Germany, and South Korea. The vehicles business represents 7.1 for each penny of the nation assembling total national output (GDP). As of FY 2014-15, around 31 for each penny of little autos sold comprehensively are made in India. An extending white-collar class, a youthful populace, and an expanding enthusiasm of the organizations in investigating the country markets have made the bikes portion (with 80 for each penny piece of the overall industry) the pioneer of the Indian car market. At 7.64% development, India quickest developing traveler auto market at present. The car business in India is relied upon to be the world third biggest before the end of 2016, with the nation at present the world second biggest car maker. car generation was anticipated on ascend from 16.9 million in FY15 to 28.8 million by FY21. Moreover, traveler vehicle creation is required to increment to 10 million in FY21 from 4.1 million in FY15. Solid development sought after because of rising pay, developing white collar class, and a youthful populace has moved India among the world main five automobile producers by 2015. In April-March 2015, general vehicles send out developed by 14.89 percent over the same. Time frame a year ago. Traveler Vehicles, Commercial Vehicles, Three Wheelers and Two Wheelers developed by 4.42 percent, 11.33 percent, 15.44 percent and 17.93percent individually amid April-March 2015 over the same time frame a year ago.

The administration plans to create India as a worldwide assembling and in addition an innovative work centre point. It has set up National Automotive Testing and Infrastructure Project (NATRIP) focus and al National Automotive Board to go about as facilitator between the administration and the business. Elective fuel can possibly accommodate the nation vitality request in the auto division as the CNG conveyance system in India is relied upon to ascend to 250 urban communities in 2018. Additionally, the extravagance auto business sector could enlist high development and is required to achieve 150,000 units by 2020. India is additionally a generous auto exporter, with strong fare development desires for the not so distant future. Different activities by the Government of India and the real car players in the Indian business sector is relied. Upon to make India a pioneer in the Two-Wheeler and Four-Wheeler Market on the planet by 2020.

## GROWTH OF AUTOMOBILE INDUSTRY DURING RECENT DECADES :
Just three decades back, Indian auto purchasers had only two models to browse. Both were nearby propagations of European models that had vanished from the western markets not long after World War IL Regardless of business sector request, fabricating limit was confined though government licenses, and purchasers needed for hold up a while. In the wake of paying money in advance to get conveyance. Imports were debilitated through high obligations, which stay high even now, and outside made autos were prized belonging of just the most well-off.

The presentation of a little hatchback in 1983 by Maruti Suzuki, together advanced by the Indian government and Japanese little auto maker Suzuki was from numerous points of view a vital crossroads in the improvement of the Indian vehicles industry. In spite of the fact that little, the Maruti 800, as it was called, was present day and significantly more dependable than its rivals. After a generally moderate begin, the auto charmed itself to the developing Indian white-collar class and remained to smash hit for these following two decades. Up to this point, it was the most modestly created auto on the planet, and today stays well known in the semi-urban and country markets of India.

More altogether, Maruti Suzuki presented more proficient assembling rehearses and built up various nearby part suppliers. This mechanical eco-framework with tremendously enhanced capacities facilitated the section of a few remote auto makers, after modern permitting was surrendered in the 1990s. The development of part suppliers additionally empowered select residential car firms, with no related knowledge in auto assembling, to add traveler vehicles to their item extend. Although few outside producers have attempted to extend a dependable balance, the developing acquiring force of the white-collar class keeps on drawing in new contestants to the Indian traveler auto market.

## GOVERNMENT INITIATIVES
The Government of India energizes remote interest in the vehicles segment and permits 100 for every penny FDI under the programmed course. Extract obligation on little autos, bikes, bikes and business vehicles was decreased in February a year ago to 8 for every penny from 12 for every penny to help the 'Make in India activity of the Indian. Government.

**A portion of these real activities taken by the Government of India are**

- Under the Union spending plan of 2016-17, the Government has declared to give credit of Rs 850,000 to ranchers, which is relied upon to support the tractors portion. The administration is adjusting to guarantee that no less than one relative is monetarily solid to bolster the family. This is required to enhance the conclusions of passage level bikes.
- The Government arrangements to advance eco-accommodating autos in 20/98 the nation i.e. The CNG based on vehicle, half, and half vehicle,
- The government has figured a Scheme for Faster Adoption and Manufacturing of Electric and Hybrid Vehicles in India, under the National Electric Mobility Mission 2020 to energize the dynamic actuation of dependable, reasonable, and effective electric and cross breed vehicles in the nation.
- The Automobile Mission Plan for the period 2006-2016, composed by the administration is gone for quickening and supporting development in this division. Additionally, the settled Regulatory Framework under the Ministry of Shipping, Road Transport and Highways, has influence in giving a help to this segment.

**KEY AUTOMOBILE MANUFACTURES IN INDIA**

- Maruti Suzuki
- Ford India Limited
- Eicher Motors
- Bajaj Auto
- Daewoo Motors India
- Hero Motors
- Hindustan Motors
- Hyundai Motors India Limited
- Telco etc…,

## III. COMPANY PROFILE



**" RENAULT NISSAN AUTOMOTIVE INDIA PRIVATE LIMITED "**

The first joint Renault-Nissan Alliance plant for global markets, the plant at Chennai in India has a production capacity of 400,000 units.

Opened in March 2010, the plant represents an investment of 45 billion rupees ($990 million) and employs 1,500 people the first Renault. Vehicles designed for the Indian market to roll off the production lines were Oleos and Fluence.

The Chennai plant is the first Alliance site on implement a production system on based sharing both companies' the knowledge and best practices. The new manufacturing process allows there plant to produce Renault and Nissan vehicles on the same line.

**VISION**

To be a customer - focused and sustainable Alliance manufacturing company that delivers excellence for the global market

**MISSION**

Guided by relentless focus on creating value for our customers, we will constantly strive to implement the critical initiatives required to achieve our vision.

| Customers | Build high quality, affordable and safe cars for everyone |
|---|---|
| Finance | Build high quality, affordable and safe cars for everyone |
| People | Providing a safe learning environment with focus on employee development |
| Process | Provide a high degree of structure and substance through alliance production way |

## HOW RENAULT-NISSAN OPERATES

The objective is to develop synergies worth at least €4.3 billion by 2016. To achieve this goal, a convergence plan was undertaken in April 2014 in four key areas for the Alliance: engineering, manufacturing, and logistics, purchasing, and human resources.
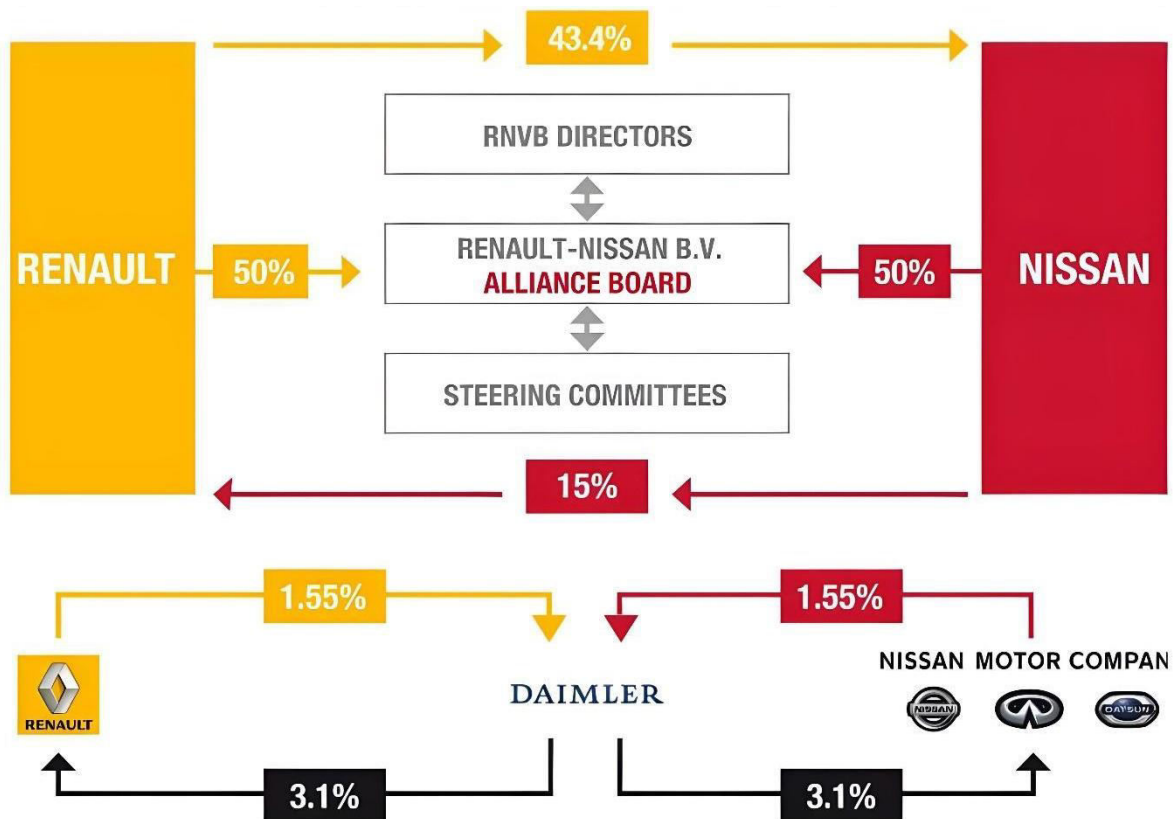


These four functions are managed jointly for Renault and Nissan, with each under the responsibility of an Alliance Executive VP.

The role of these Executive VPs is to strengthen the integration process in each of the converged functions.

Under the leadership of Arnaud Deboeuf, Alliance Executive Vice President for Renault-Nissan BV and the Alliance CEO Office, a team of Alliance Global VPs and Directors assigned to specific areas is aiming to increase and accelerate synergies.

The Global VP Directors of a global function in the Alliance manage and steer the function. They oversee both partners' operations.

The Global Directors coordinate collaborative work between the two companies and see that their operations will help to strengthen synergies. The Steering Committees choose the priority issues and give the working groups support in implementing the Alliance's projects.

These bodies work with the network of joint teams set up by the two companies (Cross Company Teams and Functional Task Teams) to identify opportunities for synergies.

## OUR SYNERGIES IN THE ALLIANCE

Strategic partnerships: Daimler, AVTOVAZ and Mitsubishi the Renault-Nissan Alliance has entered into numerous strategic partnerships since its creation.

On April 7, 2010, the Alliance concluded a long-term cooperation agreement with the German group Daimler AG. The cooperation is being pursued mainly in projects already under way and in the joint development of vehicle platforms and powertrain components.

## IV. REVIEW OF LITERATURE

### 1. "Optimization Techniques for Production Planning and Control in Indian Manufacturing Sector" - Authors: A. Gupta and S. Kumar , 2023

- This paper focuses on optimization techniques specifically tailored for the Indian manufacturing sector. It explores the application of linear programming, integer programming, and metaheuristic algorithms to address production planning and control challenges unique to Indian industries. The authors discuss case studies and real-world applications to illustrate the effectiveness of these techniques in improving production efficiency, resource utilization, and cost reduction in Indian manufacturing environments.

### 2. "Integration of Lean Manufacturing Principles in Production Planning and Control: A Case Study of Indian Automotive Industry"- Authors: R. Sharma and P. Patel, 2022

- This study examines the integration of lean manufacturing principles into production planning and control processes within the Indian automotive industry. The authors analyze the implementation of lean tools such as Kanban, 5S, and value stream mapping to streamline production processes, reduce waste, and improve overall efficiency. The paper provides insights from a case study conducted in an Indian automotive manufacturing facility, highlighting the challenges and benefits of adopting lean principles in production planning and control.

### 3. "Multi-Objective Optimization for Sustainable Production Planning and Control in Indian Textile Industry" - Authors: K. Mehta and N. Shah, 2022

- This paper focuses on multi-objective optimization approaches for sustainable production planning and control in the Indian textile industry. The authors address conflicting objectives such as cost minimization, energy efficiency, and environmental sustainability. They propose a multi-objective optimization framework tailored for the Indian textile sector, considering factors such as raw material availability, energy consumption, and waste management. The paper discusses case studies and real-world applications to demonstrate how multi-objective optimization can help Indian textile manufacturers achieve sustainable production practices while remaining competitive in the market.

### 4. "Lean Production Implementation in Indian Manufacturing: Challenges and Strategies for Production Planning and Control"- Authors: K. Patel and M. Joshi, 2024

- This paper examines the challenges and strategies for implementing lean production principles in Indian manufacturing, with a focus on production planning and control. The authors discuss common obstacles faced by Indian manufacturers in adopting lean practices, such as cultural barriers, resistance to change, and lack of awareness. They propose strategies for overcoming these challenges and successfully integrating lean principles into production planning and control processes, emphasizing the importance of employee training, continuous improvement, and stakeholder engagement. The paper provides insights from case studies and real-world examples to illustrate effective lean implementation strategies in the Indian manufacturing context.

**5. "Real-Time Production Monitoring and Control Systems for Indian Food Processing Industry" - Authors: S. Patel and R. Singh, 2023**

- This study focuses on the implementation of real-time production monitoring and control systems in the Indian food processing industry. The authors examine the use of sensor technologies, IoT devices, and data analytics platforms to track production activities, monitor equipment performance, and ensure product quality in real-time. They discuss the benefits of real-time production monitoring systems in improving process visibility, reducing downtime, and enhancing overall efficiency in food processing plants. The paper also addresses challenges such as data integration, cybersecurity, and scalability, offering recommendations for successful deployment of real-time production monitoring systems in the Indian food industry.

## V. NEED FOR THE STUDY

Optimizing production planning and control at Renault Nissan Automotive India Pvt Ltd through automation is imperative for sustaining competitiveness in today's automotive landscape. By streamlining processes and reducing manual interventions, automation holds the key to unlocking efficiency gains across the production chain. This endeavour not only promises cost reductions through optimized resource utilization but also ensures enhanced quality standards by enforcing standardized procedures. Ultimately, by investing in the optimization of production planning and control with a focus on automation, Renault Nissan Automotive India Pvt Ltd can fortify its market position and forge ahead as a leader in the automotive industry.

## VI. OBJECTIVES OF THE STUDY

● To Investigate current production planning and control practices.
● To Identifying opportunities for improving production planning and control.
● To Optimize scheduling processes to minimize idle time.
● To Developing recommendations for enhancing production planning and control.
● To Propose recommendations for implementing optimized production planning and control

## VII. SCOPE OF THE STUDY

The scope of the study on optimizing production planning and control at Renault Nissan Automotive India Pvt Ltd encompasses an in-depth examination of the current production planning and control processes within the company. This includes analysing existing systems, identifying bottlenecks, evaluating resource utilization, and assessing the effectiveness of scheduling techniques. Additionally, the study will explore potential areas for improvement, such as implementing advanced Automation, integrating new technologies like AI and IoT, and enhancing collaboration between departments. The ultimate goal is to develop recommendations and strategies that enhance efficiency, reduce costs, and improve overall performance in the production planning and control domain.

## VIII. RESEARCH METHODOLOGY

Research methodology refers to the systematic approach researchers take to conduct their studies. It includes the methods, techniques, and procedures used to gather and analyse data, aiming to answer research questions or test hypotheses. This framework encompasses the selection of research design, data collection methods, sampling techniques, data analysis procedures, and interpretation of findings. Essentially, it provides a structured plan for researchers to follow, ensuring that their study is carried out in a rigorous and systematic manner, thus enhancing the reliability and validity of the research outcomes.

**DESCRIPTIVE RESEARCH**
Descriptive research is a method that aims to describe the characteristics or behaviours of a subject without manipulating it, often using techniques like surveys or observations to provide an overview of the topic being studied.

**SECONDARY DATA**
Secondary data refers to data that is collected by someone other than the primary user. Common sources of secondary data for social science include censuses, information collected by government departments, organizational records and data that was originally collected for other research purposes. Primary data, by contrast, are collected by the investigator conducting the research.

## SIMULATION TECHNIQUE

Simulation technique refers to the process of creating models or replicas of real world systems, process, or phenomena and performing experiments on these models to understanding their behaviour, performance, and outcomes. It involves the use of mathematical and computational models to mimic the essential features and dynamics of the system being studied.

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