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STUDY AND REVIEW OF PRODUCTION PLANNING AND CONTROL IN AUTOMOBILE SECTOR

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ABSTRACT

In order to compete successfully in today's global market, businesses must first integrate their internal and external operations. Processes like PPC (production planning and control) fall under this category. Cascade planning is used in the automotive industry for both long- and short-term production and sales strategies. Costly manufacturing issues emerge due to a lack of communication and coordination between the various stages of planning. Along the planning cascade, this study presents a unified approach to sales, buying, supply chain, and production planning. We can save money and unlock untapped value by coordinating our long-, medium, and short-term goals. Production of customized vehicles is used to demonstrate the fundamental strategy for unified planning.

Keywords: Control, Planning, manufacturing Production, and Scheduling.

I. INTRODUCTION

Academics strive to expand their understanding of PPC systems by analysing the interactions of key PPC components, while practitioners work with less-than-ideal software and ad hoc manual methods to get valuable results. Academics are frequently upset with production control managers' apparent lack of comprehension of fundamental concepts, while practitioners often feel that academics are not researching the 'right' subjects and are affected by the arrogance of ignorance. For example, while receiving orders, experts must agree on lead periods so that they can provide delivery dates and organize the availability of supplies for assembly.

When deciding on a delivery date, it is common to approach the lead time as though it were continuous and predictable. This may be a decent approximation if the demand for available resources is generally consistent or modest. Queueing theory, on the other hand, demonstrates that long and unpredictable wait times emerge from overloaded resources and the availability of demand and service, both of which are unpredictable. Therefore, true lead times are determined by the system's load as well as the random impacts caused by difficulties with quality, reliability of equipment and processes, supplies, employees, and demand. Of course, the stated lead times have an influence on the workload, stock, and possibilities of on-time delivery. Many firms, on the other hand, adopt the mutually incompatible approaches of varying load and locking in the claimed lead time.

Perhaps this is why so many people have unrealistic expectations. The techniques used to control industrial output vary greatly. Despite their origins in industry, large system software developers now have significant influence on the minute features of PPC systems. Formal definitions of PPC systems often subdivide them into make-to-order and make-for-stock systems, although some organizations have local goals such as keeping certain groups of employees and equipment active. Job production is the purest version of the make-to-order system, which is a manufacturing process based on the unique requirements of each individual customer. Make-for-stock systems, on the other hand, employ base stock, re-order cycle (ROC), and re-order point (ROP) approaches to grow stock to goal levels.

ABOUT THE COMPANY / INDUSTRY / SECTOR

INDUSTRY PROFILE

India has the fifth biggest vehicle market in the world. In 2019, India produced the fifth-most automobiles and the seventh-most commercial vehicles worldwide. By 2026, the Indian automobile sector is predicted to earn between Rs. 16.16 and Rs. 18.18 trillion (USRs. 251.4 and USRs. 282.8 billion). According to statistics from the Department for Promotion of Industry and Internal Trade, the sector drew FDI of USRs. 30.51 billion between April 2000 and June 2021, or 5.5% of the total FDI during the period (DPIIT).

It's projected that by 2026, the Indian vehicle market would be worth Rs.300 billion.

With a CAGR of 2.36 percent between FY16 and FY20, a total of 26.36 million automobiles were produced in the nation that year. There was a rise of 1.29% in annualized growth rate (CAGR) for domestic car sales between FY16 and FY20, which resulted in 21.55 million units sold in FY20.

Within India, the market is dominated by two-wheelers and personal automobiles. Small and midsize automobiles account for the bulk of passenger vehicle sales. More than 20.1 million vehicles were sold in FY20, with two-wheelers making up 80.8% of the market and passenger cars taking 12.9%.

Production of passenger cars (other than those made by BMW, Mercedes, Tata Motors, and Volvo Auto) together with three-wheelers, two-wheelers, and quadricycles reached 2,125,304 units in September 2021.

OVERVIEW OF WORLD MARKET

Statistics and information about the automotive sector worldwide

Due to the COVID-19 pandemic and automotive semiconductor shortages, the worldwide automobile industry has seen decreasing demand and production halts since 2020. This chip shortage resulted in the removal of around 11.3 million cars from global production in 2021, with projections estimating that interruptions in the automotive supply chain would lead to the removal of an additional seven million units from production in 2022. Global vehicle sales began to rebound following the pandemic's

dip, reaching 66.7 million units sold in 2021. This sales volume is expected to fall again in 2022, with a 2023 sales volume that is still lower than in 2019.

The automobile sector, which is an important economic indicator, is on the cusp of new technology and developments. Furthermore, the need for distinctive and expensive features by consumers is driving the car sector in the present period. Globally, the car industry is supported by a variety of variables, including the availability of low-cost trained labor, significant R&D centers, and low-cost steel manufacturing. The Global Automotive Market is estimated to reach 122.83 million units by 2030, according to the publication.

LITERATURE REVIEW

Roliand Van Dierdonck and Jeffrey G. Miller (2018):

For the purpose of understanding the widespread discrepancies between companies' needs for production planning and control, Roliand Van Dierdonck and Jeffrey G. Miller provide a model based on unforeseen circumstances. When considering data processing system investments and organizational technologies, a company's functional needs are tied to its competitiveness and environment. Data from a sample of businesses and an expert panel are used to demonstrate the model's feasibility and provide avenues for its implementation. The dominant view in the literature is that an effective management of production systems will faithfully reflect the economic strategy of the enterprise. The model used to reflect this theory includes this connection. Starting with this simple blueprint, the task of production planning may be derived. The next step is to figure out the information processing system involvement (IPSI) level and the number of available resources necessary to complete the task.

Maurice Bonney (2019):

In this article, Maurice Bonney examines where we are in terms of Production Planning and Control (PPC), emphasizes recent technology and system advancements, and ties them to the needs of the market. For PPC to effectively adjust to these internal and external changes, it must become more dynamic and enable better management of resources and delivery performance. Certain requirements for the new PPC systems are now defined. To meet these standards, it is suggested that administrative procedures be refined and further research on the factors that affect PPC system performance be conducted. The quantitative, organizational, and behavioral aspects of PPC are dissected. An outline for formulating a research and actionable goal is provided.

Vaidyanathan Jayaraman (2018):

The characteristics of the remanufacturing setting were examined by Vaidyanathan Jayaraman. Remanufacturing's value as a tool for lessening production's impact on the environment and saving money is rapidly rising. Companies have discovered it to be a lucrative strategy for a wide range of goods, while also enhancing their reputation as environmentally responsible. Here, we look at the remanufacturing firm's production planning and controlling procedures. The research is evaluated across all of the areas of decision-making that go into planning and managing a production. Many areas remain unexplored because of a lack of research. It is emphasized that there is a need for a more unified structure and set of models to govern the production's planning and regulating operations. It's also important to remember that most companies still struggle with these problems and lack formal procedures for handling

them. There is a need for prototypes and blueprints tailored to the specific difficulties and requirements of re-processing businesses.

Cheng Wang and Xiao-Bing Liu (2020):

Planning for integrated manufacturing was a topic of conversation between Cheng Wang and Xiao-Bing Liu. This article's goal is to provide a model for optimizing production plans across several goals, whereby production planning and control are brought together to facilitate the modelling and fabrication of administrative models for businesses. The limitations of ERP planning systems are analysed, and a prototype for optimizing production scheduling based on various goals is provided. In order to maximize the management and organization of industrial processes, the model takes into account not only net demand and potential, but also several performance management objectives, such as on delivery, manufacturing balance, stock, and overtime manufacturing. Researchers found that a multi-objective optimization model is useful for optimizing enterprise production administration and monitoring, and that manufacturing small-business product development management takes into account more than just power and equipment when measuring performance.

Nikos I. Karacapilidisa and Costas P. Pappis (2018):

The problem of Master Production Scheduling is tackled by Nikos I. Karacapilidisa and Costas P. Pappis, who provide a model-based, interactive solution for textile production management. Scheduling these systems is difficult because of the unique characteristics of the sector, such as the need to coordinate the activities of several units across multiple stages, the uncertainty of future plans, and the fluidity of production needs at each stage. The consequences of these factors on the production's control systems are analyzed, and a detailed breakdown of the system's component modules and their relationships are shown. The state-of-the-art OPTech production control system is also compatible with the system.

Autenrieth (2018), Jiang (2018)

As part of the larger technical and organizational shifts happening across the economy as part of the Fourth Industrial Revolution, the manufacturing sector is undergoing an internal transition as well. Increased rivalry, diverse market demands, unique consumer wants, a wide range of goods, stringent criteria for delivery time, rising labour costs, and a decline in production units are all visible external market developments in this setting.

Areal (2018):

To solve the challenge of determining the best order in which to build automobiles while the production line is out of balance, Areal employs two global heuristic approaches, namely simulated annealing and genetic algorithms. These optimisation techniques have been shown to be effective in the scheduling of actual production data for a highly flexible automobile manufacturing assembly line.

Germes and Riezebos (2020):

Unit-based pull systems are defined by Germes and Riezebos as those that restrict the total number of orders on the shop floor, whereas load-based pull systems restrict the total amount of work to be done on each order (the amount of time it takes to process).

PROBLEM STATEMENT

By keeping in mind, a goal to maximize profit, the production planning issue can be resolved in a way that meets the needs of the product's target market. For tackling this issue, scholars have assumed that the demand amount is stable and known. In this study, we'll go through some of the problems that might arise during the production planning and production controlling for the automobile industry.

- Sources of raw materials not being approved for use until the production starts.
- There was a holdup in getting approval to begin production because of the delay in receiving sample goods.
- Faulty data recording and transmission which can create issues in machine data.
- Final Quality Assurance Inspection Failed.
- Machine failure which creates delay.

OBJECTIVES OF THE STUDY

- Optimization of production efficiency by methodical and review the planning of production processes.
- The process of coordinating the resources (machines, workers, etc.) dedicated to manufacturing in order to meet established goals (in terms of output, quality, efficiency, and cost).
- The manufacturing process will run more smoothly and efficiently if all related divisions work together.

RESEARCH DESIGN

For the purpose of analyzing the results of a project, researchers using a quantitative research design look at a variety of factors, both numerical and statistical. Visual representations of data (charts, graphs, etc.) are the most common tool for statistical analysis and meta-data compilation (it is information about the data by the data)

II. METHODOLOGY

Methods for data collection

Primary Data: Primary source of data was collected through Questionnaire.

Secondary Data: Books and Journals were used for the secondary source of information for this research. Logistics for magazines on the internet.

Sampling

The sampling approach used for data collection is convenient sampling. The convenience sampling technique is a non-probability approach.

Sampling size

The sample of one hundred people has been selected at random from the larger population. Sampling is the practice of selecting a representative sample from a larger population in order to extrapolate information about that larger group.

Analytical strategy

Graphs and charts are used to depict diagrams.

Following the use of the relevant statistical methods, logistical conclusions will be formed.

Findings and recommendations will be provided to make the research more helpful.

III. MODELING AND ANALYSIS

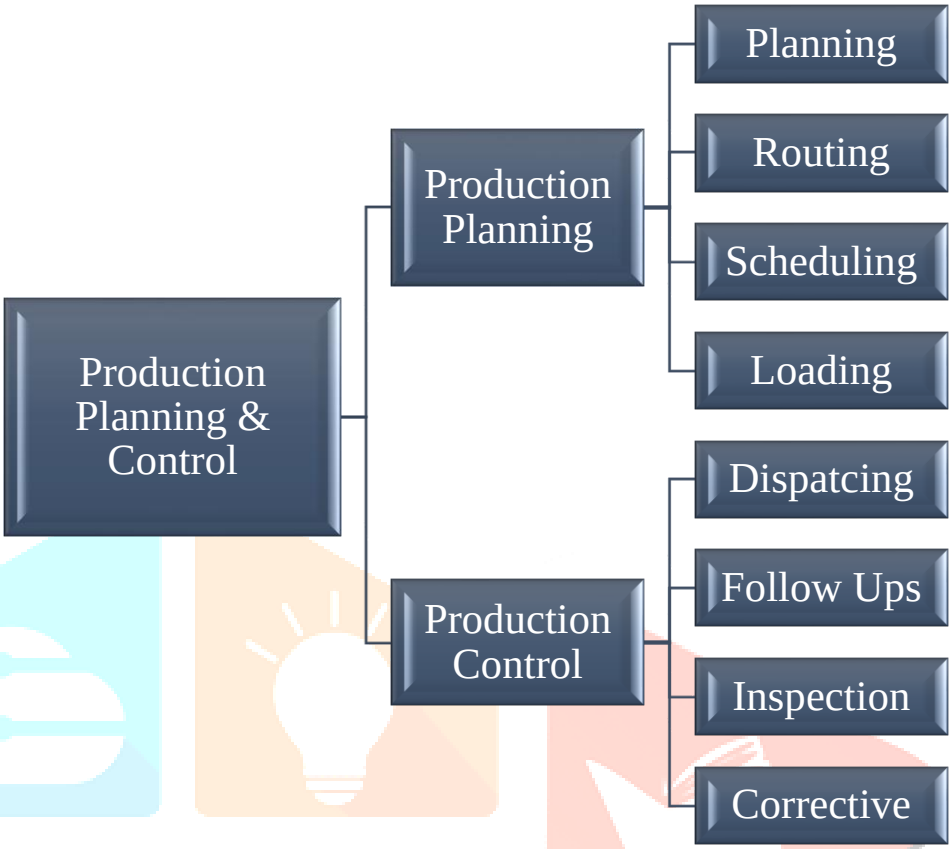


FIGURE: STEPS OF PRODUCTION PLANNING AND CONTROL

Having proper production planning and control operating systems can easily ensure a cost-effective manufacturing process and steps, encourage more timely delivery of goods and products, reduce overall time, satisfy customer needs and demand, synchronize manufacturing department with other department heads of industry and ensure that proper man is assigned to the best tasks. Production planning is the heart of any industry/ manufacturing plant. There are other tasks include material prediction, planned order processing, long term management, infrastructure development, delivery management and other. The PPC process begins with expecting a product's demand and then creating a production plan to meet that require in order progressing the product advancing. Production planning and control are divided into two categories: Production's planning & controlling, and these two are further divided into stages. Figure 2 shows the steps of production planning and control, which is explained below.

- **PLANNING:** The planning department receives comprehensive information from managers regarding the quantity to be produced and the dates when delivery to consumers was guaranteed. This enables detailed planning of productive activities. The engineering department also provides planning department with the required engineering and drawing specifications.

- **ROUTING:** Routing calls for selections about the path of work as well as the order in which character duties might be accomplished. The purpose of routing is to locate the most green and cost-effective sequence of events. When creating a direction card, understand that plant device is running at full potential and people and different sources are getting used to capability.

- **SCHEDULING:** Scheduling is the process of estimating completion and operation times, and how long it will take to complete the entire series as intended, taking into account all the important factors. This includes creating a schedule detailing the total time required to create the product and the time spent on each piece of equipment and procedure.

- **LOADING:** Workload is the amount of work, and workload is the process of distributing that amount of work among users the processes required to create each item. Assigning tasks to work centres or devices within work centres is called loading.

- **DISPATCHING:** Dispatch refers to the act of transferring something to a specific location. It refers to the completion of all actions necessary to carry out the production plan established in the routing and planning processes.

- **FOLLOW-UPS**: The control component of production planning and control is a follow-up. It includes analysis of whether work is progressing as planned and to what extent deviations from standards have occurred, along with taking corrective action to restore law and order. Follow-ups are also called as checking the process.

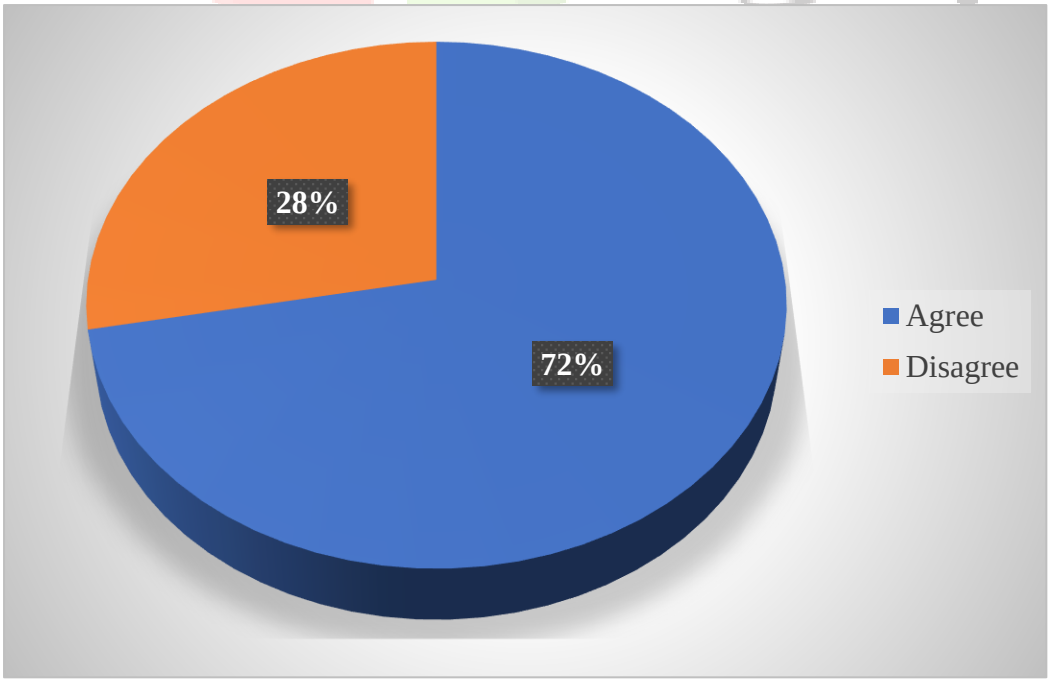
- **INSPECTION**: Monitoring is a control component of production planning and control. It includes assessing whether the work is proceeding according to plan or not, as well as evaluating the extent to which deviations from standards have occurred and taking corrective action to restore order.

- **CORRECTIVE:** The next stages of the production control process are evaluated, and changes are made as needed. This process includes routing, work scheduling, and even interviews with workers who are taking extended breaks.

IV. RESULTS AND DISCUSSION

1. The ability to plan and control production is essential to minimizing waste and maximizing profits.

Categories	Respondents	Percentage
Agree	72	72%
Disagree	28	28%

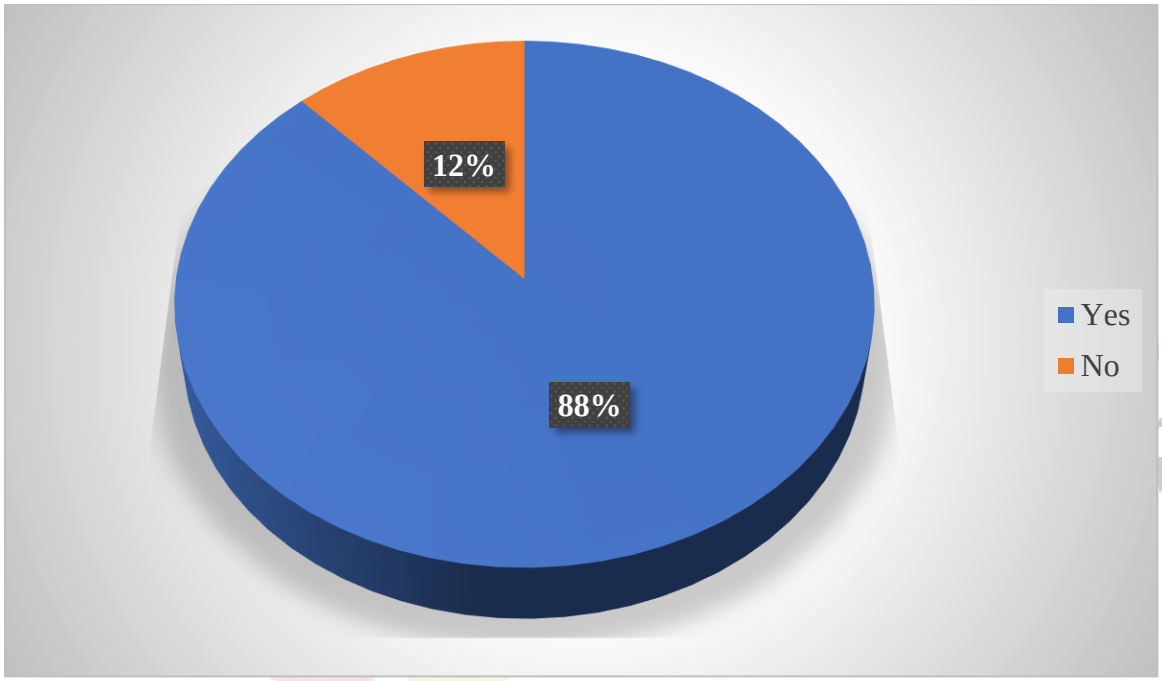


Interpretation:

The capacity to plan and regulate production is highlighted in the following graph as being crucial to reducing costs and increasing revenue. 72 percent of those polled agreed, while 28 percent were in opposition.

2. Foreseeing potential snags in the production process and mapping out solutions to such problems are essential components of any good production plan.

Categories	Respondents	Percentage
Yes	88	88%
No	12	12%

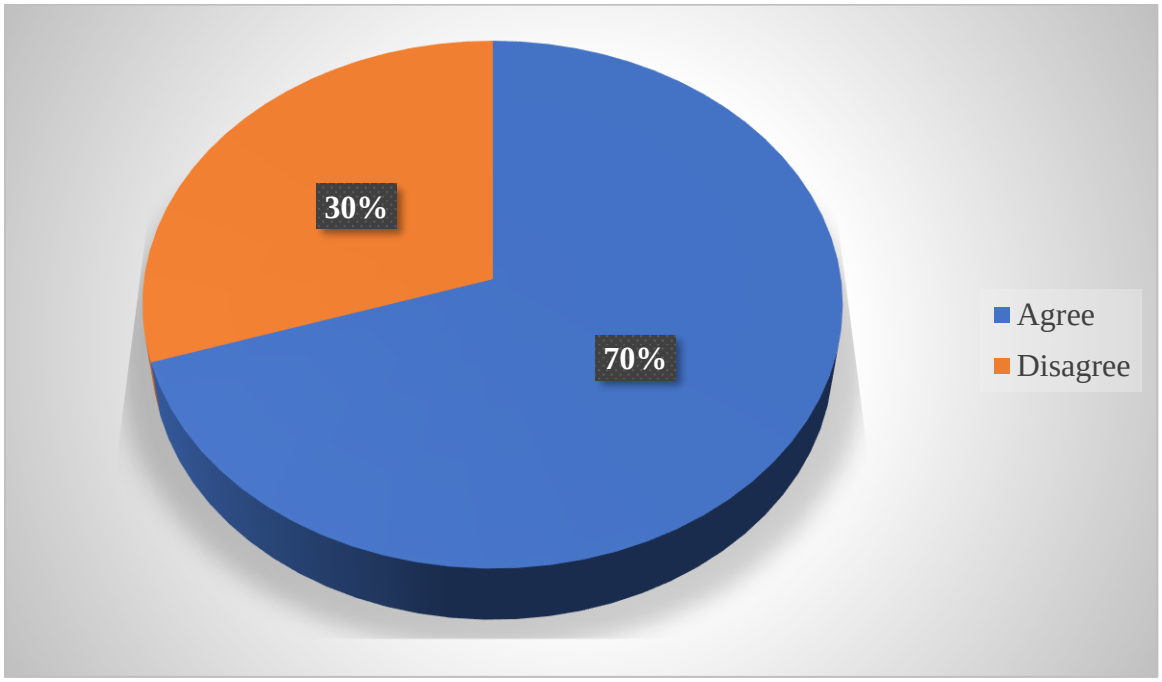


Interpretation:

Look at the numbers in the table below as an example. The success of every production plan hinges on its ability to anticipate and then address potential obstacles. Eighty-eight percent of respondents were favourable, while just twelve percent were negative.

3. The time needed to complete each task is what scheduling in the Production Planning and Control process is all about.

Categories	Respondents	Percentage
Agree	70	70%
Disagree	30	30%

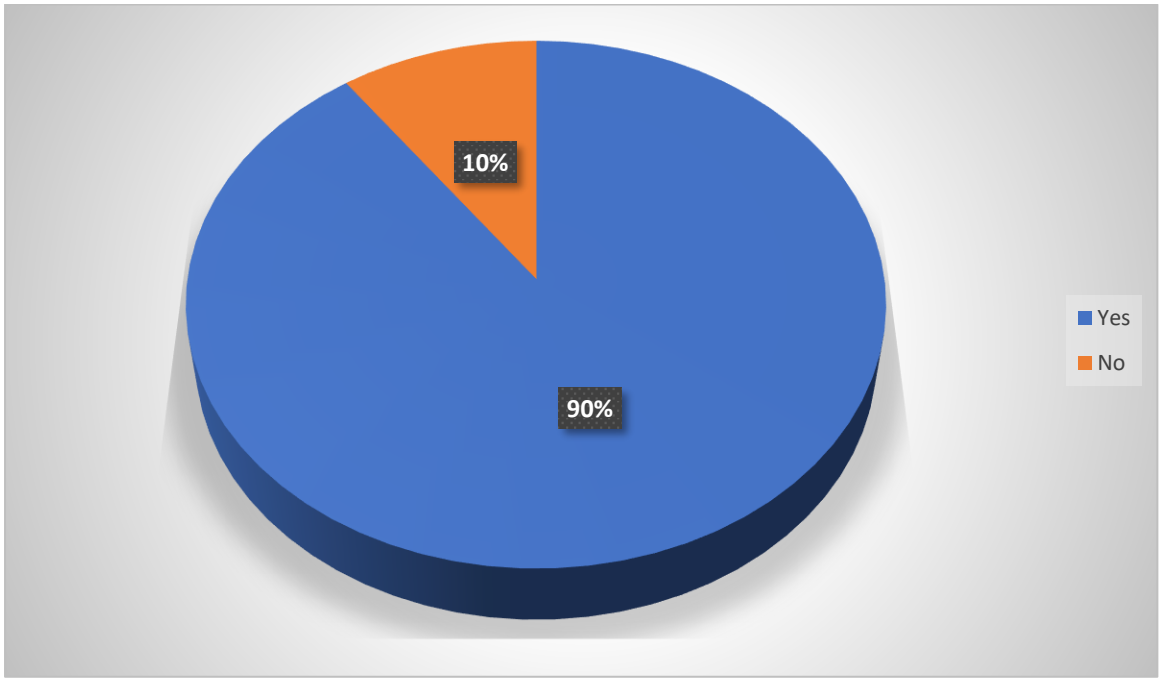


Interpretation:

Time commitments for each step in the Production Planning and Control process are estimated using the previous Gantt chart. Seventy percent of respondents supported the suggested timetable, while thirty percent did not.

4. Should the automotive sector place a premium on production planning and control?

Categories	Respondents	Percentage
Yes	90	90%
No	10	10%



Interpretation:

To what extent do you agree with the following assertions about whether or not the car industry should put more emphasis on production planning and control? Most respondents (90%) responded "yes," while a minority (10%) said "no."

V. CONCLUSION

The proposed approach enables the development of a consistent and unified planning procedure that addresses the long-term, medium-term, and short-term planning horizons in depth, assuring the exploitation of the following opportunities. The time-consuming media hiatus and workarounds may be eliminated. In orderly fashion, data is managed. In the event of personnel loss, the system's knowledge may be used to quickly fill up the gaps. As a result, up to two members of the planning team might dedicate less time and effort to the process. If a bottleneck is detected by the planning tool, it is feasible for early action to be taken. In order to have a successful product launch, careful product planning must be done in advance. The use of this technique allows for the creation of items with zero potential dangers.

SUGGESTIONS

- Putting processes to the test and outlining their details
- Find a system for ordering supplies.
- Plan out your material procurement process.
- Learn to recognize possible bottlenecks.
- Organize frequent training sessions for employees.
- Efficiency gains in manufacturing due to mechanization
- Full enterprise resource planning functionality for your business

Make more accurate predictions. Answering the question "what items will you need to create to fulfil demand" is the first step in developing a successful production strategy. Create a Record of Your Abilities. Dismantle Isolated Planning Efforts. Integrate with transport logistics processes and use real-time monitoring.

VI. REFERENCES

- Inalfa Roof Systems. (2017). Inalfa Roof Systems Group. Retrieved May 18, 2019, from http://www.inalfa-roofsystems.com/en

- Lang Wood, J. (2017). Disadvantages of lean manufacturing. Retrieved August 13, 2018, from

- http://www.ehow.com/list_6025715_disadvantages-lean-manufacturing.html

- Nayab, N. (2020, August 2). Criticism of lean manufacturing. Retrieved August 13, 2018, from http://www.brighthubpm.com/methods-strategies/105933-criticism-of-lean-manufacturing/

- Shpak, S. (2017, August 13). Advantages and disadvantages of lean production. Retrieved August 3, 2020, from http://smallbusiness.chron.com/advantages-amp-disadvantages-lean-production46696.html

- Körpeoglu, H. Yaman, and M. S. Aktürk (2018). Methods for master production scheduling based on stochastic programming with many stages. 166–179 in E.J. OR 213(1): European Journal of Operational Research.

- Author: Lang Wood, J. (2018). Consequences that might arise from adopting a lean approach to production. The article was retrieved from on August 13, 2015.

- http://www.ehow.com/list 6025715 disadvantages-lean-manufacturing.html

- Theresa M. Leung (2019). Optimization of a plastics compounding plant's production schedule under strict quality controls (Master thesis). The City of Waterloo, Home to the University of Waterloo.

- In his book, Liker, J. K. (2017). A look into the transformation to lean manufacturing in the United States (1st ed.). Productivity Press, New York.