

“A Study to Identify Challenges of Production Control in Large Scale Industries of Pune Zone.”

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Abstract

The research identifies the challenges faced for the implementation and usage of the production control systems. Some challenges like high level of investment and maintenance, negative feedback from employees, deviation system, rules and regulations of government, unforeseen emergencies are taken for the evaluation. The intensity of these challenges for the production control in large scale industries is identified.

The research gives the idea about the benefits of the production control practices. Production control avoids the deviations and interruption of the production lines. Production control practices improves the overall performance of the production system which includes improvement in purchase management, production technology, wastage management, customer service and cost saving.

.Keywords:Identify Challenges, Production Control,Production Benefits,Large Scale Industries, Pune, Revenue and profit of industries.

Introduction

Production control is managerial function which plans, directs and controls the resources and processing activities in an industry, this makes significant influence on the performance of industries. As the speed of globalization increases the competition also increased. To meets the speed and requirements of the customers, industries started the automation, technology upgradation, digitalization of the production control systems. Advanced control technologies used for improving the business performance of industries.

Liberalization policy become effective from August 1991 in India. Foreign investment started in overall states of India very rapidly, but Maharashtra is become very favourable place for the investor due to the geographical locations, government policy and infrastructure. Maharashtra approved 20,909 industrial projects with an investment of 14,29,142 ₹ crore till October, 2020. In 2020 till October, 247 projects with proposed investment of 37,887 crore were registered in the “Magnetic Maharashtra” policy.

Foreign and domestic investor are interested for investing in the Pune. Geographical location and environmental conditions are comfortable for the industries, Pune is close to the Mumbai which acts as economical capital of India. Infrastructure and red carpet treatment for industries by the state government and local government authorities. Pune is educational hub called as Oxford of east so availability of the trained and educated workforce. Industrial technology changes also grabbed by the educational systems and implemented into the systems. The Researcher, in this research, wants to study the awareness, evaluate the usage, identify challenges, find out benefits and analyze impact of production control practices in large scale industries.

The research is on the production control practices in large scale industries. Large scale industries are working with the multiproduct and huge volume of the products so planning for the same is required. But successful implementation of the planning is depending upon the production control practices in large scale industries. Globalization of world economy increased competition in market to provide good quality and low cost product in time with the customer satisfaction. Penetration of new technologies arises in every sector and large scale industries are working on the implementation of it in production planning and control. Large scale industries contributing to the GDP of the around 26 %. Pune has GDP about 69 billion, which may increase by the operations of the large scale industries.

Present research is analyzing the awareness of new technologies in production control of the large scale industries. Artificial intelligence, augmented reality, machine learning, robotics manufacturing, simulation models are upcoming technologies. The awareness of these technologies is required as per the process and requirements in large scale industries. Awareness is about the new technologies in production control practices gives future perspective to the large scale industries.

Literature review

Pandemic is increases during these days SARS (Serve Acute Respiratory Syndrome), Influenza A (H1N1), Middle East respiratory syndrome (MERS)and Avian Influenza A are examples of epidemics. Epidemic management is needs to handles critically because human lives and economic situations mostly depend on it. Currently Covid-19 virus infected lot of peoples from globally. In very short period large populations of the glob infected, initiation of the infection is from the China as a starting point. Then many areas of the world facing infection of Covid-19. (He, Zuopeng, & Wenzhuo, 2021). Social distancing is identified prevention against the Covid-19, which is possible with usage of the different technological aspects. Understanding of need of human lives and technology usage coming in front of

the world. All technological experts are designing, developing and implementing the technological modules for the safety of the human lives. Information technology and information systems usage avoid the overcrowding and implement the isolation with availability of various requirements. (Ye, Jin , & Hong, 2020 June) Various applications, modules, gadgets, instruments, systems are involved in the fight against the epidemics of Covid-19. This all are useful for communication, knowledge exchange, analysis of data for conclusions and implementation. Robotics in manufacturing, Augmented reality, Simulation models are vastly used in the current situations. (He, Zuopeng, & Wenzhuo, 2021) Epidemic moves very fast around the world and prevention systems are looking so weak. The performance of systems like hospitals, medicine distribution centre, diagnosis labs are short following. Data collection instruments, systems and application are integrated but unable to conclude the final decisions. In short the medical systems integration required properly which helpful for the hospital management, medicine suppliers, pharmaceutical, biological and vaccine industry. Inference calculating by decision making authority to done with the help of this systems. (He, Zuopeng, & Wenzhuo, 2021) Information technology and information systems are assured tools and techniques for the functioning of the other modules of business. Usage of IT increases tremendously after COVID-19 infections time. Information Technology supports the business and other functions (Modi Bimal, Pandey, & Dusija, April 2020). India have the vast sector of the software, automation, services and hardware. Revenue of the information technology sector supports the Indian economy majorly, but differentiation within sector are follows service 50.7%, engineering services along with products of software 21.1%, Business process management have a share of 19.8%, and Hardware with 8.4% share.

In a collectively manner review says that the information sector has to work for technology to fight against COVID-19 and they have a bright future. Some statements from the annual report show the impact of COVID-19. Restrictions, lockdowns and law by local authorities in most places of the world leads the growth of the information technology sector. The work passion, working style and function of working leads the growth of the IT industries. Big Data, Cyber security, integration of systems works in favour if the IT industries. Impact that the COVID-19 pandemic had on the world's capital markets infrastructure (CMI). Pandemic makes impact on the industries, import and export of the many things, orders from the customers also affected and supply to customers are also impacted. Demand and supply ratio mismatched due to the covid-19 situations, overall business planning moves towards noncompliance, regulatory norms and guidelines changes to protect against covid-19 but impacted most of the business plans. But during these period customer relationship, health safety of workforce

maintained with revenue of industry. The Industries total revenue declined; revenue can be attributed to the pandemic as well as divestiture of its transportation systems business.

Objective

- 1.To study the geographical location and profile of large scale industries.
- 2.To identify challenges of production control in large scale industries of Pune zone.
- 3.To find out benefits of production control practices in large scale industries.

Scope of the study

The study is restricted to the large-scale industries of information technology located in geographical location of Pune. The study concerned to identify challenges of production control in large scale Industries, profile,age revenue and profit/operating margin/operating income of selected large scale industries in information technology sector.

Hypothesis

H1 (Alternative Hypothesis) There is significant difference across challenges of production control practices in large scale industries.

H0 (Null Hypothesis) There is no significant difference across challenges of production control

H2: -(Alternative Hypothesis) There is significant correlation between age of large scale industries and impact of Covid-19.

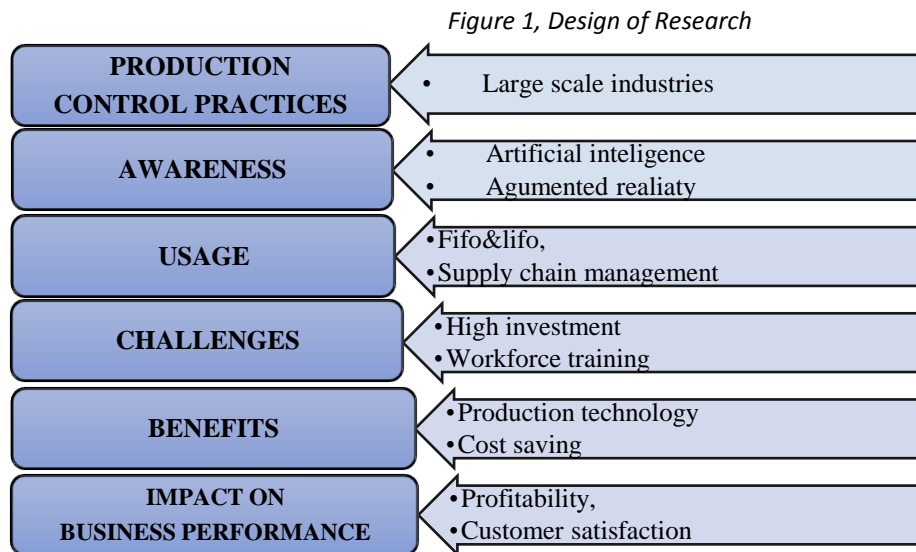
H0: - There is no significant correlation between age of large scale industries and impact of Covid-19.

Research methodology

Design of research: -(Martínez-Mesa, 2014)

3.1. The conducted research is an exploratory type (C.R.Kothari, 2018)and survey method is applied for the collection of the data. **Design of research:** -(Martínez-Mesa, 2014)

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The awareness of production control practices increase usage. During usage of tools, techniques and systems of production control challenges arise, but the overcoming from the challenges always gives benefits. The benefits of the production control practices improved business performance of large scale industry.

3.2. Sampling: -

The conducted research was carried out for production control practices in the large scale industries with respect to awareness, usage, challenges, benefits, business performance, business performance parameters in Industry 4.0 and impact of the Pandemic. The research was carried with the primary data collected through the personnel interview and Google forms. Respondents involved are from production planning and control department or from the production department. During the sampling researcher take help of his office colleagues, school friends, college friends, relatives and management students from the Chetan Dattaji Gaikwad Management Institute, Pune. From the database of the Maharashtra Industrial Development Corporation (MIDC) researcher decides the different locations of the large scale industries.

3.3. Sample Size of the research: -

Sample is some percentage of total population (Martínez-Mesa, 2014). Sample is used as the representation of the whole population. Data collection and data

analysis give the inference about the population. Calculation of the sample size is critical task in the research; sample depends upon the many parameters mostly on the original population. For the sample size researcher has used the Cochran's formula for calculating sample size when population is infinite. Cochran (1977) developed a formula to calculate a representative sample for proportions as:

Cochran formula is:

$$n_0 = \frac{Z^2 pq}{e^2}$$

Where:

e is the desired level of precision (i.e. the margin of error),

p is the (estimated) proportion of the population which has the attribute in question,

q is 1 – p.

The z-value is found in a Z table.

Explanation of Cochran's Formula: -

Researcher collecting the data about the production control in the large scale industries of Pune zone, and estimating the optimum number of responses. Researcher unable to predict about the population in the beginning; so, during study researcher assume maximum variability. Researcher considers half of the respondents use production control system.

Proportion of population p is 1 - 0.5= 0.5

Precision considered at least ± 5% so confidence is 95%.

A 95 % confidence level gives us Z values of 1.96, as per the normal tables.

Calculation for the sample size

$$\frac{\{(1.96)^2(0.5) (0.5)\}}{(0.05)^2}$$

As per the formula sample size for research. Considering huge number of employees in large scale industries of Pune zone. Researcher has taken additionally 25 % more samples are added as a safer margin for success of the study so total sample size become as per calculated. This sample size gives confidence levels as the researcher required.

1. Pilot study

Before starting the field research, it is important to take the trial run to ensure the accuracy of the various parameters selected during the research. Then objectives and hypothesis is decided and research moves ahead. The questionnaire was prepared and used as validated instrument for data collection of the research.

Researcher also assists to the respondents over phone to fill the online questionnaire. Pilot study carried out with the 50 respondents from 10 different profiles of industries selected from the Pune Zone. After data collection and evaluation 32 responses were found completed, taken for the data analysis of pilot study.

Alpha Cronbach's is (Bonett, October 2014) a model of internal consistency, measure of scale reliability and average inter-item correlation, means how closely related a set of items are as a group. Reliability test was found to be 0.962 for all the 38 items of awareness level.

Suggestions from Respondents: -

- Number of questions need to be reduced and questionnaire should be simple which save time of respondents.
- Information about the turnover of the five years is not easily available for sharing.
- Remove the repetitive meaning questions from the questionnaire.
- Objective type of questions is more preferred which saves the time of respondents and structured responses will be collected.

Conclusion of pilot study: -

During pilot study 50 respondents were communicated as respondents from which 32 responses have found completed and taken for analysis. Data is collected from the 11 different locations with 10 different profiles of industries. Reliability statistics means Cronbach's Alpha (0.962) indicates the questionnaire is reliable. As per suggestion of respondent's final survey questionnaire make simple, objective type and secrecy questions avoided.

Data analysis

Pune selected as a geographical location for the studies and from various locations of Pune, large scale industries from information technology sector.

Location of Industry

In recent years, many IT industries started their subsidiaries or supportive software concern industry in Pune. Geographical location, Infrastructure, connectivity to other IT hubs, power supply are the main reasons due to which Pune has become IT hub of the information technology and software Industry. Selected industries for study are located as follows, In Hadapsar, Magarpatta city is the main location where most of the IT Industry are situated which are 42%, Kharadi 21%, Hinjewadi 17%, Talawade 8% and other 12% includes Shivaji Nagar, Karve Road, Senapati Bapat road, etc.

Table I. Location of industries

Sr. No	Location of Industry	No. of Industry out of 24	Percentage of Industry
1.	Hadapsar	10	41.7
2.	Hinjewadi	4	16.7
3.	Kharadi	5	20.8
4.	Talawade	2	8.3
5.	Others	3	12.5

Profile of Industry

In this study, IT industries are segregated on their work domain or profile i.e. the core area on which they work mostly. The study sample indicates Technology, Services, and solution industries are more around 42% which is followed by Information technology industries with 29%, media, communication and networking with 17% of the total population and Operation Management services with the least count mentioning 12%. Most of the industries are also working as service industries which is supportive to the other manufacturing, automobile, Pharma, electrical and mechanical industries also which is not mentioned below chart.

Tenure of CEO with Industry

The future and present of every industry depends on the top management's decision, implementation, and projection towards the upcoming time for the industry. Chairman, Managing Director, CEO, CFO, CS are working as decision makers for the industry. Expansion, merging, splitting and critical situation handled by these positions. Covid-19 also the critical situation and unknown to all of us. Covid-19

impacts on Industry and role of CEO for Industries are vital, but 5 Industries CEO has the tenure period less than 2 years. But revenue, and profit percentage of the mentioned 5 industries for year 2020 which exact Covid-19 period dose not shows the remarkable negative performance of Industry.

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Sr. No	Location of Industry	No. of Industry out of 24	Percentage of Industry
6.	Less than 15	1	4.2
7.	15 - 20	2	8.3
8.	21 - 30	7	29.2
9.	31 -45	10	41.7
10.	More than 45 years	4	16.7

Table II. Tenure of CEO with Industry

Age of Industry

Covid-19 is an unexpected critical situation that is handled by industry. Selected Industries have good experience in the IT sector. Though Covid-19 situation unexpected to all from selected industries, only 4% of the Industry have less than 15 years age and remaining 96% have more than 15 years age. In short, all selected industries are capable to handle the situation.

Sr. No.	Tenure of CEO in Years	No. of Industry out of 24	Percentage of Industry
1.	Less than 2 years	5	20.8
2.	2 - 5 year	10	41.7
3.	6 - 10 year	4	16.7
4.	11 - 15 year	2	8.3
5.	More Than 15 Years	3	12.5

Table III. Age of Industries

Revenue of the Industry

Covid-19 impacted every sector of the economy. But IT sector have less impact than any other sector because for maintaining the social distancing, IT software application plays a fantastic role for the same. The Graph reflected the decreasing trends of revenue. In the year 2018 one industry have negative revenue performance followed by four industries in 2019. Eight industries shows negative revenue in 2020, means four industries are increased in the negative revenue performance. Though industries already struggling due to the economical conditions and Covid19 also hit them hard with the rising of number of industries 16.6 % to 33.3% from year 2019 to 2020. In year 2018, twenty three industries in positive revenue performance, in the year 2019 twenty industries have positive revenue performance. But in year 2020 sixteen industries have positive revenue, which means four industries are decreased from the positive to negative revenue performance, means positive revenue performance shifted to 83.3% to 66.6%, which shows the impact of Covid-19.

Sr. No..	Revenue Generated	No. of industry out of 24		
		Year 2018	Year 2019	Year 2020
1.	More Than -5.0%	0	3	3
2.	-4.0 to 0.0	1	1	5
3.	0.1 to 5.0	7	5	4
4.	5.1 to 10.0	8	7	3
5.	More Than 10.0	8	8	9

Table IV. Revenue of Industries

Profit of the Industry

Profit makes industry more comfortable to grow and live. Organizational behavior changes timely as per requirements of clients, orders, internal changes, economical changes, norms and regulatory guidelines of governmental authorities. All the changes of the industries to gain the profit. Epidemic affects the performance of the mostly every industry which leads into affection of the profit. When negative profit band considered four, nine and seven industries reflect with respect to the period i.e. year 2018,2019 and 2020. Increase in always keep industry in comfort zone. When profit band considered against percentage with respect to year, eight industries in band of profit more than 10% for year 2020. When 2019 considered thenthirteen industries found in band of more than 10.0% profit. Which

remark the covid-19 impacted profit of the industries. Digital calculations show approximately 25% of industries affected. 54.1% industries come in band of profit having more than 10% in 2019 and 33.3% industries in band of profit having more than 10% in 2020.

Sr. No.	Profit Earned	No. of industries out of 24		
		Year 2018	Year 2019	Year 2020
1.	More Than-5.0%	3	8	6
2.	-4.0 to 0.0	1	1	1
3.	0.1 to 5.0	7	1	3
4.	5.1 to 10.0	1	1	6
5.	More Than 10.0	12	13	8

Table V. Profit of Industries

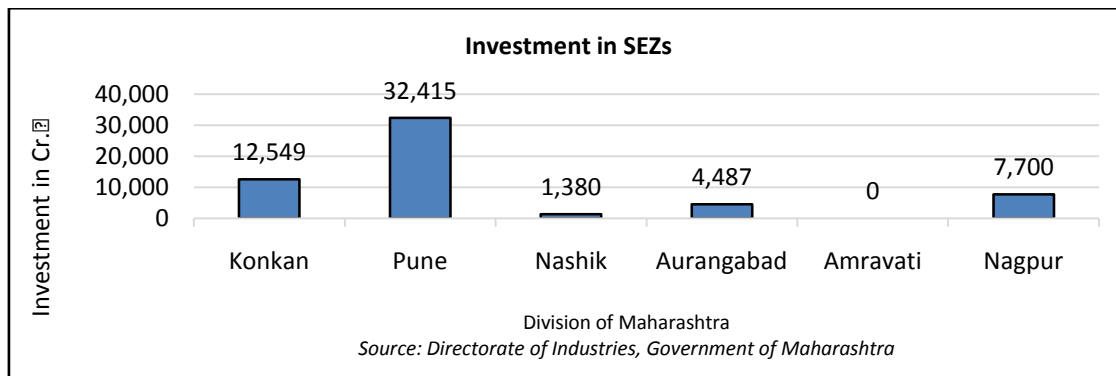


Figure 2, Investment in SEZs

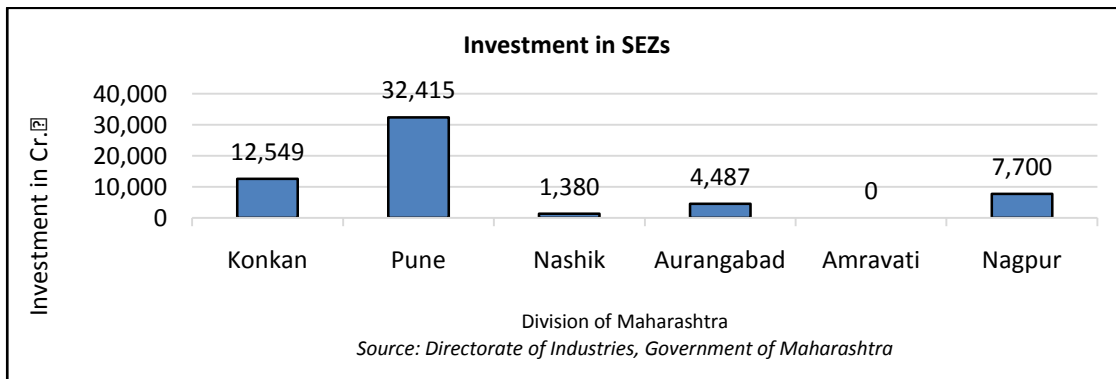


Figure 3, Investment of Industries

Results & findings

Industries are located in five different locations of Pune zone in the Industrial area, Knowledge park and special economic zone. Many giant players of software industries having the subsidiaries in the Pune. Industries profile are related to the service, technology, business management module and software products. Five industries CEO position handed over within two year. Covid-19 impacted the revenue of the industries, reflected through decreasing trend of revenue with respect to the year. Trending figure of the industries indicates that the negative revenue industry percentage 16.6% rises to 33.3% from 2019 to 2020. Industries come down from profit band more than 10%, near around 20% reduction shows in number of industries. In 2019 near around 54.4% industries is in band of more than 10% profit but in 2020 it down to 33.3%. profit margin increases in 2020 as compare to 2019 but less than 10% never shows good comfort zone to the industries.

Discussions & Suggestions

1. Industry should analyze functional requirement, operational scope, current structure and nature of techniques, tools, technologies and systems required for their own large scale industries.
2. Involvement of workforce increase the usage of production control practices, which leads to the successful implementation and valuable inputs for future perspective.
3. Design of production control system should support routine procedural part and as per requirement of the end user so problem rectification and resolution occurs fast.
4. Stepwise implementation with planning and preparation of production control system to overcome challenges.

5. Industries should execute the correlation, assessment, evaluation of production control practices for their own benefits.
6. Industries should ensure impact of Production control practices regularly and continuously against the business performance parameters for overall efficiency, productivity and competency.

Paper speaks about the industrial locations in Pune area, working profile mentioned with category and working functions of the industries. Three years revenue and profit of industries considered for the calculations and analysis. Industries mostly declared the revenue and profits /operating margin /operating income in the Millions or Billions of USD, Millions or Billions of Euros, Millions or Billions or Corer of Rupees. Analysis about revenue and profit are done with consideration of base value of USD is considered as 75 Rs and value of Euro considered as 90 Rs. Trend of three-year revenue and profit estimated to calculate impact of covid-19. One preventive measures for covid-19 is social distancing, which makes impact the saving of transport cost, power utilization cost, hospitality cost.

Conclusion

Estimation of data reflects that Information technology from large scale classification also impacted. Covid-19 spread throughout all places of the so no support from another location of industries. Decreasing number of the industries with respect to the revenue in the year 2019 to year 2020 concludes revenue of 25% industries reduced. Profit margin having more 10% number industries reduced around 20%.

Limitations & future study

Selected industries are from Pune, as Pune is IT hub but Bengaluru, Noida, Mumbai have good numbers of IT industries. Selected industries are subsidiaries of the parent industry or supportive of the parent industry so no separate revenue or profit margin is declared. Separate and individual study with respect to the industry required. Selected industries have stocks in markets; the private industry also needs to be selected for the study. Revenue and profit/operating margin/operating income only two variables are considered for the verification of economic performance which needs to be increased i.e. per capita income, sales, orders, infrastructure also give concrete support to the study. Only four profile industry selected for study, different profile industry also needs to be included. Quarterly review of

revenue and profit for the year 2020 needs to be verified which gives exact impact about steps in Covid-19, i.e. spread of infection, lockdown period, decreasing trends of infection, launching of various vaccines.

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