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A Study on Capacity Planning in Pharmaceutical Manufacturing: with Reference to Select Pharma Companies in India

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ABSTRACT: Capacity planning is the method and planning of how efficiently the company can utilize its resources to meet the market demand. A well-executed capacity planning helps the organization to avoid the stock out conditions and serve the customers without any failure. The pharmaceutical capacity planning is an important aspect as this sector directly deals with mankind. The field of study is significant in order to meet the future demands, improve resource allocation, quality of the product and service level. This research work includes the secondary data collection through industrial reports, financial reports, case studies and various research papers. The main factors included for the research are the R&D investments, plant & equipment costs and inventory cost as these factors directly influence the capacity planning in manufacturing. The key findings of this study concludes that the pharma industries are continuously focusing on improving the efficiency in manufacturing by adopting the technology, reducing cost and expanding market size.

KEYWORDS: Pharmaceutical Management, Capacity planning, Pharma Manufacturing, Technology adoption

I. INTRODUCTION

Capacity planning within this industry is paramount for ensuring seamless production, meeting the demand of the market and provide an uninterrupted service to the customers. The study is much needed as with increasing the population and demand need for the pharmaceutical products has also increased extensively. This sector of business cannot afford to go out of stock in when patients need it urgently. This study helps in understanding the problem of manufacturing by analyzing various factors and also provides a conclusive result to improve the efficiency of pharmaceutical manufacturing to ultimately optimize the capacity planning.

II. BACKGROUND

Given its significant impact on an organization's operational activities, capacity planning is one of the most critical components of any industry. Capacity planning in the Indian pharmaceutical manufacturing sector entails controlling production capacity to satisfy the rising demand for pharmaceutical products both domestically and globally. A number of factors, including the rising incidence of chronic illnesses, rising healthcare costs, and government attempts to support the pharmaceutical industry, are driving expansion in this sector. The pharmaceutical sector improves human welfare and offers substantial socioeconomic advantages to society through fostering community growth, supply chains, and job creation. The pharmaceutical sector in India is among the biggest and most advanced in the world; it ranks fourth in terms of volume and thirteenth in terms of value (Akhtar g.,2013). For any pharmaceutical product, API is the most basic and essential component. Earlier in India, has always depended on other countries for raw materials and import of medicines which leads to increased dependency on foreign countries making Indian manufacturing weak (Singh S. et al., 2021). The core activities such as R&D that require high investments and high turnaround time have begun to move offshore to countries such as India. India's capability not just as a cost competitive production center but also as cutting-edge knowledge-hub endowed with rich scientific research talent pool that can create, mass produce, market and supply, is fast being recognized by key Pharma players globally (Kumar T.V., 2017).

Another factor contributing in the capacity planning is the inventory section of the organization. Capacity planning involves forecasting raw material requirements based on production schedules and inventory turnover rates. Strategic sourcing practices, such as bulk purchasing, supplier partnerships, and inventory management techniques, help minimize raw material costs and mitigate supply chain risks, enhancing overall production efficiency and cost-



effectiveness. The manufacturing in pharma industry is also highly influenced by the firm's facility that includes plant and equipment. A regular upgradation of these helps in improving the process by adopting the technology and also maintenance helps in betterment of the product quality and avoids any failure in function thus help in mitigation of delays for the customers (Perez-Gosende et al., 2021).

III. METHODOLOGY

1. RESEARCH DESIGN: The study on capacity planning in pharma manufacturing involves the research design of quantitative component like data analysis through financial reports and qualitative reports like case studies.

2. DATA COLLECTION: This research work involves the secondary data collection of the select pharma companies which are Sun Pharma Industries Limited, Abbott laboratories and Glenmark Pharmaceuticals Limited. Also, the tools analysis is used to analyse the data.

- **SECONDARY DATA**

1. **Financial Report analysis:** Studied the revenue generated, cost of consumption in inventories, supply chain, and other capacity planning factors.
 2. **Industry official sites:** Data collection through the official sites of the pharma companies.
 3. **Case studies:** Read various case studies done by the officials, managers and various other content relevant to the topic.
- 3. Research papers:** The online available research papers to know more about the pharmaceutical capacity planning.

- **TOOLS ANALYSIS**

1. **Document Analysis:** Reviewing organizational documents, such as Regulatory policies, Good Manufacturing Process, Contract manufacturing to gather information on the formalized aspects of pharmaceutical manufacturing.
2. **Financial Data Analysis:** Analysing financial data related to inventories, manufacturing, plants and equipments to know overall capacity requirements.

4. SAMPLE DESIGN

- **SAMPLE SIZE**

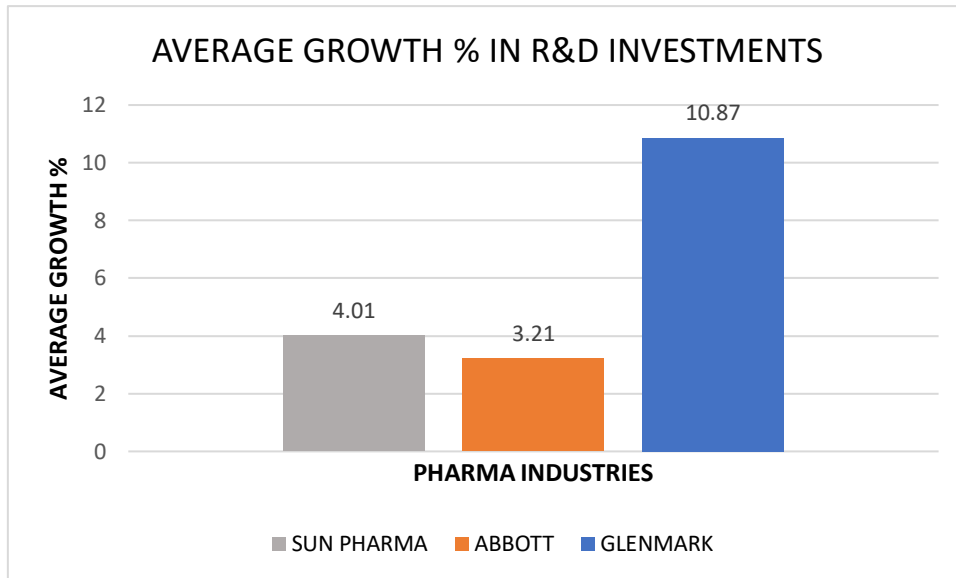
The collection of data is of 5 years that is from financial year 2018-2019 to 2022-2023. The data from financial reports, industry official site, case studies and research paper are analysed and then interpreted using different analysis tools.

- **SAMPLING METHOD**

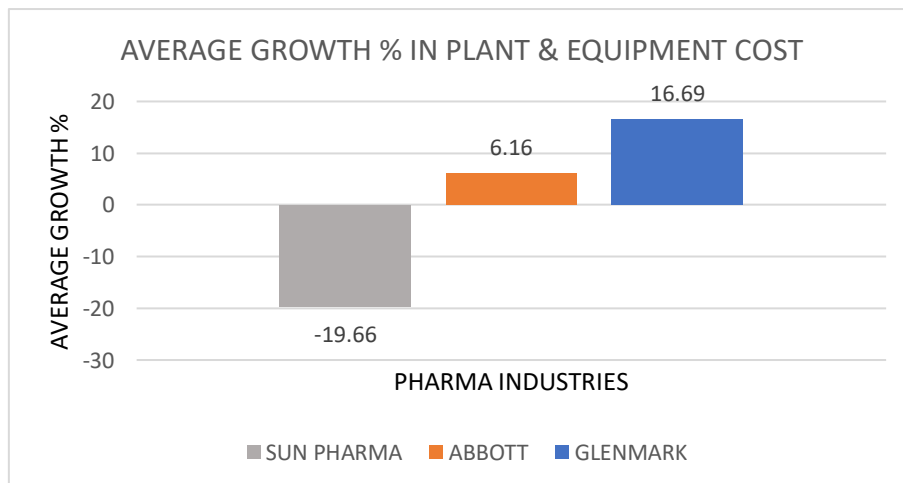
1. **Selection Criteria:** The selection of the pharma companies which are Sun Pharma Industries Limited, Abbott Laboratories and Glenmark Pharmaceuticals. This was based on the company's reputation and market presence which helps in study of capacity planning in pharma manufacturing.
2. **Sample size:** The duration of five years was selected to get sufficient required data.
3. **Data collection:** The study includes the secondary data through reports and case studies.

IV. DATA ANALYSIS AND INTERPRETATION

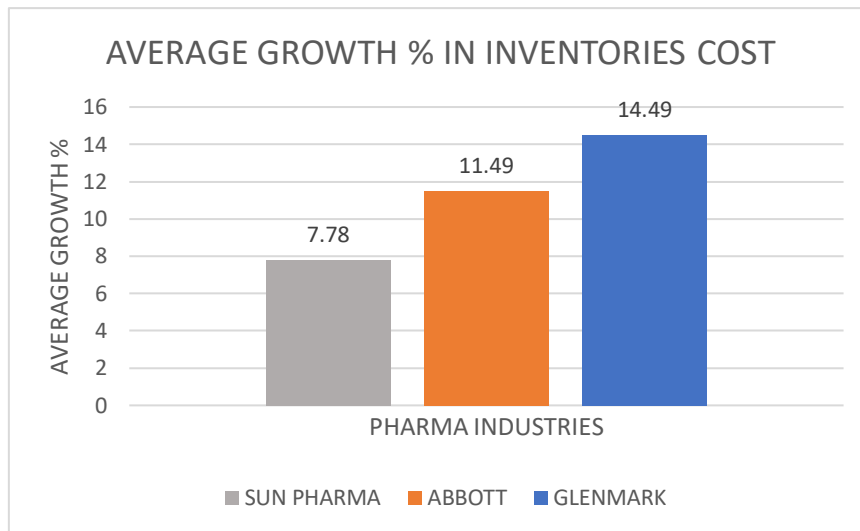
COMPANY	AVERAGE GROWTH %
SUN PHARMA	4.01
ABBOTT	3.21
GLENMARK	10.87



COMPANY	AVERAGE GROWTH %
SUN PHARMA	-19.66
ABBOTT	6.16
GLENMARK	16.69



COMPANY	AVERAGE GROWTH %
SUN PHARMA	7.78
ABBOTT	11.49
GLENMARK	14.49



V. CONCLUSION

1. The highest growth % in R&D Investments is of Glenmark pharmaceuticals that is 10.87%, followed by Sun Pharma Industries Limited and then Abbott laboratories.

- This reflects that Glenmark Pharmaceuticals is investing heavily in R&D to develop new drugs, therapies, and innovative solutions to address unmet medical needs. This reflects the industry's commitment to driving scientific progress and bringing novel treatments to patients.
- Among the three, Abbott Laboratories is investing least in R&D it maybe due to less financial return on their investments.
- Sun Pharma depicts a decline of -19.66% in plant & equipment cost which means a reduction in the expenses associated with maintaining and upgrading the physical infrastructure and equipment used in the manufacturing process. It also indicates that the company may have the following factors:
- SPIL may have implemented more efficient processes and technologies that reduce the need for frequent equipment replacements or upgrades, leading to lower costs.
- It might adopt cost reduction strategies such as outsourcing maintenance services, reducing energy consumption, or implementing more efficient cleaning and sanitizing practices to minimize equipment downtime and maintenance expenses.
- Advances in technology could lead to more reliable and efficient equipment, reducing the need for frequent replacements or upgrades and resulting in lower costs.
- Changes in regulatory requirements or guidelines might lead to a reduction in the need for specific equipment or infrastructure, resulting in lower costs.

2. Glenmark Pharma on the other hand has huge growth rate of 16.69% in plant and equipment investment.

- This indicates a positive outlook for the pharmaceutical industry, signalling growth, expansion, and a proactive approach to meet the rising demand for pharmaceutical products.
- Also, the growth in plant & equipment cost indicates a regular upgradation of machineries that leads to maintenance of product quality and ensures safety.
- The data also suggests that Glenmark is investing to upgrade their facilities with advanced technologies.

3. Glenmark Pharma (14.49%) and Abbott laboratories (11.49%) growth rate in Inventories cost is higher as compared to Sun Pharma (7.78%).

- This shows that these two pharmaceutical companies protect the firm against supply chain disruptions.
- High growth in inventory cost means increased inventory level which ultimately help mitigate the risks associated with the industry's complex and sensitive production environment.
- Also, it indicates that Glenmark Pharmaceuticals focusses on avoiding the stock-out situation and provide high service level to customers.



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