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EVALUATING THE ROLE OF PRODUCT LIFE CYCLE MANAGEMENT IN ACHIEVING COMPETITIVE ADVANTAGE IN THE MARKET

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Abstract

Product Life Cycle Management (PLCM) plays a critical role in shaping competitive market positioning by enabling organizations to strategically manage products from conception to decline. In highly dynamic and competitive markets, firms must continuously innovate, optimize resources, and respond effectively to changing customer demands. PLCM provides a structured framework that integrates product design, development, production, marketing, and disposal processes, ensuring efficient coordination across all stages of the product life cycle. Through effective life cycle management, organizations can reduce time-to-market, enhance product quality, control costs, and improve decision-making throughout the product development process.

Moreover, PLCM supports businesses in identifying opportunities for product differentiation, market expansion, and strategic repositioning during different life cycle stages such as introduction, growth, maturity, and decline. By leveraging data analytics, customer feedback, and market insights, companies can adapt their strategies to maintain competitiveness and sustain long-term profitability. The integration of digital technologies such as enterprise resource planning (ERP), data analytics, and cloud-based product management platforms further enhances the effectiveness of PLCM in modern markets. Ultimately, effective Product Life Cycle Management not only strengthens innovation capabilities but also enables firms to maintain a strong competitive position by aligning product strategies with evolving market conditions and consumer expectations.

I. INTRODUCTION

Product lifecycle management:

Product Lifecycle Management (PLM) refers to the strategic process of managing a product from its initial idea generation stage through design, manufacturing, distribution, service, and final disposal. It integrates people, processes, business systems, and product information across departments to ensure efficient coordination throughout the product's lifespan.

PLM differs from Product Life Cycle (PLC). While PLC focuses on the market performance of a product—introduction, growth, maturity, and decline—PLM emphasizes managing product-related data, engineering processes, documentation, and collaboration across business functions.

In modern industries, PLM acts as an information backbone that connects:

- Customer Relationship Management (CRM)
- Supply Chain Management (SCM)
- Enterprise Resource Planning (ERP)
- Engineering and Design Systems

Effective PLM enables organizations to reduce time-to-market, improve product quality, enhance coordination, and maintain competitive advantage.

Scope of the study

- The study is limited to the cement division of Kesoram Industries Limited.

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- It focuses specifically on understanding the Product Life Cycle stages of cement products.
- The geographical scope is restricted to Hyderabad and Ranga Reddy District.
- The study is based on responses from 100 respondents.
- It examines marketing performance and lifecycle positioning of cement products.
- The study does not cover other divisions such as tyres or rayon in detail.

NEED OF THE STUDY

In today's competitive market, consumer preferences change rapidly. Understanding product lifecycle stages helps organizations design appropriate marketing, production, and pricing strategies.

The need for this study arises because:

- Infrastructure growth directly impacts cement demand.
- Product positioning changes across lifecycle stages.
- Customer satisfaction influences brand sustainability.
- Market competition requires strategic lifecycle planning.
- Companies must align production with demand cycles.

The research provides insight into customer perception, lifecycle positioning, and strategic improvements required for long-term growth.

OBJECTIVES OF THE STUDY

- To analyze the Product Life Cycle stages of Kesoram cement products.
- To identify the time taken by products to reach growth and maturity stages.
- To study market performance during different lifecycle phases.
- To evaluate marketing strategies adopted at each stage.
- To assess overall product performance in the market.

II. RESEARCH METHODOLOGY

Data for my study was obtained by browsing through net and from different books relating to Financial services, fund and also from the brochures of Company.

Primary Sources include data ascertained from employees And interaction with different people at work place.

Secondary Sources

- Company annual reports
- Official website information
- Industry reports
- Textbooks and journals
- Government publications

Limitations of Study:

- Study restricted to a limited geographical area.
- Sample size limited to 100 respondents.
- Responses may vary based on personal perception.
- Market conditions change over time.
- Financial data availability is limited to published sources.

III. REVIEW OF LITERATURE

Introduction to Product Lifecycle Management

Product Lifecycle Management (PLM) refers to the strategic and systematic management of a product throughout its entire life—from initial concept generation to design, manufacturing, service, and eventual disposal. PLM integrates people, processes, business systems, and digital tools to ensure seamless product development and operational efficiency.

Unlike Product Life Cycle (PLC), which focuses on market performance stages (introduction, growth, maturity, and decline), PLM emphasizes the management of product information, engineering processes, and cross-functional collaboration throughout the product's lifespan.

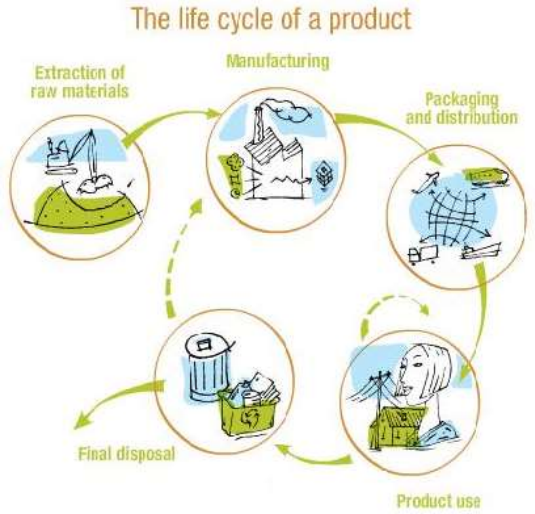
PLM is not merely a software system; it is a business strategy that connects engineering, manufacturing, marketing, and supply chain operations.

New Product Development (NPD)

New Product Development (NPD) refers to the complete process of bringing a new product or service into the market. It includes:

- Idea generation
- Concept development
- Engineering design
- Market research
- Commercialization

NPD operates within the broader PLM framework and plays a vital role in maintaining competitive advantage and market share.



Introduction to development process

The core of PLM (product lifecycle management) is in the creations and central management of all product data and the technology used to access this information and knowledge. PLM as a discipline emerged from tools such as CAD, CAM and PDM, but can be viewed as the integration of these tools with methods, people and the processes through all stages of a product's life. It is not just about software technology but is also a business strategy.

The reality is however more complex, people and departments cannot perform their tasks in isolation and one activity cannot simply finish and the next activity start. Design is an iterative process, often designs need to be modified due to manufacturing constraints or conflicting requirements. Where exactly a customer order fits into the time line depends on the industry type, whether the products are for example Build to Order, Engineer to Order, or Assemble to Order.

User skills

The broad array of solutions that make up the tools used within a PLM solution-set (e.g., CAD, CAM, CAx...) were initially used by dedicated practitioners who invested time and effort to gain the required skills. Designers and engineers worked wonders with CAD systems, manufacturing engineers became highly skilled CAM users while analysts, administrators and managers fully mastered their support technologies. However, achieving the full advantages of PLM requires the participation of many people of various skills from throughout an extended enterprise, each requiring the ability to access and operate on the inputs and output of other participants.

Despite the increased ease of use of PLM tools, cross-training all personnel on the entire PLM tool-set has not proven to be practical. Now, however, advances are being made to address ease of use for all participants within the PLM arena. One such advance is the availability of "role" specific user interfaces. Through Tailorable UIs, the commands that are presented to users are appropriate to their function and expertise.

Product development processes and methodologies

A number of established methodologies have been adopted by PLM and been further advanced. Together with PLM digital engineering techniques, they have been advanced to meet company goals such as reduced time to market and lower production costs. Reducing lead times is a major factor as getting a product to market quicker than the competition will help with higher revenue and profit margins and increase market share.

Concurrent engineering workflow

Concurrent engineering (British English: simultaneous engineering) is a workflow that instead of working sequentially through stages, carries out a number of tasks in parallel. For example: starting tool design before the detailed designs of the product are finished, or the engineer starting on detail design solid models before the concept design surfaces models are complete. Although this does not necessarily reduce the amount of manpower required for a project, it does drastically reduce lead times and thus time to market. Feature based CAD systems have for many years allowed the simultaneous work on 3D solid model and the 2D drawing by means of 2 separate files, with the drawing looking at the data in the model; when the model changes the drawing will associatively update. Some CAD packages also allow associative copying of geometry between files. This allows, for example, the copying of a part design into the files used by the tooling designer. The manufacturing engineer can then start work on tools before the final design freeze; when a design changes size or shape the tool geometry will then update. Concurrent engineering also has the added benefit of providing better and more immediate communication between departments, reducing the chance of costly, late design changes. It adopts a problem prevention method as compared to the problem solving and re-designing method of traditional sequential engineering.

Bottom-up design

Bottom-up design (CAD Centric) is where the definition of 3D models of a product starts with the construction of individual components. These are then virtually brought together in sub-assemblies of more than one level until the full product is digitally defined. This is sometimes known as the review structure showing what the product will look like. The BOM contains all of the physical (solid) components; it may (but not also) contain other items required for the final product BOM such as paint, glue, oil and other materials commonly described as 'bulk items'. Bulk items typically have mass and quantities but are not usually modelled with geometry.

Bottom-up design tends to focus on the capabilities of available real-world physical technology, implementing those solutions which this technology is most suited to. When these bottom-up solutions have real-world value, bottom-up design can be much more efficient than top-down design. The risk of bottom-up design is that it very efficiently provides solutions to low-value problems. The focus of Bottom-Up design is "what can we most efficiently do with this technology?" rather than the focus of Top-Down which is "What is the most valuable to thing to do?"

Top-down design

Top-Down design is focused on high-level functional requirements, with relatively less focus on existing implementation technology. A top level spec is decomposed into lower and lower level structures and specifications, until the physical implementation layer is reached. The risk of a top-down design is that it will not take advantage of the most efficient applications of current physical technology, especially with respect to hardware implementation. Top-Down design sometimes results in excessive layers of lower-level abstraction and inefficient performance when the Top-Down model has followed an abstraction path which does not efficiently fit available physical-level technology. The positive value of Top-Down design is that it preserves a focus on the optimum solution requirements.

Product and process lifecycle management (PPLM)

Product and process lifecycle management (PPLM) is an alternate genre of PLM in which the process by which the product is made is just as important as the product itself. Typically, this is the life sciences and advanced specialty chemicals markets. The process behind

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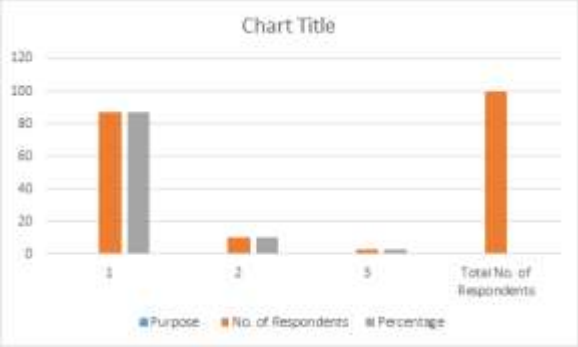
the manufacture of a given compound is a key element of the regulatory filing for a new drug application. As such, PPLM seeks to manage information around the development of the process in a similar fashion that baseline PLM talks about managing information around development of the product.

IV. DATA ANALYSIS & INTERPRETATION

1. Organization will provide the information of the new developing products?

A) Yes
B) No
C) If required

S.No	Purpose	No. of Respondents	Percentage
1	Personal use	87	87
2	industrial use	10	10
3	Other use	3	3
Total No. of Respondents		100	100%

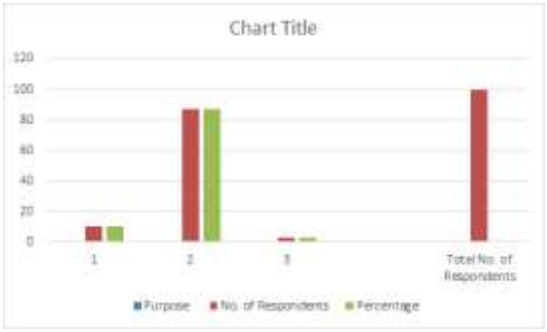


Interpretation: From the data collected it is observed that 87% of the Data on new products will be displayed, 10% of the data use for hide and 3 % of the data use for if required.

2. How much time it requires to develop a new product process?

A) Weeks
B) Months
C) Years

	Purpose	No. of Respondents	Percentage
1	Weeks	10	10
2	Months	87	87
3	years	3	3
Total No. of Respondents		100	100%



Interpretation: From the data collected it is observed that 87% of the employees says that it will take the months of time , 10% of the of the employees says that it will take the weeks of time , 3% of the of the employees says that it will take the years of time .

3. Role of R&D in the new development process?

A) Total work
B) Only developing
C) Only design

	Purpose	No. of Respondents	Percentage
1	Total work	95	95
2	Only developing	5	5
3	Only design	0	0
Total No. of Respondents		100	100%



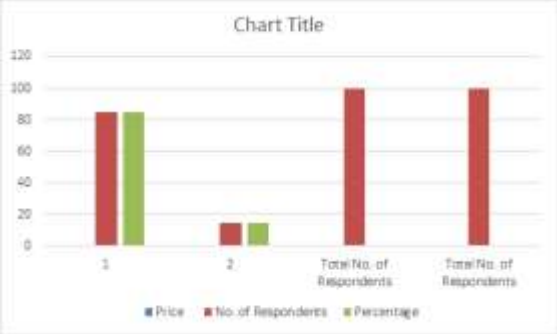
Interpretation:

It is observed that 95% of the people feel that the R&D is affordable, and 5% of people feel that the R&D of service is not affordable.

4. How much time it will take that the product from growth to mechturity?

A) Weeks
B) Months
C) Years

	Purpose	No. of Respondents	Percentage
1	Weeks	10	10
2	Months	87	87
3	years	3	3
Total No. of Respondents		100	100%

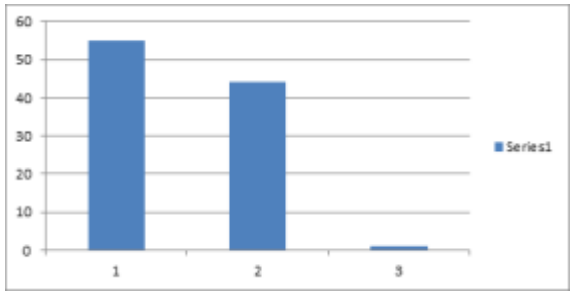


Interpretation: From the data collected it is observed that 87% of the employees says that it will take the months of time , 10% of the of the employees says that it will take the weeks of time , 3% of the of the employees says that it will take the years of time .

5. If the product was in declaim stage what the organization will do?

A) Modify the project
B) Develop a new project
C) Stop the project

	Purpose	No. of Respondents	Percentage
1	Modify the project	55	55
2	Develop a new project	44	44
3	Stop the project	1	1
Total No. of Respondents		100	100%



Interpretation:

From the data collected it is observed that 55% of the employees says that Modify, 44% of the of the employees says that it will start new , 1% of the of the employees says that stop the project .

FOR CUSTOMERS:

1.Whether the price of the service is?

a. Affordable
b. Not Affordable

S.No	Price	No. of Respondents	Percentage
1	Affordable	85	85
2	Not Affordable	15	15
Total No. of Respondents		100	100%



Interpretation:

It is observed that 85% of the people feel that the price of service is affordable, and 15% of people feel that the price of service is not affordable.

2.What is the purpose you are using Products of Kesoram cement Limited?

c. Personal use
d. Industrial use
e. Other use

S.No	Purpose of buying	No. of Respondents	Percentage
1	Personal use	87	87
2	industrial use	10	10
3	Other use	3	3
Total No. of Respondents		100	100%



Interpretation: From the data collected it is observed that 87% of the customers usefor personal, 10% of the customers use their constructions use for rental and 3 % of the buyers use for other use

V. FINDINGS, SUGGESTIONS,CONCLUSION

FINDINGS

1. A majority of employees expressed satisfaction with the existing new product development process in the organization.
2. Employees have a positive perception of the overall organizational performance and production efficiency.
3. There are adequate opportunities for personal and professional growth within the organization, though some employees expect further enhancement.
4. Production operations are considered systematic and well-managed by most respondents.
5. Teamwork within departments is viewed positively, contributing to smooth workflow and coordination.
6. The communication system within the organization is reasonably effective and supports operational efficiency.
7. Research and Development (R&D) activities play a significant role in improving employee skills and technical knowledge.
8. Employees are generally satisfied with the performance evaluation and appraisal system followed by their superiors.
9. The organizational environment is perceived as professional, with minimal internal politics affecting work performance.

SUGGESTIONS

- The organization should strengthen its focus on innovative new product development programs to remain competitive in the market.
- More structured training and career development initiatives should be introduced to improve employee growth opportunities.
- Management should further enhance teamwork practices through collaborative workshops and cross-functional projects.
- Internal communication channels can be improved by implementing digital communication platforms and regular review meetings.
- The performance appraisal system should be made more transparent and development-oriented to better motivate employees.
- The company should adopt advanced demand forecasting and market analysis techniques to improve production planning.
- Management must ensure a professional work culture by maintaining fairness, transparency, and zero tolerance for workplace politics.
- Continuous quality improvement practices should be implemented to

strengthen product lifecycle sustainability.

CONCLUSION

The study on Product Life Cycle Management at Kesoram Cement Limited indicates that the organization maintains a structured production system and effective operational practices. Most products are currently positioned in the maturity stage of the product life cycle, indicating stable market presence and consistent demand. However, a few products show signs of entering the decline phase, requiring strategic intervention.

The company demonstrates satisfactory employee engagement, efficient production management, and supportive R&D initiatives. To sustain long-term competitiveness, the organization must focus on innovation, quality enhancement, and proactive lifecycle management strategies.

By strengthening product development processes, improving quality standards, and maintaining strong employee relations, Kesoram Cement Limited can successfully extend product lifecycle stages and avoid early decline in the competitive market.

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