

A Combined Lean & PCMM-based Process Improvement Framework for Better Human Capital / Resource Management in Mining Industry

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ABSTRACT- In today's competitive business environment, even small improvements in productivity and efficiency can have a huge impact on company's profitability. Companies can improve operations and quality by controlling / improving lead time and reducing waste. Lean is an operational management technique used to systematically improve the efficiency and quality of processes / services. The concept is being used in mining organizations across the globe and resulted into improved productivity, safety & morale of the employees. PCMM is maturity model used for HR / people related process improvement. PCMM consists of best of the HR & People management practices used in IT & Technology industry. This paper explores the possibility of implementation of a new lean & PCMM-based framework in mining industries that will help in optimal utilization of human capital. This framework will have positive business impact and result into benefits. Companies that excel at implementing such best practices throughout the organization will find themselves at a great advantage in a world where humans and machines working together outperform either humans or machines working on their own.

KEYWORDS- Lean, Mining, Human Capital, PCMM

I. INTRODUCTION

India is in the list of top 10 global producers of several minerals. The country produces more than 87 minerals including fuel minerals, metallic minerals, non-metallic minerals, atomic minerals and minor minerals. [1]. Mining sector has a major role in nation's development and economy.

Indian mining industry is characterized by limited adoption of standard frameworks and relatively lower maturity from the perspective of systematic planning, sustainability and business processes. The industry which is facing challenges such as fluctuating demand, cyclical pricing, and reduction in the profitability; operating an effective, efficient and sustainable business is very crucial.

The sector should explore growth opportunities through innovation and explore through advanced technology & process improvement frameworks for better productivity & safety. Lean is one of the most widely used process improvement framework used across the globe and in various industry. Indian mining industry is capital as well as human intensive and require lots of attention towards

reduction of wastage of both. Lean is one of the most widely used framework in varied industries, which has helped immensely in improving the utilization of machines & manpower. People Capability Maturity Model (PCMM) is process improvement framework used by IT & Technology companies for better management of their biggest asset i.e. human resources.

Combination of Lean & PCMM may help the industry in optimal utilization of human resources / capital. This paper explores the possibility of implementation of best practices of Lean & PCMM in mining industry.

The available data reveal the limited utilisation of Lean & other frameworks and that there is a lack of coherent and conceptual models to guide the implementation of new systems in this industry. It demands innovative systems and frameworks. So, there is a need for promotion of lean and other frameworks which would help to achieve better results in mines design & sustainable operations. Adaptability to new & enhanced lean systems can be the key for mining organizations to become competitive at the global level.

II. HUMAN RESOURCES / CAPITAL AND USAGE OF LEAN

In today's competitive environment human resource management is becoming increasingly important. This is reflected in the adoption of human resource (HR) practices supporting the creation and development of highly qualified people who are both motivated and committed to their organizations. Thus, the way the company frames its policies towards its workforces will affect their performance at work. It therefore means that management in organisations must adopt a philosophy in which employees are seen not as a cost to be reduced but as an asset to be valued [5].

Lean philosophy's objective is to eliminate wastes from work processes. Before diving into the 8 wastes, it is important to understand what waste is. Waste is non-value-added task or activity or process in a system. The seven wastes are Transportation, Inventory, Motion, Waiting, Overproduction, Overprocessing and Defects. The 8th waste of non-utilized talent / human capital or 'Skills' of workers was later introduced in the 1990s. [4]

Human Capital is the foundation of the Manufacturing and Services organization. Companies should not underestimate or overlook their human resources and

assets. Organizations will always face new challenges on the Human Capital horizon, but by rigorously and regularly practicing the tools provided by Lean can be of great help. [3]

Lean is all about eliminating wasteful or redundant activities, improving workflow and drawing more value from what companies do. Because of its success in manufacturing, lean has spread over the years to many other sectors — including Mining, Oil & Gas, Construction etc. Another area where lean can be used by these companies are HR and performance management. Generally, in this context, lean concepts can be applied to any department, function, and sub-functions including Human Capital management. [2]

Usage and implementation of lean in the mining industry started few years ago. Over the years, it has provided some benefits to the mining industry through cost reduction, productivity & quality improvement, and better safety. Mining and metal industries have been using lean framework based on business context, needs, internal and external environment. It’s helping companies in achieving some benefits but more can be done by working towards further improvements to meet ever changing needs of the organizations and businesses.

III. HUMAN RESOURCES / CAPITAL AND PEOPLE CAPABILITY MATURITY MODEL (PCMM)

The People Capability Maturity Model is a tool that helps companies successfully address the critical people issues

in the organization. The People CMM is being built based on Capability Maturity Model for Software (SW-CMM). It has best practices for managing and developing an organization's workforce. Software CMM has helped many organizations to improve productivity and quality. Based on the best current practices in fields such as human resources, knowledge management, and organizational development, the People CMM guides organizations in improving their processes for managing and developing their workforce. The People CMM has helped many organizations in process improvement and supported in establishing a culture of excellence. [6]

In this model, the first level focuses on the foundation of the organization: ability to develop and repeat successful business practices. The second and third levels focus on creating a conducive environment of best practices and help in setting up common HR systems & processes. The fourth level ensures optimization of processes / systems. And finally, the fifth level begins the process of continually improving the business processes and ultimately creates an environment that empowers individuals to drive organizational changes that provide the most benefit to the organization. These maturity levels combine to form the framework for a well-managed organization in the new economy. [7]

In addition to the vertical maturity levels (ML 2 to 5), the People Capability Maturity Model focuses on four process areas across each of the maturity levels. The following figure shows these process areas:

Levels	People CMM Threads			
	Developing competency	Building workgroups & culture	Motivating & managing performance	Shaping the workforce
5 Optimizing	Continuous Capability Improvement		Organizational Performance Alignment	Continuous Workforce Innovation
4 Predictable	Mentoring Competency Based Assets	Competency Integration Empowered Workgroups	Quantitative Performance Management	Organizational Capability Management
3 Defined	Competency Development Competency Analysis	Workgroup Development Participatory Culture	Competency Based Practices Career Development	Workforce Planning
2 Managed	Training and Development	Communication & Coordination	Compensation Performance Management Work Environment	Staffing

Figure 1: PCMM Framework [7]

Some of practices of PCMM can be used by mining companies for optimal utilization of resources and can be further combined with lean practices for best results from human talents.

IV. COMBINED LEAN & PCMM-BASED IMPROVEMENT FRAMEWORK

In lean, human resource’s underutilization is also considered as a waste. Human resource / talent should be

treated as an asset with minimum wastage. The underutilisation of human resource in terms of working hour and most important in terms of capacity and capability. It is based on the belief that the human factor plays a significant role when it comes to improvement potential as evidenced in the mining & allied industry. It is advised that almost attention should be paid to minimize this type of waste.

The best practices / processes of Lean can be combined with some of the PCMM practices to reduce wastage of

human capital. It can dramatically improve performance across all functions, technical as well as support functions. In fact, combined framework can unlock significant opportunities for mining companies to make more rigorous decisions and improve the return on invested capital. Following diagram showing mapping of Lean’s Define, Control & Optimize phases to PCMM MLs:

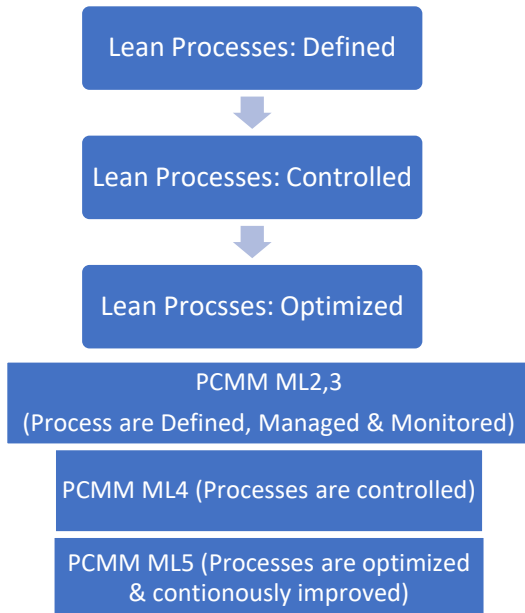


Figure 2: Mapping Lean Stages to PCMM Maturity Levels (ML)

The People CMM is a process-based model; it assumes that workforce practices are standard organizational processes that can be improved continuously through the same methods that have been used to improve other business processes.

Some of the following process areas / practices of PCMM can be used by Lean Practitioners for better utilization of Human Capital –

Table 1: PCMM Process Areas

Maturity Level	Process Areas / Practices (can be integrated with Lean and used as per the need of the Organization)
Maturity Level 2	Staffing, Communication and Coordination, Work Environment, Performance Management, Training and Development, and Compensation.
Maturity Level 3	Competency Analysis, Workforce Planning, Competency Development, Career Development, Competency-Based Practices, Workgroup Development, and Participatory Culture
Maturity Level 4	Competency Integration, Empowered Workgroups, Competency- Based Assets, Quantitative Performance Management, Organizational Capability Management, and Mentoring
Maturity Level 5	Continuous Capability Improvement, Organizational Performance Alignment, and Continuous Workforce Innovation

The number of processes / practices areas are very high and quite comprehensive. Mining companies should select only the required processes / practices as per the

organizational needs, which can help in reducing the wastage of human capital inline with lean philosophy. To implement the combined Lean & PCMM practices, company should:

- Form the team and identify the champions & SMEs
- Identify quantum of wastage of human capital / resources
- Set the target as per the direction of management
- Select the required practices / processes to be tracked
- Prepare a Lean implementation plan at the department / company level including –
- Lean tools to be used
- PCMM processes / practices to be used
- Reporting system
- Implement the defined / selected tools / processes / practices
- Monitor & Track and evaluate the performance of the systems implementation
- Decide about the future action plan (short-term as well long term)

This framework can have positive business impact and result into benefits. Companies that excel at implementing such best practices throughout the organization will find themselves at a great advantage in a world where humans and machines working together outperform either humans or machines working on their own. The complexity of most mining operations—along with their sheer scale, safety-critical focus, geographic isolation, and environmental impact and other challenges can be tackled by the new proposed framework.

It will allow companies to make more accurate decisions, improve health and safety, boost efficiency, and ensure sustainable operations.

V. CONCLUSION

Currently there are no structured framework which combines the best practices of lean & PCMM implementation in mining and can provide a clear direction about the lean & PCMM based process / systems applications in various key operations specifically in Human Resource Department. If implemented with proper planning & with key selected processes, It will help in reduction of wastage of human capital / resources and improve the productivity, morale of the employees and motivate them to perform better.

In future the framework can be enhanced to add more improvement frameworks like six sigma, value engineering etc.

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