

A Sociological study of Technological advancement and Modernization in heavy industries (with special reference to Bhilai Steel Plant)

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Abstract

The current age of post-industrial complex society has made innovation and modernization imperative to survive the stiff global competition in huge open market in order to meet massive demand for high-quality goods and services. Steel industry forms the backbone of any country and steel production is considered one of the indices of growth. Bhilai Steel Plant(BSP) in Chhattisgarh(C.G) is the largest producer of steel in India. It is also the largest integrated plant of Steel Authority of India Limited (SAIL). Of late, a lot of modernization initiatives have been rolled out in the plant by the SAIL management with an aim to achieve high productivity, quality and cost effectiveness. Several aspects of work from professional qualifications of workers to the actual conditions in which the work is done, the systems of wages, the relations between workers and management etc. are bound to be affected due to such technological changes. The focus of this paper is to study various social consequences of adopting modernization in Industry at large scale with special reference to BSP (C.G)

Introduction

“Technology is a useful servant but a dangerous master.”

- **Christian Lous Lange**

In sociological terms, Modernization means the transformation from ancient traditional rural agrarian society to new-age scientific industrialized urban society. Technological advancement and modernization goes hand in hand with the modernization of society. Necessity is the mother of invention. With the rise of demand for mass production of high quality goods, the innovation and new ways to produce goods was a pressing need. This led to inventions of many modern hi-tech technologies like artificial intelligence, automation, internet to name a few. These modern techniques not only changed the way we used to live our life but also the way we used to see the world and different aspects of life. Modernization has deeply influenced every institution, be it social, political or economic. It has affected our banking, markets, demand-supply equation, environment, education pattern, health and safety, laws, man-power requirements, skill-set requirement and possibly every sector. Technology is a product of civilization. Karl Marx has accorded that the formation of social relations, mental conceptions and attitudes are dependent upon technology. Veblen has considered technology as the only explanation of social change. W.F Ogburn insists that any change in technology brings changes in society by changing the environments to which we try to adapt.

Industries are the institutions where we see the amalgamation of the economy and the society into one. Today, the educated consumer class wants to avail things with great sophistication and comfort in use. Automation is one such technology by which a process or procedure is performed with minimum human assistance. In last two decades, ever since globalization took off, automation has been spreading its wings and still evolving. Adopting modern means of production has become very essential to overcome the limitation of human labour like physical limitation, time limitation, night shifts, accuracy and finesse. The biggest advantage of these modern techniques in industries is large quantity production with acute precision in very little time.

Modernization in Industries is sometimes looked upon as the second industrial revolution. Also automation and robotic machines have made it a landmark step in the evolution of mankind. Today every industry has to keep up with the pace of rapidly changing technologies in order to survive the stiff competition. Therefore, adopting modernization programmes in production lines was the most likely choice for industries like information technology, telecom, textile, health, heavy machinery and steel.

Modernization in iron & steel industry started long back since World War-II to meet the huge demand for war materials. Since then, steel continues to be the most important engineering and construction material in the modern era. As the tag line of Maharatana Public Sector Undertaking Steel Authority of India Limited (SAIL) aptly says "*There is a little bit of SAIL in everyone's life*". Apparently, steel industry directly influence the economy and hence the national progress and living standards of people. Bhilai Steel Plant situated in the state of Chattisgrah is the flagship unit of SAIL which is also the sole producer of railway tracks for the entire nation.

Steel PSUs in India started facing strong competition from private steel producers post LPG (liberalization, privatization and globalization) in 1991-92 that called for a modernization and expansion plans of steel plants not only in terms of capacity building but also technological upgradation, introduction of energy efficient and environment friendly technology. Setting up of proper infrastructure such as new coke oven, modern blast furnaces, mills etc., availability of land, critical inputs and skilled workforce also played a major role in the success of modernization and expansion of steel PSUs.

Review of Literature

Following noteworthy work has been done on the topic:

1. Atul Kumar Kaushik, Amit Goyal, Punit Kumar Rohilla & Vikas Acharya, IJTAMV, 2017 concluded in their study titled "*Automation Impact on Indian Steel Industry*" that the modernization has affected the manpower requirement.¹
2. Rajat Kumar Panigrahy, Ashok Kumar Panda and Srikanta Patnaik, 2011, found in their study titled "*Rourkela steel plant automation: A case study*" that Automation introduced in blast furnace, Steel Melting shops and Re heating furnaces has increased output by about 8-10%. Automation in the rolling mill has

contributed to about 15% increase in the output. The working condition of the employees has improved drastically. The operating personal strength is reduced by 25% and the overall production cost is reduced by 20% ²

3. Evgeny Yasin, VIII International Academic Conference conducted a study titled “*Modernization of Economy and Public Development*”, Moscow (2007) observed that country needs modernization and essence of modernization is transition to innovative economy. They also added that only cultural and significant institutional changes can help into transition ³
4. Andreeva, E., Myslyakova, Yu., Glukhikh, P., & Ratner, in their study titled “*Economic and social impact of modernization on cultural values*” published in Journal of International Studies of the modernization (2017) insisted that modernization was developing as a universal process and it cannot happen without the transformation of institutions and culture ⁴

Objectives of study

- I. To examine the impact of modernization on the productivity and overall cost
- II. To investigate the impact of modernization and automation on workers
- III. To study the effect on the relationship of worker with management due to modernization

Study Area

The study is restricted to Bhilai Steel Plant situated at Bhilai, Dist. Durg in Chhattisgarh state.

Research Methodology

The area of research is limited to permanent employees (both executives and non-executives) in the Plant/ works areas of BSP, excluding Mines and non-core functions like administration, medical and establishments.

For the current study, sample size of 50 respondents, comprising of executives and non-executives in the Plant area, has been selected by Random Sampling basis. The primary data has been collected by conducting interviews with the employees of the plant. Secondary data has been collected through Websites, journals, various reports published by Indian Government.

Findings

- i) Impact of modernization on the productivity and overall cost in BSP
 - Prime Minister Shri Narendra Modi dedicated newly modernized BSP to the nation after completion of Rs 70,000 crore worth modernization and

expansion programme (MODEX) to raise its total steel-making capacity across five integrated plants to 21 million tonne per annum (mtpa)⁵

- Post modernization, BSP now have an enhanced hot metal production capacity of 7.5 mtpa, an increase of 62% from 4.7 mtpa earlier, making it the largest among all SAIL steel plants.
 - New Blast Furnace no. 8 – Mahamaya - has a capacity to produce 2.8 mtpa.
 - New Steel Melting Shop no. 3 increased the crude steel capacity to 7 mtpa from earlier 3.9 mtpa and the new Bar and Rod Mill doubled the capacity to 2 mtpa
 - BSP's new Universal Rail Mill enhanced total rail production capacity of SAIL to 2 mtpa
 - In Feb 2018, SAIL announced installation of Automation and Control System for Wire Rod Mill at BSP
 - The Rail, Structure Mill and Plate Mill surpassed its ABP target by big margins in 2017
 - Merchant mill of BSP recorded a 15% increase in productivity post PLC based automation
- ii) Impact of Modernization and technological advancement on workers:
- Almost all the employees feel that modernization and automation has relieved the workers from hazardous tasks and improved the safety levels of workplace to a large extent esp places like coke oven, blast furnace, mills etc.
 - Majority of workers think that most of the production work has now done by machines, so the nature of task for them has now been shifted towards supervision and maintenance
 - Many workers agreed that the work load has reduced for e.g. the burden of night shifts has reduced as compared to earlier times. This gives a positive impact on mental, physical and emotional health of the workers
 - Almost all the workers feel that enhancement of technical skills is required to operate sophisticated and modern machines
 - Some workers (operators) who don't know much about the internal operations of modern and complex machine feels alienated from their work

- Very few operators feel as the slaves of automated machines or just a button-pusher
 - Majority of executives feel that workers are more averse to do tough tasks in challenging environment compared to earlier times as the modern equipments and tools protects them from lot of hazardous and unsafe situations
 - All the employees agreed that modernization and automation results in reduction in workforce. A modern automated machine can do the task of hundreds of workers with better precision and much faster. Hence, on one hand modernized machinery gives employment opportunities for skilled jobs but at the same time creates technological unemployment for those workers whose jobs are done by mammoth machines. Workforce in last 10 years has been reduced by about 40%, from 30,748 to 19, 273⁶
- iii) Impact of modernization on Industrial Relations in BSP
- BSP Management organizes several safety and skill up-gradation training programs to update the technical knowledge of workers for handling modern automated machines. During the year 2016-17, total 40.6% of regular employees were trained on various such programs.⁷
 - Due to centralization of controls large maintenance teams has formed which needs to work in coordination with each other. It has increased the social interaction between the workers of different workstation
 - Due to modernization and automation, the link between individual output and wage is replaced by collective output of a workstation and wage as the real production is done by huge machines units
 - The repairing and programming the complex modern control devices and supervising the whole production cycle are done by the supervisor who is a highly skilled human and not a machine. Hence, technological modernization has increased the value of high skilled worker in terms of wages, responsibility and availability
 - As a part of Modernization & Expansion Programme (MODEX), BSP has hired several contractual workers for performing temporary and intermittent tasks

Conclusion

Technology is, of course, a double edged sword. Fire can cook our food but also burn us.

Every breakthrough technology has two sides like two faces of a coin, be it Industrial Revolution, Digitalization or Technological Modernization. The onus lies completely on

humans how to use it. With rapid technological inventions, innovations in highly dynamic global market, the vital industries with huge production demands like Bhilai Steel Plant need to adopt Modernization, Expansion and Automation. On one hand it has greatly improved the quality and quantity of product with cost effectiveness and also enhanced safety and comfort of workers. And on the other, modernization has resulted displacement of workers with obsolete technical knowledge. However, modernization cannot eliminate humans from work as machine cannot think. It only helps us to do complex tasks in more smarter, faster and easier way.

Union steel minister Mr. Birender Singh stated “The modernized steel plant of Bhilai will not only augment the steel production of SAIL but will also mark the completion of SAIL’s modernization.”⁸ According to the Annual reports of SAIL, BSP will continue with balanced modernization and automation in a big way and BSP’s success reports speaks volumes about the enhanced production of BSP. In an International conference in Bhilai conducted at Indian Institute of Metals, the current CEO of BSP Mr. A.K Rath said that modernization and automation is the need of hour to meet the world class standards and excel in global competition.

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