Study of Steel Production in Dubai Steel Factory in Sudan as Model for Steel Industry

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Abstract— "*The iron and steel industry is an important basic industry of our national economy and plays a vital role in the process of industrialization and urbanization. Steel industries have many challenges in production processes that hinder improvement of productivity and hence to decrease in efficiency, to notice these challenges facing production of steel industry Dubai steel factory in Sudan was taken as a sample of steel factories .The objective of this study was to define the steel production problems this was done through construction of comprehensive questionnaires, this questionnaire was design to display the problems according to the results.. The questionnaire was divided to two parts one for labors and Foremen, and the other for Engineers and Administrators. The questions were oriented to any part according to their knowledge and also to get correct answers. The results after analysis by SPSS (statistical package for the social sciences) showed that there were deficiency in machinery, unsatisfactory salary, not up to date technology, materials shortage and less skilled employees. In conclusion managerial sector was found to be the most barriers facing Dubai steel factory in Sudan development.*

Keywords — Steel industry, Questionnaires, Data analysis**.**

1. INTRODUCTION

The steel industry in general has distinct and unique characteristics that differentiate it from other industries. The production of steel has relative as follow: long life cycle of product, the companies are highly capital intensive, there is a global overcapacity of steel (1).

Definition of productivity is the ratio of the obtained desirability in a production process (outputs) to the amount of resources (inputs) which is consumed (2). Improvement productivity in steel factories leads to prosperity when to improve productivity so as to achieve the goals of steel makers, to do that this is fulfilled by three steps according to (1). These are: increasing the output or maintaining the existing level of output and a reduction of inputs by avoiding wastage and a better utilization of the resources, increasing the output without any change in the inputs by adopting improved working methods, realizing a substantial improvement in the output with marginal increases in the inputs (1).

Measurement of factory productivity is done by using this equation (3).

$$\text{Total productivity} = \frac{\text{Monetary value of Production}}{\text{Monetary value of Total input required}}$$

Increase production is the goal that means more production (output) with constant raw materials required (input) gives more efficiency therefore improve productivity (1).

The impact of the expansion of domestic steel production is creating more jobs therefore impact on the country economy. Increased domestic production would have significant multiplier effects on GDP (Gross domestic product).by replacing imports with domestic production; expansion of Steel production would also reduce the trade deficit. These consequences would far outweigh any losses from reduced exports of steel scrap (4). In Sudan, Steel industries are considered as one of the important industry as compound with other industries because of the variety product, usually is a high cost to establish and effect on national income. In Sudan there are (110) steel factories, foundry and workshops (5). The total of production from steel industries is 406.300tonsof Steel in 2015 the planning production was 1.195.000 tons of Steel the percentage of actual production not more 34% (6). The Steel industry exposures to many problems (raw materials, electricity breaking off, customs charges, operation process, maintenance, and internal decision making) to know these challenges questionnaires were made at Dubai steel factory in Sudan. The objective of this study was the study the status of steel industry through construction of questionnaire and statistical analysis of collected data.

2. METHODOLOGY

Dubai steel factory in Sudan is one of the many factories in Sudan, it's product about 11.000 tons of steel in 2018(7). To increase productivity Dubai steel factory in Sudan was taken as case study to display the problems. To achieve these goals, questionnaires were distributed to collect the data from the persons who deal with these problems daily and their suggestions to improve the productivity, these questionnaires covered 100% of all the people wok in Dubai steel factory in Sudan to achieve more information and specifics. These questionnaires covered 14 Engineers and Administrators and 84 Labors and Foremen. Questionnaires analysis was made by SPSS (statistical package for social sciences).

3. RESULTS:

The questionnaires distributed into two groups, the first one for Engineers and Administrators and it has 28 questions. The second group for Labors and Foremen and it has 14 questions. All the questions were selected according to hypotheses of the research.

4. DATA ANALYSIS

4.1 CRANACH'S ALPHA METHOD: -

Where reliability was calculated using Cranach's alpha equation shown below: (8)

Table: (1): Illustrates Cranach's alpha method for reliability and validity

Valid	Sample	Reliability	Validity
Labors & Foremen	84	0.88	0.93
Engineers & Administrators	14	0.82	0.91

4.2 LABORS AND FOREMEN

Cranach alpha coefficient = (0.88), a reliability coefficient is high and it indicates the stability of the scale and the validity of the study Validity coefficient is the square of the islands so reliability coefficient is (0.93), and this shows that there is a high sincerity of the scale and that the benefit of the study.

4.3 ENGINEERS AND ADMINISTRATORS

Cranach alpha coefficient = (0.82), a reliability coefficient is high and it indicates the stability of the scale and the validity of the study Validity coefficient is the square of the islands so reliability coefficient is (0.91), and this shows that there is a high sincerity of the scale and that the benefit of the study Table (4) illustrates the views of the distribution of the Labors& Foremen by Managerial by (%87.0) and Technical by (%13.0) and the Engineers &Administrators by Managerial by (%67.0) and Technical by (%33.0).

Table (2): Illustrates the frequency and percentage for the managerial and technical problems

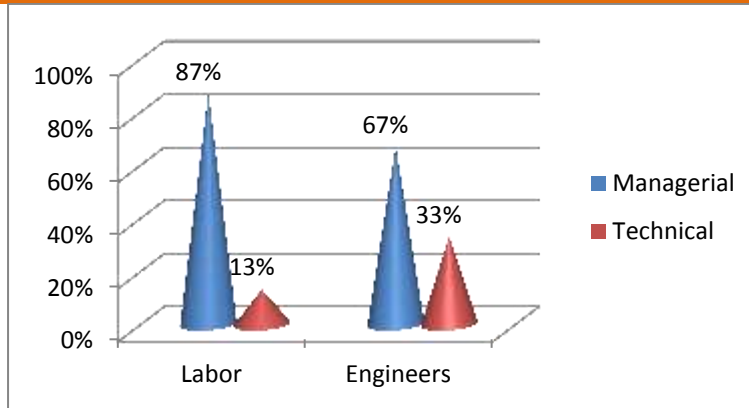| Valid	Labors & Foremen		Engineers &Administrators	
	Frequencies	*Percentage*	*Frequencies*	*Percentage*
Managerial	26	87%	16	67%
Technical	4	13%	8	33%
Total	30	100%	24	100%

Fig (1): Illustrates the percentage of the managerial and technical problems

Table (5) illustrates the views of the distribution of the sample of Machine problem (%13.0), Salary problem (%29.0), Not Following technology (%13.0), and Materials problem (%17.0), and Improve managers and employees skills (%29.0).

Table (3): Illustrates the frequency and percentage for the problems

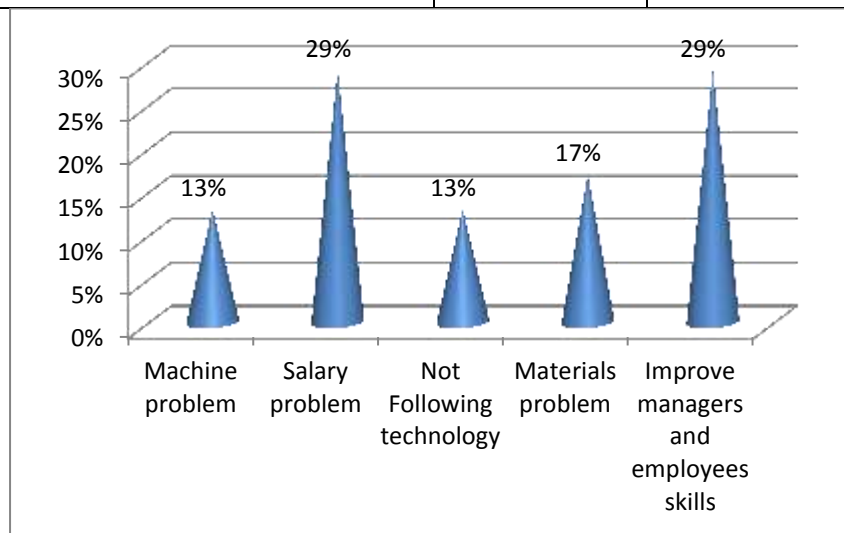| Valid	Frequencies	Percentage
Machine problem	3	13%
Salary problem	7	29%
Not Following technology	3	13%
Materials problem	4	17%
Improve managers and employees skills	7	29%
Total	24	100%

Fig (2): Illustrates the five problems in the factory

The five problems found are: Machine problem Salary problem not follow up technology, Material problem, and improve managers and employees skills.
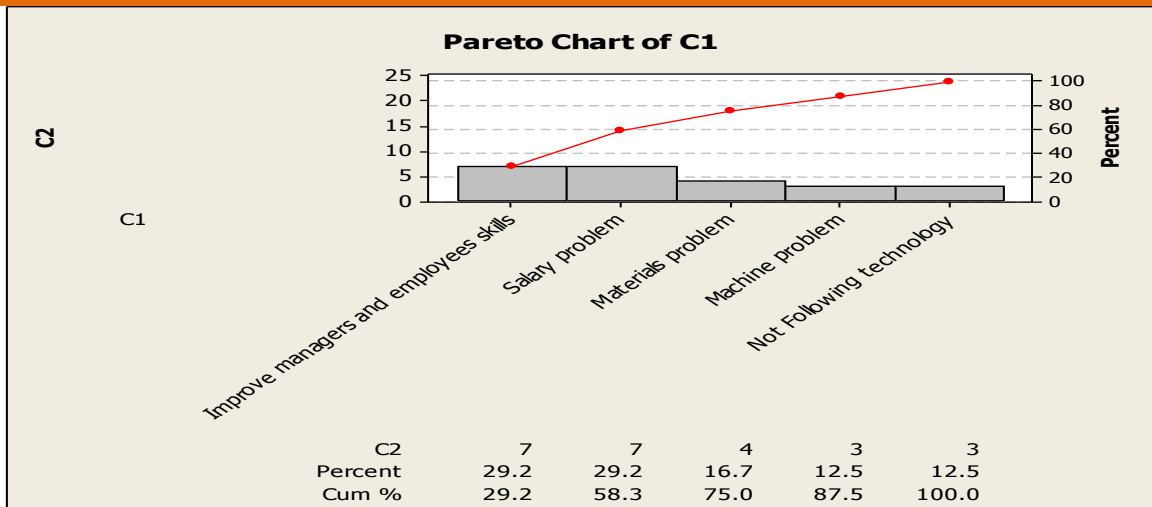
Fig (3): Illustrates the five problems in the factory by using Pareto chart

After analysis the data from questionnaires, problems were divided in two categories management problems and technical problems found (67%) of problems in management sector in questionnaire for engineers and administrative and (33%) in technical sector and (87%) of problems in sector in questionnaire for labors and foremen and (13%) in technical sector.

5. DISCUSSION

The questionnaires illustrate the area of problems according to analysis this area was improper management the result matches with the results reported in {Sudanese Business & Employers federation Initiative toward economical fix up. July 2019} the production was about 34% from the full capacity, solving of the reported problems will contribute in increase efficiency and improvement productivity.

According to Chaudhary ,Pervej (2016) change in efficiency of input leads to decline in total productivity, this matches with the results in this present study, these point found in analysis no(1,4) machine problems and materials problems.

According to Soltany ,Sayadi, Hayati (2013)there are problems in purchasing and providing principal raw materials, the target is minimize the total cost but some constrains in resources, and production, to avoid that must be applied model contains all these constrains, this matches with the results in this study as far as not follow up technology.

This cooperation between factories steel and government could be enhanced the first step to achieve that to drive together to prosperity in national economic.

6. CONCLUSION

After analysis the questionnaires ,managerial problems was the most of the barriers faces Dubai steel factory in Sudan(67%) in Engineers and Administrators, and (87%) in Labors and Foremen, to improve productivity in Dubai steel factory in Sudan depends on the solving many problems existed in work place (machine problem, Salary problem, not following up technology, materials problems, improve managers and employees skills) the way of dealing with these problems impact on productivity, steel factories must be adopt industrial management policy to go far and conserve his position in local competition must be change his policy and start to apply industrial tools mentioned above to achieve more quality, less cost, less time and absolutely more profits.

7. RECOMMENDATION

After analysis the data the most problems were in management side so the way of Dubai steel factory in Sudan management the work must be revisited to solve the problems face Dubai steel factory in Sudan and put the management in the priority of his aim, Recommend to apply decision making policy to avoid incorrect decisions and also the management and industrial process on the same wave so any decision will take effects on other.
Motivation policy one of the most way to apply because it has two benefits one encourage the labors to make more effort, and the other benefit is increasing the productivity.
More attention in management means solving more than 70% from Dubai steel factory in Sudan according to questionnaires analysis and immediately focused on 5 problems existed in the factory and off sure more productivity.
Highly recommend to apply these solutions to increase productivity in Dubai steel factory in Sudan the solutions are: using control chart, apply six sigma orientation, earned value, Microsoft office, tpm (total productive maintenance), and matrix structure to arrange the work and giving variety solutions by scientific ways.

Finally strong recommended establishing foundation for steelmakers to control the scraps price, identify the steel price in domestic market and more cooperation between the steelmakers.

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