A Study on the Performance of Global Steel Industry

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ABSTRACT

Today steel becomes a major component of human life and also for the economy. If steel industry is growing in any economy, simultaneously it will develop the economy also. Hence this study is very important for the countries which are in the phase of developing or underdeveloped. To assess an industry performance there are no standard factors and techniques. In this study data were collected and analyzed according to the continent. Production, consumption, export, and import are considered as major factor to assess the performance of the world steel industry.

Keywords : Human life, Industry, Techniques, Performance, Country

Introduction

Steel is an essential part of human life. In this competitive world growth of the country is assessed according to per capita steel consumption of the country. Steel and new technologies are the two important elements for the growth of any country in the world. As per the human development index of Wikipedia, there are 189 countries in the world. But as per world steel association, 94 countries play a big role in the production of steel. Therefore the scope of world steel industries is these 94 countries.

Steel industry means the total companies which produce steel and together it is called as the steel industry. Performance means the act of presenting or the process of presenting work. In this study, performance means the work done by the steel industry or output of the steel industry. Performance of the steel industry is very important because the Indian steel industry stands second in the world steel industry ranking. As we know per capita steel consumption is the indicator of economic development of the country. To compare the Indian steel industry with world steel industry we need to understand the world steel industry performance first hence this study was taken.

Literature review

As per "The Analysis Journals of August 1956", EPS of the steel industry was growing and that was the major indicator of the performance of the US steel industry. In this study, they concluded that the Steel industry is in the Maturity stage (1).

In this article, the author has identified the performance of the glass industry by demand. Author fined the performance of glass industry by linking the building industry. During 1960 Building industry was increased and most of the building was constructed by using glass as one of the components (2).

According to Authors Literature review stock price changes, corporate earnings, Industry returns are considered for the industry analysis. For this study, they took relative price performance and risk of 30 different industries (3).

According to Marie Bohata to assess the performance of the selected industry they took some of the economic indicators like production, sales, export, employment, wage, and labor productivity (4).(Bohata, 1995)

In this study production or output is considered as the major performance indicator for the Cement industry.

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To assess the growth of the industry they took 26 firms to output for the 20 years (5).

In this study to assess the performance of the Indian steel industry, different parameters are taken. They are sales, PBDIT, PAT. Raw materials cost and consumption pattern, wages cost and energy cost, Debt equity ratio, borrowing to sales ratio, long term borrowing to total borrowings ratio. At the end of the conclusion, they pointed out the problems of the steel industry. Few major problems are increased in price, unpaid debts, excess manpower, high energy cost, and low domestic demand, etc. This study concentrated majorly on financial factors (6).

From the above literature, it can be noted that to assess an industry performance there are no standard factors. And most of the study was done on the basis of financial factor and by selecting the few companies. No study is taken on the world steel industry. So this study was taken, and to assess the performance of the world steel industry production, consumption, export, and import are considered a major factor.

Objectives of the study

- To analyze steel consumption, production, export, and import according to continent-wise.
- To assess the performance of the World steel industry in terms of production and consumption.

Statement of the Problem

Steel is one of the major components of human life. Running a day without steel is highly impossible in today lifestyle. Most of the things which we use are made by using steel or fiber. So this indicates that steel is one of the important components in the economy. The growth of the country is assessed by the usage of steel. This world is built with 7.7 billion populations (7) and most of the people are using steel. The Steel industry is the major components for other industry. The steel industry growth will impact on the growth of other major industries in the world. According to world steel association worldwide 6

million people directly working for the steel industry. The average per capita steel consumption is 214.5 KG (8). The World steel industry is having around 900 billion dollars of turnover for a year (9). 40.5 million Peoples are working in the global steel industry supply chain. All these factors say that it's a very import industry and still there is scope for the study.

The present study will focus on the world steel industry. The scopes of the present study towards the performance assessment are production, consumption, export, and import. To assess the performance of World steel industry secondary data was collected from world steel association for ten years. To test the hypothesis t-test is used and to identify the relationship correlation is used. Data was divided according to the continent to understand the flow of raw material into consumption.

Hypothesis

Ho: There is a positive correlation between production and consumption of the world steel industry during the study period.

Data analysis

70% of world steel production is based on Iron ore and the remaining 30% is based on the recycling of scrap. 70 % of world crude steel production is done by using Basic Oxygen Furnace Steelmaking process, 28 % is done by using electric furnaces and the rest of the 2% production is done by using other methods (10) .

According to world steel organization during 1950 steel production was 189 million tons and now it reached to 1630 million tons. More than 50 % of the finished product is done in Asia. Crude steel will be converted into hot rolled products, railway track materials, heavy sections, concrete reinforcing bars, hot rolled bars, wire rods, hot rolled plats, hot Rolled coil, sheet, strips, electrical sheet and Strips, tin mill products, metal coated sheet and strip, non-metallic coated sheet and strip, tubular products, seamless tubes and welded tubes.

Production of Iron Ore, Crude steel and Pig Iron of the world

Continent	Iron Ore		Crude Steel		Pig Iron	
	Metric Tons	%	Metric Tons	%	Metric Tons	%
Africa	85,291	4	15,656	1	5,978	1
Asia	541,262	28	1,039,587	69	824,427	76

Europe	211,231	11	281,374	19	174,244	16
North America	101,447	5	115,500	8	40,126	4
Oceania	550,538	29	6,703	0	4,938	0
South America	412,697	22	44,691	3	33,454	3
Total	**1,902,466**	**100**	**1,503,511**	**100**	**1,083,167**	**100**

Sources: World Steel Association(world steel in figures, 2019)

Oceania continent and South America produces 51% of Iron ore of the world. But Asia produces 69% of crude steel and 76% of Pig Iron, which indicates that Oceania and South American continents are the top exporters of Iron Ore of the world. Asia is top in the production of byproducts and finished products.

China produces 48% of hot rolled products and the rest 52% of hot rolled products are produced by 75 countries. Japan and the United States are the 2nd and 3rd largest hot rolled product producers. 75 countries will produce hot rolled long products and China contribute 58% of total production, India is the second largest hot rolled long products and contribute 5% of total production. According to world steel association data, 22 countries are producing railway track materials. China is producing 46% of total railway track materials and the second largest producer in the United States which produces 10% of production.

China is the top first country in the world for steel byproduct production. China stands first for 17 major byproducts of steel. Japan, India, United States, Russia and South Korea stands next to China in the steel byproduct production.

Asia is the highest steel consuming continent in the world. The United Arab Emirates is the world's highest per capita steel consumption country. UAE average consumption in the last ten years is 1341KG. And Singapore is the second largest steel consumer. According to world steel association data Ethiopia is the lowest per capita steel consumer in the world, which consumes only 19.7 KG.

Consumption of steel according to Continent is as follows. Asia is the highest steel consuming continent in the world for crude steel equivalent, finished steel products, and finished steel equivalent, but in Per Kg finished steel equivalent Europe is the most consuming continent. Asia itself consumes almost 50% of steel production. Oceania is the lowest steel consuming continent in the world which consumes only 1 to 2 percent of total steel production.

When we compare the production and consumption of Oceania steel it is totally opposite. Oceania iron ore production is 29%, which is the highest production of iron ore in the world, but per capita steel consumption is only 2%. Even South America also consumes very less steel. South America iron ore production is 22% of the world steel iron ore production, but it consumes only 7% of Per capita steel.

In the consumption of finished steel equivalent, Europe is the top continent in the world and consumes 51 % of world steel.

Continent	CRUDE STEEL EQUIVALENT		USE PER CAPITA (KG CRUDE STEEL)		FINISHED STEEL PRODUCTS		KG FINISHED STEEL PRODUCTS		FINISHED STEEL EQUIVALENT		KG FINISHED STEEL EQUIVALENT	
	Metric Tons	%	KG	%	Metric Tons	%	KG	%	Metric Tons	%	KG	%
Africa	34874	2	1591	6	32383	2	1912	8	34750	3	683	3
Asia	1028835	69	10749	42	968153	70	9294	40	826009	65	6819	35
Europe	229898	15	10324	40	208967	15	9402	41	209492	16	9970	51
North America	147524	10	1723	7	129812	9	1393	6	148802	12	742	4
Oceania	8250	1	560	2	7300	1	297	1	12002	1	479	2
South America	46920	3	952	4	41373	3	773	3	46523	4	912	5
Grand Total	**1496301**		**25899**		**1387988**		**23071**		**1277578**		**19606**	

Sources: World Steel Association(world steel in figures, 2019)

Australia, Brazil and South Africa are the top iron ore exporter in the world, together these countries export more than 70% iron ore. Russia, Brazil and Ukraine are the top exporter in the world; together these three countries export more than 70% of pig iron. China, Japan and United states are the top crude steel exporter in the world; together these countries export more than 60% of crude steel in the world.

Continent wise steel exports are as follows

Continent	Direct Reduced Iron		Flat Products		Indirect Exports of Steel		Ingots and Semis	
	Metric Tons	%	Metric Tons	%	Metric Tons	%	Metric Tons	%
Africa	194	2.60	2314	1.11	1886	0.63	218	0.37
Asia	1244	16.68	100165	48.15	133342	44.81	12743	21.38
Europe	2154	28.88	91103	43.79	120762	40.58	37272	62.55
North America	2232	29.92	10418	5.01	36373	12.22	2805	4.71
Oceania	9	0.11	1061	0.51	918	0.31	38	0.06
South America	1627	21.81	2983	1.43	4318	1.45	6515	10.93
Grand Total	7460	100.00	208044	100.00	297598	100.00	59590	100.00

Continent	Iron Ore		Long Products		Pig Iron	
	Metric Tons	%	Metric Tons	%	Metric Tons	%
Africa	74236	6.08	922	0.84	600	4.40
Asia	107727	8.82	49352	45.09	1801	13.20
Europe	103886	8.50	51627	47.17	7606	55.73
North America	48294	3.95	5699	5.21	194	1.42
Oceania	542056	44.37	164	0.15	18	0.13
South America	345367	28.27	1685	1.54	3427	25.11
Grand Total	1221564	100.00	109449	100.00	13647	100.00

Continent	Scrap		Semi-finished and Finished Steel Products		Tubular Products	
	Metric Tons	%	Metric Tons	%	Metric Tons	%
Africa	7	2.63	3923	0.92	180	0.44
Asia	22	15.17	186278	43.77	20090	48.73
Europe	40	53.30	198783	46.71	16573	40.20
North America	14	25.73	23068	5.42	3458	8.39
Oceania	3	2.40	1369	0.32	53	0.13
South America	7	0.77	12157	2.86	876	2.12
Grand Total	93	100.00	425579	100.00	41230	100.00

Sources: World Steel Association(world steel in figures, 2019)

Steel production starts with the extraction of iron ore and China, Japan, and South Korea are the top World iron ore import countries. From 2007-08 to 2016-17 China import is increased by 165% and South Korea import is increased by 64%. These countries together import more than 75% of the iron ore. The United States,

Italy, and Turkey are the highest pig iron importer in the world. During 2007-08 to 2016-17 Turkey import is increased by 50%.

The Asian continent is the highest steel importer in the world except for direct reduced iron and indirect import. Import of Pig iron in Asia is reduced by 50% from 2007-08 to 2016-17. Only in the African continent import of pig iron is increased from 2007-08 to 2016-17. Import of Iron ore is increased in Asia by 117% from 2007-08 to 2016-17. In Africa, Asia and South America Semi-finished and Finished steel products import are increased. In Africa, it is increased by 109% and in Asia 23% and in South America 28% from 2007-08 to 2016-17.

When we compare the import and export ratio of Asia is very high. That means to import and exports are almost equal in the Asian continent. And in Oceania Export ratio is very high in the Iron ore and import ratio is very low. Asia is one of the major importers for Oceania in world steel.

Continent wise steel import

Continent	Iron Ore		Pig Iron		Scrap		Semi-finished and Finished Steel Products	
	Metric Tons	%	Metric Tons	%	Metric Tons	%	Metric Tons	%
Africa	5882	0.49	63	0.47	2509	2.57	23047.00	5.56
Asia	981254	82.42	4647	34.43	51296	52.54	173987.60	41.99
Europe	174204	14.63	4178	30.95	36610	37.50	151851.30	36.65
North America	19362	1.63	4529	33.55	6709	6.87	49978.20	12.06
Oceania	3784	0.32	32	0.23	61	0.06	3021.10	0.73
South America	6129	0.51	49	0.36	453	0.46	12466.30	3.01
Grand Total	**1190616**	**100.00**	**13498**	**100.00**	**97637**	**100.00**	**414351.50**	**100.00**

Sources: World Steel Association(world steel in figures, 2019)

Data analysis of ten years production and consumption are as follows. First year is the base and kept that as a standard.

Year	1	2	3	4	5	6	7	8	9	10
Crude steel production	100	100	92	106	114	116	122	124	120	121
Steel Consumption	100	100	93	106	114	117	125	125	121	123

Correlation Coefficient Formula

$$r = \frac{n(\Sigma xy) - (\Sigma x)(\Sigma y)}{\sqrt{[\,n\Sigma x^2 - (\Sigma x)^2][n\Sigma y^2 - (\Sigma y)^2]}}$$

r = 0.998498859

This indicates that both Production and consumption are positively correlated. When we see the above table we can confirm that steel consumption and production increased by 25% in the last 10 years. To test the hypothesis t-test is used.

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{s^2 \left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

$$s^2 = \frac{\sum_{i=1}^{n_1}(x_i - \bar{x}_1)^2 + \sum_{j=1}^{n_2}(x_j - \bar{x}_2)^2}{n_1 + n_2 - 2}$$

t test = -0.18322878

Here X1 is Production and X2 is consumption.

At 5% IOS k value will be -2.10 to 2.10 and t value is -0.18322878 hence Ho is accepted and it shows that both production and consumption are growing in the same direction.

Conclusion

These details conclude that performance of the world steel industry is good. The world steel industry is meeting the demand of the global steel requirement. In the same proportion, production and consumption took place in the world steel industry. There may be an excess of production in terms of minute but not in a large extent. In Asia steel consumption and production is more than any continent. Oceania and South America is the highest iron ore producing continent. But Asia is the highest crude steel and pig iron-producing continent. Asia is the highest steel consuming continent in the world for crude steel equivalent, finished steel products, and finished steel equivalent, but in Per Kg finished steel equivalent Europe is the most consuming continent. Asia itself consumes almost 50% of steel production. According to T-test and correlation, the performance of the world steel industry is having positively correlated. The overall conclusion is the production and consumption of world steel is almost equal to the performance of the world steel industry is good.

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