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The Impact of Structural Changes in the Indian Manufacturing Industries: 1980-2013

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Abstract: With regard to the importance of the manufacturing, industrial sector for economic growth and its priority for motivating other sectors to development, the paper is aimed to study the structural changes condition in the Indian manufacturing industries. The changing in value-added of industrial activities due to industrial and economic policies is an important indicator for the recognition of manufacturing industries structure. We have analyzed the industrial structure and competitiveness of each industrial activity by using data value-added of manufacturing industries and common indexes such as the structural changes index in the period of 1980-2013. The results of structural index analysis showed that of textile products; leather; basic chemicals and chemical products in the periods of 1980-98 and also in the periods after 2000industries wearing apparel; dressing and dyeing of fur tanning and dressing of leather ; wood and products of wood; motor vehicles, trailers and semi-trailers; recycling; other transport equipment have been the industrial activities that their structural changes indexes has been positive and they have had the highest competitiveness in comparison to other industrial activities and the greatest opportunities to create value-added.

Keywords: *Manufacturing industry sector, Value added of industry, Structural Changes index*

1. Introduction

Industrial development holds the key to fast economic development. Realizing the political leadership of the economy chose to pursue the path of planned industrial development. The change in the industrial structure is attributed largely to the government policies which have influenced the pattern of industrialization through controls over the composition of investment, the regulation of foreign trade and direct influence on the pattern of income distribution, policies of import substation and export promotion and the composition of demand (Kuar, 1997). The liberalization of Indian economy started gradually in the 1980's and major economic liberalization (structural adjustment programs) began from 1991. Reforms in industrial and trade policy (according with liberalization) were a central focus of much of India's reform effort in the early stages. The 1980s and 1990s have witnessed extensive changes in the industrial policy of the Indian government and the first step toward liberalization was taken by relaxing licensing and various other controls. Reforms in industrial and trade policy (according with liberalization) were a central focus of much of India's reform effort in the early stages. The 1980s witnessed policy liberalizations of small doses (Panagariya, 2004). These included more liberal permission for capacity expansion, rising of investment limit for exemption from licensing, raising of the asset threshold for the application of the MRTP Act, delicensing of a number of industries, broad banding, liberalization of imports, liberalization of policy towards large houses and companies for encouraging industrialization of backward areas, etc. This trend towards liberalization became more pronounced since around the mid-eighties.

The small dose of liberalization has had significant beneficial effects which became visible by way of acceleration of industrial growth, increase in supply and competition and more attention paid by manufacturers for quality, cost and after sales-service etc. Also The Government of India had announced important changes in the industrial and trade policies in its Industrial Policy Statement of July 22, 1991. Also the government of India had announced important changes in the industrial and trade policies in its Industrial Policy Statement of July 22, 1991.The majority of the new industrial policy package of 1991 also added a bold set of measures which included liberalization of foreign investment and technological participation, redefining the role of the public sector, to maintain a sustained growth in productivity and gainful employment and to attain international competitiveness. In pursuit of the above objectives, significant changes have been introduced in the areas, namely, industrial licensing, foreign investment, foreign technology agreements and public sector policy (Singh, 2008). Considering the importance of the Indian industry, we focus on the effects of structural change on the manufacturing sectors as the main purpose of this research and tries to find an answer to this question which industrial branches (activities) in the industrial structure of India have been

more impressed by as the consequence of the changes in industrial policies and liberalization in the Indian economy during1998-2013.Therefore, this study tries to survey the industrial changes, the process of the combination of industrial activity of factories and the focus of their industrialized activity. The study is organized as follows. Section 2 will present definition of structural change and review of literature. Section 3 discusses the methods of industrial structure analysis. The sources of data and construction of variables are given in Section 4. Section 5 presents analysis of the growth and structure of Indian manufacturing industries Section 6 discusses the results of structural changes index analysis. Section 7 states conclusion and suggestion.

Defining structural change: The terms "structure" and "structural change" have been widely used in economic research, although with different meanings and interpretations. In development economics and economic history, structural change is commonly understood as "the different arrangements of productive activity in the economy and different distribution of productive factors among various sectors of economy, various occupations, geographic regions, types of product, etc. …". (Memedovi and Apadre, 2010). Some economist and economic theory have given significant attention to structural change. Chenery and Syrquin pointed that although the concept of structural change has been defined in different ways, the most common meaning refers to long-term and persistent shifts in the sectoral composition of economic systems. Adam Smith stated structural features were strongly related to the level of economic development while for Ricardo changing the composition of the productive system was a requisite for economic growth. Structural change is the process by which an economy is progressively transformed over time. Change can occur across industries, within industries or at the level of the firm. The largest changes are occurring at the macroeconomic level affecting all industries and firms but often with a different impact (Downes and Stoeckel, 2006). The most common attributes used for measuring the structural changes are shares of total output and shares of total employment. Other characteristics, including capacity, occupational composition of the work force, size of plants and firms, produce mix, plant location and extent of foreign direct investment could also be used to document structural changes. Based on given definition, the aim of this study is to examine the impact of Structural change concept occurring in the manufacturing industry sector by change in quantity important economic index such as value-added that it has changed during the change in Indian manufacturing industries after 1990 year. The created value added in the industrial sector is the index which is used to study the industrial structure of countries. Therefore, value added reflects to economic capabilities of the activities of a sector and its higher proportion showing positive changes in industrial structure.

2. Methods of Industrial Structure Analysis

The industrial policies in any country cause changes in the manufacturing sector structure. Structural changes in the manufacturing sector can be considered by the change in share of industrial value added activities. Positive changes in industrial structure which resulted in strengthening industrial infrastructures of a sector and reinforcing vertical and horizontal relations will definitely increase the share of value added of that activity and that sector. These changes may be due to the increase of production due to the application of better equipment, the increase of productivity, the use of new methods of production or even the number of workshops of an industrial activity. Structural change is a process and also it is a general and common concept that consequently is difficult to capture in a single measure. Different measures are often used in the literature. But, despite the differences in formulation the results of the indexes tend to be relatively close. Several statistical methods can be used for this purpose ranging from simple descriptive indicators, such as the Lilien index to complex econometric techniques, such as non-parametric methods aimed at gauging the dynamics of overall specialization (De Benedictis and Tamberi, 2004). To continue it will be mentioned to several indexes. The index of Lilien was defined in terms of relative growth rates. The Lillian index of structural change in industry employment is calculated as follows:

$$I_{Lillien} = \sum \frac{e_i}{e_T} \times (\Delta Ln(e_i) - \Delta Ln(e_T))^2 \qquad (1)$$

Here ei is employment in industry i and eT is total employment. A standard approach for measuring structural changes which proves flexible for comparisons among different distributions over time and across countries, namely the Finger- Kreinin dissimilarity index or OECD index (UNIDO, 2010). The SCI may be defined as half the sum of the absolute value of the differences in variable over time. The calculation is given by the formula:

$$SCI_{OECD} = \frac{1}{2}\sum \left| X_{i,t} - X_{i,t-1} \right| \qquad (2)$$

Where $X_{i,t}$and $X_{i,t-1}$ represent each industry's share of total value-added at a time (t) and (t-1), respectively. The created value added in the industrial sector is the index which is used to study the industrial structure of countries. Analysts expressed their position to demonstrate structural changes in industries in such a way in which the structure of an industry includes two main components; the technical structure and market structure of the industry. The technical structure of the industry refers to a situation in which technical conditions are more concerned that can produce the maximum output using a combination of factors. Thus, the structure defines the composition and diversity of its production regarding the type of production whether it is applied, capital oriented or knowledge oriented. Generally, structural changes depend on factors such as changes in industrial investment, the removal of competing industries in the industrial market, changes in productivity of production factors, the strengthening of backward and forward linkages, changes in the level of technology on production methods, and changes in the severity of domestic and foreign demands for industrial products. Thus, the changes in any of these mentioned factors can lead to changes in the structure and the level of activity of the industry and the changes value added will be reflected consequently (Darounparvar et al., 2009).

The index of structural changes in the country's manufacturing industries mainly shows the industrial capability and the centralization of value added of an industry for the base year. Consequently, the increase in the index for the base year represents the progress and growth of the desired industrial activities in comparison to other industries. In other words, those industries which had greater growth in industrial activities and could maintain or increase their capability for industrial activities are industries which have been affected more by industrial policies or structural changes. Therefore, in order to analyze the structural change and the share of industrial activities value added will be used, index of change industrial activities value added. This method mainly has been used by experts of the United Nations Industrial Development Organization (UNIDO) and the World Trade Organization (WTO) to analyze the industrial structure. The index of structural changes of a period to the base year can be calculated through the following equation which is based on the relation of the average rate of geometrical growth in a certain period.

$$SCI_i = \left[\frac{\left(\frac{V_i}{V_T}\right)_i}{\left(\frac{V_i}{V_T}\right)_O}\right]^{\frac{1}{n}} \qquad (3)$$

In which SCIi is the average index of structural changes of the sector or the Ith activity, Vi is the amount of value added of the ith industrial activity, VT is the total value added of industry sector and n is the number of years in the desired period. The numerator is related to the share of value added of the sector or the industrial activity from the total added value of the sector or the industrial activity in the ith period and the denominator represents the same share in the base year or period. If the numeric amount of SCIi is less than 100, it means that the manufacturing industry under the desired activity cannot concentrate on the former industrial activity during the certain time and its capability to establish added value has been decreased in comparison to other industries. In contrast, the increase of the numeric amount of SCIi more than the base index (100) shows the structural changes has been led to the improvement of the desired capability of the industrial activity. In order to illustrate the structural changes in the manufacturing industries in terms of increasing the share of industrial value added of polygon graphs or spider diagrams are used (Salimifar and Sheirzour, 2006).

Olga Memedovic Research and Statistics Branch Program Coordination and Field Operations Division UNIDO (2010) in the working paper entitled "Structural Change in the World Economy: Main Features and Trends" have provided a starting point for more specific studies at sector, national and regional level. In this working paper has been presented a quantitative analysis of sectoral trends in the global economy. This analysis has referred to six continental regions and covers a period of 40 years. Constant-market-shares (CMS) analysis has been used to investigate changes in the contribution of regional aggregates to world production. It has been followed by an analysis of the evolution of the manufacturing industry and the intensity of structural change by the use of Finger-Kreinin index of structural change in the manufacturing industry for a sample of 30 countries and 18 sub-sectors. Three main findings resulted from the analysis. First, the long-term rise in the share of services in global value added has been slowing down in the last decade. Second, the upward trend in the global value added share of North America and Asia seems to be partly reverted in favor of other regions. Third, after a setback during the 2000s, structural transformation in the manufacturing sector has been accelerating in the last two decades.

3. Results

The coverage of the Annual Survey of Industries extends to all Indian manufacturing industries at the two-digit level of classification. Variables are reported for 17 two-digit industry groups (20 to 38) according to NIC-1998 and 24 two-digit industry groups (15 to 37) according to NIC-2004 pertaining to the manufacturing industry. The data for 1980-98 are matched to the NIC-98 classification according to the published tables by NIC-1987 and data for 1998-2013 according to the published tables by NIC 2004. It is worth to be mentioned that according to the modified classification system in a manufacturing industry in the 2013-14 based on NIC2008(National industrial classification). Also Suitable deflectors have been used to deflate the time series data. The wholesale price index (base 1981-82 = 100) for different sectors has been used for 1980-98 and the wholesale price index (base 2003-24 = 100) for different sectors has been used since 1998-2013.The necessary data and information were collected from secondary sources as (a) Annual Survey of Industries (census sector), Ministry of Statistics and Program Implementation, Govt. of India. (b) National accounts statistics, central statistics organization and (c) ministry of planning, government of India.

Nature of structural change in Indian manufacturing industry: In this part presents an analysis of the share and structure of Indian manufacturing industries over the past 24 years 1980-91 and 2013-14. Variables are factories, gross value added. Therefore, the study analyses the following aspects: share and structure of factories and gross value added. In order to have an idea about the changing structure of the Indian manufacturing industry, various industries have been classified as leading, lagging and moderate industries, in terms of their respective percentage shares of the manufacturing industry.

Growth and structure of factories and gross value added in1980-1998: As it is clear from table (1) that the total number of factories in the manufacturing sector increased from 92612 in 1980-81 to 106966 registering a growth rate of 1.5 percent per annum, for the eightieth. The number of factories further increased to 128643, recording a growth rate of 2.7 percent per annum in 1997-98 in the ninetieth. The number of factories recorded a growth rate of 2 percent per annum for 1980-97. The study of the structure revealed that share of the (20-21) food products reduced in the number of factories from 18.4 percent in 1980-81 to 17.7 percent in 1997-98, but the industry had the maximum share in a number of factories among the others. The (30) basic chemicals and chemical products (except products of petroleum and coal) was having the highest share up to 1980-81 and afterwards occupied the fourth position in terms of the number of factories. Its share was 3.8 percent in 1980-81, which increased to 7.3 percent in 1997-98. The (22) beverages, tobacco, etc. deteriorated its share significantly from 9.6 percent in 1980-81 to 6.7 percent in1997-98. The (26) textile products and (38) other manufacturing industries groups also increased their shares. The share of (22) beverages, tobacco, etc. (23) cotton textiles (27) wood and wood products, furniture and fixtures (28) paper, etc.; printing, etc. (33) Basic metal and alloy industries (34) metal products and parts reduced in total number of factories for the period as a whole. The (24) wool, silk and man-made fiber textiles (31) rubber, plastic, petroleum and coal products (37) transport equipment had with some fluctuations in share of a number of factories. The (29) leather, etc. and (25) jute and other vegetable fiber textiles placed at the bottom of the table.

The gross value added in manufacture sector increased from 11915 cores in 1980-81 to 29496 cores in 1990-91 with registering a growth rate of 9.5 percent per annum, during the eightieth. The gross value added also increased to 47578, recording a growth rate of 7.1 percent per annum in 1997-98 in the ninetieth. The manufacturing sector achieved totally a growth rate of 8.5 percent per annum for the period 1980-98. The leading industries were (30) basic chemicals and chemical products (except products of petroleum and coal), (22) beverages, tobacco, etc., (38) other manufacturing industries, (26) textile products, (29) leather, etc. the (33) Basic metal and alloy industries, (24) wool, silk and manmade fiber textiles, (32) non-metallic mineral products, (37) transport equipment, (35-36) machinery and equipment, (34) metal products and parts (28) paper, etc.; printing, etc. , achieved moderate growth rate. The (31) rubber, plastic, petroleum and coal products, (23) cotton textiles, (25) jute and other vegetable fiber textiles, (27) wood and wood products, furniture and fixtures were the lagging industries for the period as a whole. The (20-21) food products experienced negative growth rates. As regards, percentage distribution of the gross value added among manufacturing groups, it is evident that the (35-36) machinery and equipment held the highest share with 15.8 per cent share of in gross value added in 1980-81 and followed by (31) rubber, plastic, petroleum and coal products. The (30) basic chemicals and chemical products (except products of petroleum and coal) was having

the fifth share in 1980-98 and afterwards occupied the first position in terms of gross value added. Its share was 5.2 percent in 1980-81, which increased to 17.9 percent in 1990-91 and 21.4 percent in 1997-98. The (22) beverages, tobacco, etc. Its share significantly improved from 2.1 percent in 1980-81 to 7.3 percent in1997-98. The (20-21) food products deteriorated its share significantly from 7.0 percent in 1980-81 to 1.5 percent in1997-98. The other manufactures of industry had with some fluctuations in share of gross value added. During the period (1980-98), the least share of gross value added pertains to (27) wood and wood products, furniture and fixtures.

Table 1: The share of manufacturing industries of factory and Gross value added in 1980-1998

Industrial code	1980-81 factory	1990-91 factory	1997-98 factory	1980-81 GVA	1990-91 GVA	1997-98 GVA
(20-21) food products	18	18	18	7	9	1
(22) beverages, tobacco, etc.	10	8	7	2	2	7
(23) cotton textiles	8	7	7	12	7	5
(24) wool, silk and man-made fiber textiles	4	3	3	4	5	4
(25) jute and other vegetable fiber textiles	0	0	0	3	1	1
(26) textile products	3	3	4	1	2	2
(27) wood and wood products, furniture and fixtures	4	3	3	1	0	0
(28) paper, etc.; printing, etc.	5	5	5	4	3	2
(29) leather, etc.	1	1	1	1	1	1
(30) basic chemicals and chemical products (except products of petroleum and coal)	4	6	7	5	18	21
(31) rubber, plastic, petroleum and coal products	6	5	6	15	9	8
(32) non-metallic mineral products	7	9	9	4	5	4
(33) Basic metal and alloy industries	6	6	5	13	11	15
(34) Metal products and parts	7	7	6	3	2	2
(35-36) machinery and equipment	11	12	11	16	15	12
(37) transport equipment	3	3	3	8	8	8
(38) Other manufacturing industries	2	3	4	1	3	4
All Manufacturing	100	100	100	100	100	100

* Source: Research's calculations

Growth and structure of factories and gross value added in 1998-2013: The survey of information shows that the total number of factories in the manufacturing sector increased from 128174 in 1998-99 to 141736 registering a growth rate of 1.3 percent per annum for the1998-2008. The number of factories further increased to 221116, recording a growth rate of 7.7 percent per annum in 2013-14. The number of factories recorded a growth rate of 4.3 percent per annum for 1998-2013.The study of the structure revealed that share of the (20-21) food products reduced in the number of factories from 19 percent in 1998-99 to 17 percent in 2013-14, but the industry had the maximum share in a number of factories among the others. The (26) other non-metallic mineral products was having the highest share up to 1998-2013 and afterwards occupied the second position in terms of the number of factories. Its share was 9 percent in 1998-99, which increased to 12 percent in 2013-14. The (24) chemicals and chemical products by having 8 percent share in span of whole time occupied the fourth position in terms of the number of factories. The (17) textile deteriorated its share significantly from 11 percent in 1998-99 to 8 percent in2013-14. The 28) other fabricated metal products; except machinery and equipment's also increased their shares. The share of (22) beverages, tobacco, etc19) luggage, handbags saddler, harness and footwear (20) wood and products of wood and cork, expect furniture; (22) Publishing; Printing and Reproduction of recorded media reduced or had with some fluctuations in share of a number of factories in total number of factories for the period as a whole. The lowest share is owned by the (23) coke, refined petroleum products and nuclear fuel, (30) -(32) -(33) computing machinery, communication and optical instruments and (37) recycling. The (37) recycling placed at the bottom of the table. The gross value added ((Rs.in crore-constant price) in manufacture sector increased from 217756 cores in

1998-99 to 477038 cores in 2007-08 with registering a growth rate of 10.3 percent per annum, during mentioned period.

The gross value added further increased to 700160, recording a growth rate of 6.6 percent per annum in 2013-14. The gross value added recorded a growth rate of 9.4 percent per annum for 1998-2013.The leading industries were (24) chemicals and chemical products, (27) basic metal, (15) food products and beverages, (23) coke, refined petroleum products and nuclear fuel, (17) textile products. But their share of gross value added in comparison to 1998 till 2013 has decreased. The share of gross value added in total for (34) motor vehicles, trailers and semi-trailers; (29) machinery and equipment n.e .c; (34) motor vehicles, trailers and semi-trailers has placed in part of moderate industries. The (30) -(32) -(33) computing machinery, communication and optical instruments; (31) electrical machinery and apparatus n.e.c; (25) rubber and plastic products; (22) Publishing; Printing and Reproduction of recorded media and the rest of others industries were the lagging industries for the period as a whole. The (20-21) food products experienced negative growth rates. As regards, percentage distribution of the gross value added among manufacturing groups, it is evident that the (24) chemicals and chemical products held the highest share with 15percent share of in gross value added in 2013-14 and followed by (23) coke, refined petroleum products and nuclear fuel with 11 percent and (15) food products and beverages with 7 percent in total. The other manufactures of industry had with some fluctuations in share of gross value added. During the period (1980-98), the least share of gross value added pertains to (37) recycling.

Table 2: The share of manufacturing industries of factory and Gross value added in 1998-2013

Industrial code	1998-99 factory	2007-08 factory	2013-14 factory	1998-99 GVA	2007-08 GVA	2013-14 GVA
(15) food products and beverages	19	18	17	10	8	7
(16) tobacco products	2	2	1	2	1	1
(17) textile	11	11	8	8	6	6
(18) wearing apparel; dressing and dyeing of fur tanning and dressing of leather	2	3	4	2	2	2
(19) luggage, handbags saddlery, harness and footwear	2	2	2	1	1	1
(20) wood and products of wood and cork, expect furniture	3	2	2	0.13	0.19	0.22
(21) paper and paper product	3	3	3	2	1	1
(22) Publishing; Printing and Reproduction of recorded media	3	2	2	1	1	1
(23) coke, refined petroleum products and nuclear fuel	1	1	1	4	13	11
(24) chemicals and chemical products	8	8	7	22	14	15
(25) rubber and plastic products	5	6	6	3	2	4
(26) other non-metallic mineral products	9	11	12	4	6	4
(27) basic metal	6	5	5	15	17	12
(28) other fabricated metal products; except machinery and equipment's	6	6	8	3	3	3
(29) machinery and equipment n.e .c	8	7	5	6	6	6
(30) -(32) -(33) computing machinery, communication and optical instruments	2	2	1	4	3	3
(31) electrical machinery and apparatus n.e.c	3	3	3	4	4	4
(34) motor vehicles, trailers and semi-trailers	2	2	3	4	6	7
(35) other transport equipment	2	1	1	2	2	3
(36) furniture, Manufacturing n.e.c.	2	2	1	1	1	0
(37) recycling	0.01	0.10	0.14	0.002	0.02	0.07
Others	3	4	7	1	3	8
Total	100	100	100	100	100	100

* Source: Research's calculations

Analysis and Interpretation of changes of industrial structure in manufacturing industries in India: In this section we studied the results of the structural changes index of each of manufacturing industry due to changes in economic condition. In order to consider the differences in the change of the structural changes

index after liberalization, the analysis has been done separately for two sub-periods: pre and post-liberalization period, 1980-98and after the period of 1998-2013.

The calculated structural changes index for manufacturing industries with two digit codes in 1980-98: The table 5 reveals the result of the structural changes index for manufacturing industries with 2-digit codes in 1980-98. According to the calculated structural changes index for manufacturing industries with two digit codes, the manufacturing industries can be classified to below the group: The first group including, (26) textile products, (29) leather, etc., (30) basic chemicals and chemical products (except products of petroleum and coal), (38) Other manufacturing industries, are the industrial activities that their structural changes indexes were higher than 100 in the two periods of 1980s and 1990s.These industrial activities had the highest competitiveness in comparison to other industrial activities and they have had the greatest opportunities to create value-added. The second group includes, (20-21) food products, (24) wool, silk and man-made fiber textiles, (32) non-metallic mineral products are the industrial activities that their structural changes index was higher than 100 in the 1980-1990 period. Despite the acceptable performance in 1980s, these industrial activities have lost their comparative advantage in the next period (1990s) and they could not use of the conditions to create the value added. The third group including (22) beverages, tobacco, etc., (33) Basic metal and alloy industries, (34) metal products and parts, (37) transport equipment are the industrial activities that their structural changes index was higher than 100 in 1990-1998 period. With regard to weak performance in 1980s, these industrial activities could use of the conditions to create the value added for maintaining their proper position and created a comparative advantage in the next period. The fourth groups including (23) cotton textiles, (25) jute and other vegetable fiber textiles, (27) wood and wood products, furniture and fixtures, (28) paper, etc.; printing, etc., (35-36) machinery and equipment are the industrial activities that their structural changes index was less than 100 in the two periods of the 1980s and 1990s. The competitiveness of these of the industrial activities has declined in comparison with other industrial activities. They have had less opportunity and a chance to create value added, especially in the short term.

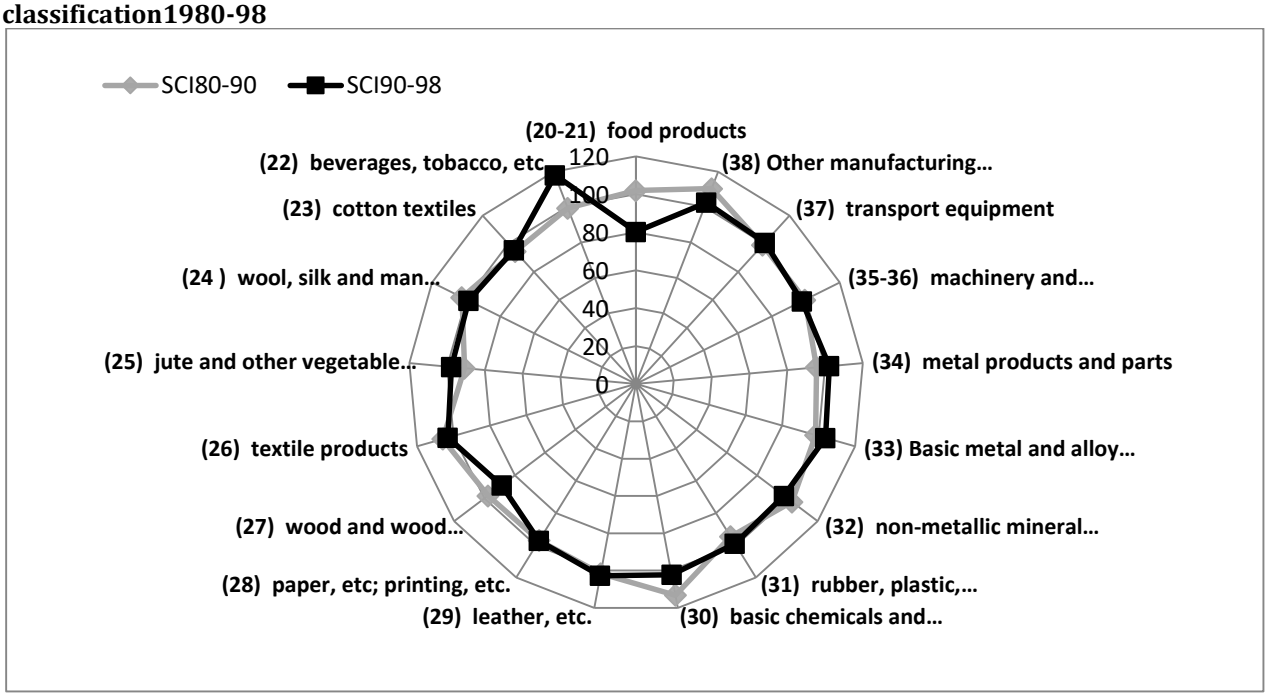
Table 3: The structural changes index for manufacturing industries with 2-digit codes in 1980-1998

Industry code	SCI80-90	SCI90-98
(20-21) food products	101.99	80.18
(22) beverages, tobacco, etc.	99.39	118.04
(23) cotton textiles	94.47	95.47
(24) wool, silk and man-made fiber textiles	102.45	98.59
(25) jute and other vegetable fiber textiles	90.78	97.70
(26) textile products	105.85	103.13
(27) wood and wood products, furniture and fixtures	97.69	88.62
(28) paper, etc.; printing, etc.	96.91	97.12
(29) leather, etc.	101.66	102.77
(30) basic chemicals and chemical products (except products of petroleum and coal)	113.19	102.26
(31) rubber, plastic, petroleum and coal products	94.60	98.98
(32) non-metallic mineral products	103.02	97.72
(33) Basic metal and alloy industries	98.40	103.73
(34) metal products and parts	95.53	102.23
(35-36) machinery and equipment	99.40	97.72
(37) transport equipment	99.07	100.81
(38) Other manufacturing industries	110.40	102.55

* Source: Research's calculations

Also, in order to analyze of structural changes in manufacturing industries has used of spider graphs. The graph (1) shows that the impact of economic policies of India on industrial codes in each industry classification before and after 1991 (pre-liberalization 1980-1990 and post liberalization 1990). Also Graphs show that the trend investments and creation of new capacity in which industry codes increases the structural changes and in which industry codes has not had success.

Graph 1: The impact of economic policies of India on industrial codes in each industry classification1980-98



The calculated structural changes index for manufacturing industries with two digit codes in 1998-2013: So according with National Industrial Classification (NIC, 2004), in order to consider the differences in the change of the structural changes index after liberalization, the analysis has been done separately for two sub-periods: 1998-2008 and 2008-2013.

Table 4: The structural changes index for manufacturing industries 2-digit codes in 1998 2013

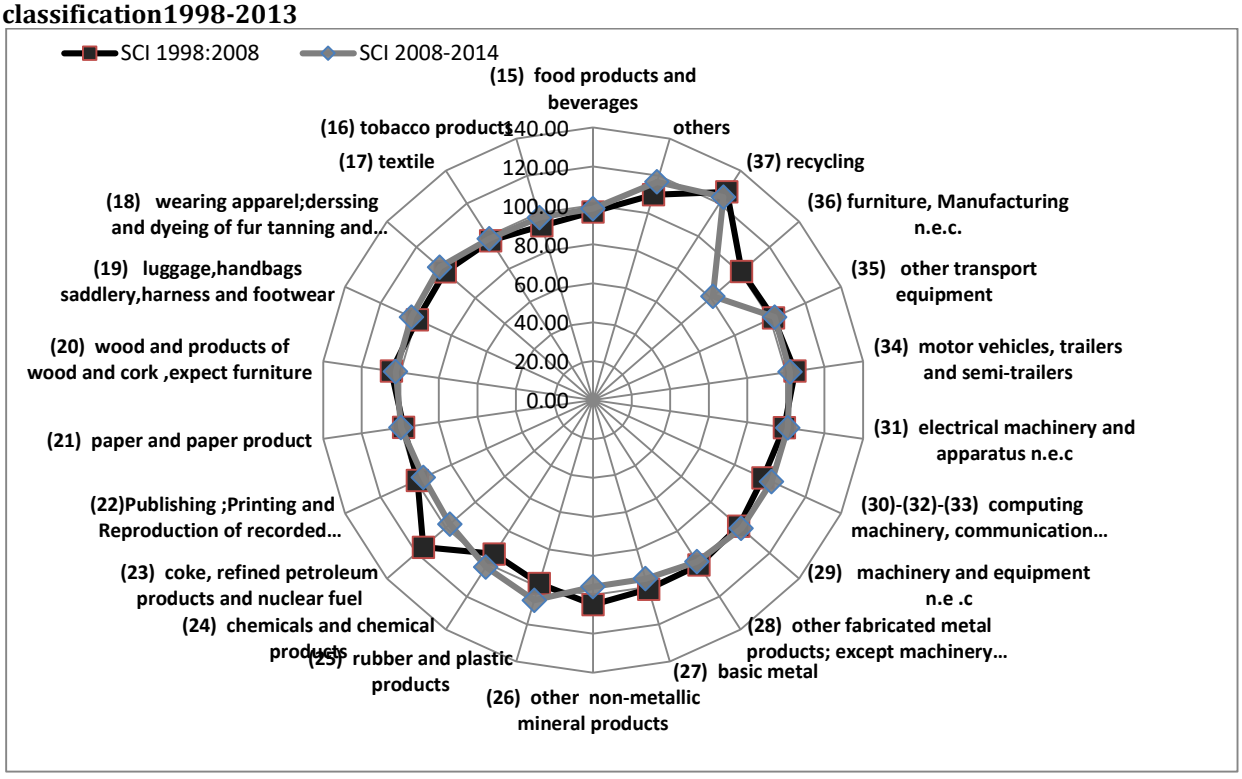
Industrial code	SCI 1998:2008	SCI 2008-2013
(15) food products and beverages	96.67	98.352
(16) tobacco products	93.30	97.661
(17) textile	97.29	98.505
(18) wearing apparel; dressing and dyeing of fur tanning and dressing of leather	100.59	104.210
(19) luggage, handbags saddlery, harness and footwear	99.29	102.542
(20) wood and products of wood and cork, expect furniture	104.66	102.461
(21) paper and paper product	98.27	99.602
(22) Publishing; Printing and Reproduction of recorded media	99.17	95.707
(23) coke, refined petroleum products and nuclear fuel	115.37	97.252
(24) chemicals and chemical products	93.90	101.868
(25) rubber and plastic products	98.17	107.169
(26) other non-metallic mineral products	105.04	95.817
(27) basic metal	101.20	95.606
(28) other fabricated metal products; except machinery and equipment's	100.67	98.649
(29) machinery and equipment n.e .c	98.91	100.643
(30) -(32) -(33) computing machinery, communication and optical instruments	95.93	100.843
(31) electrical machinery and apparatus n.e.c	99.21	101.003
(34) motor vehicles, trailers and semi-trailers	104.73	102.227
(35) other transport equipment	101.78	102.552
(36) furniture, Manufacturing n.e.c.	100.94	81.390

(37) recycling	127.10	123.881
Others	109.89	116.750
Total		

* Source: Research's calculations

According to the calculated structural changes index for manufacturing industries with two digit codes, the manufacturing industries can be classified to below the group: The first group including, (18) wearing apparel; dressing and dyeing of fur tanning and dressing of leather; (20) wood and products of wood and cork, expect furniture; (34) motor vehicles, trailers and semi-trailers; (37) recycling; (35) other transport equipment and (38) Other manufacturing industries, are the industrial activities that their structural changes indexes were higher than 100 in the two periods of 1998-2008 and 2008-2013. These, are identified as drivers of industrial growth and they have abilities that will be introduced as the axis of India's industrial strategy. The second group includes, (23) coke, refined petroleum products and nuclear fuel; (26) other non-metallic mineral products; (27) basic metal; (28) other fabricated metal products; except machinery and equipment's and (36) furniture, Manufacturing n.e.c. are the industrial activities that their structural changes index was higher than 100 in the 1998-2008 period. These have lost their comparative advantage in the next period (2008) and they could not use of the conditions to create the value added for maintaining their proper position. The third group including (19) luggage, handbags saddler, harness and footwear; (24) chemicals and chemical products; (25) rubber and plastic products; (29) machinery and equipment n.e.c; (30) -(32) -(33) computing machinery, communication and optical instruments and (31) electrical machinery and apparatus n.e.c are the industrial activities that their structural changes index was higher than 100 in 1990-1998 period. This industrial activity could be used to create the value added for maintaining their proper position and create comparative advantage in the next period. The fourth groups including15) food products and beverages; (16) tobacco products; (17) textile; (21) paper and paper product and (22) Publishing; Printing and Reproduction of recorded media are the industrial activities that their structural changes index was less than 100 in the periods of the 1998-2013.These industrial activities are industry losers. The competitiveness of these industrial activities has declined in comparison with other industrial activities. The graph (2) shows that the impact of economic policies of India on industrial codes in each industry classification in the period of 1998-2013.

Graph 2: The impact of economic policies of India on industrial codes in each industry classification1998-2013



4. Conclusion

This paper has analyzed the effect of structural changes in the Indian manufacturing industry. The analysis has been done separately for the pre-liberalization period, and the post-liberalization period to examine the industrial structure. The analysis has been done using a structural change index method that mainly has been used by experts of the United Nations Industrial Development Organization (UNIDO) and the World Trade Organization (WTO) to analyze the industrial structure. It was observed that the amounts of the structural changes index for some of industrial activities were positive in two periods during 1980s and 1990s and 2000s. So, these industrial activities are identified as drivers of industrial growth and they have abilities that will be introduced as the axis of India's industrial strategy. The increase in the number of factories and rising of the demand society to new appearance manufacturing industry (such as recycling), government supportive policies and tend to high investment and attention to special manufacturing industries (such as steel, iron, cement), the growing domestic demand, the rise in export, the high capital-intensive of some of manufacturing industries, the private sector orientation to investment, using of technological advancement and modernization, the increase in foreign direct investment and reliance to domestic resource are considered as main reasons for being high or increase of structural changes index. Furthermore, despite the acceptable performance in the 1980s, some industrial activities have lost their comparative advantage in the next period and they could not be used as a condition to create the value added. However, some industrial activities with regard to weak performance in the 1980s could create comparative advantage in the next period. At last, the industrial activities and their structural change index were less than 100 in two periods of 1980s and 1990s and 2000s can be considered as loser industries. The use of low of labor productivity due to low capital-labor proportion and decrease of export (such as food), Problem of raw materials, obsolete machinery and need to modernization, high cost and competition in foreign markets such as (textile, paper), governmental restriction on import of raw material and machinery coupled high excise duties and customs duties are considered reasons for being low or decrease of structural change index.

References

Benedictis, D. L. & Tamberi, M. (2004). Overall Specialization Empirics: Techniques and Applications. Open Economies Review, 15

Darounparvar, D., Sadqyan, A. & Ahmadi, H. B. (2009). Analytical study of industrial structure and competitiveness of industries of Iran base on separately codes 1995 -2005. *Journal of management*, 6(13).

Devashish, M. & Beyza, P. U. (2007). Indian manufacturing: a slow sector in a rapidly growing economy, World Bank and the Institute of Policy Studies (IPS), Singapore

Downes, P. & Stoeckel, A. (2006). Drivers of structural change in the Australian Economy, Centre for International Economics, Canberra and Sydney, Http:// indiabudget.nic.in (Government of India union budget and economic survey)

Fathipour, G. (2013)," The Impact of Structural Change in Industrial Manufacturing Sector on Aggregate Growth of Indian Economy", *PhD thesis, university of Pune, India.*

Kuar, I. (1997). Impact of liberalization on Indian industry, book, published Guru Nanak Dev University, Deep and Deep publish.

Memedovic, O. & Apadre, L. (2010). Structural Change in the World Economy: Main Features and Trends, Research and Statistics Branch Program Coordination and Field Operations Division, UNIDO, Working paper, No24.

Panagariya, A. (2004). India in the 1980s and 1990s: A Triumph of Reforms, International Monetary Fund (IMF), working paper, No.43

Salimifar, M. & Shirzor, Z. (2006). The Analysis of structural changes in industry in Khurasan province of Iran in 1995-2003. *Journal of knowledge and development (ISC)*, 2(19).

Siddharthan, N. S. (2005). Indian industrial policy and global competition, Institute of Economic Growth, Delhi University North Campus, Delhi – 110007.

Singh, A. (2008). The past, present and future of industrial policy in India: adapting to the changing domestic and international environment, Centre for Business Research, University of Cambridge, and Working Paper No. 376.

Szirmai, A. (2011). Manufacturing and economic development, World Institute for Development Economics Research (WIDER), Working Paper No. 75.

Time– Series Data on Annual Survey of Industries 1998-99 TO 2013-14, Government of India, Time series data on annual survey of industries, Annual Survey of Industries (ASI), Ministry of Statistics and Program Implementation, 2011.

www.rbi.org (Reserve bank of India).