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Growth and Development of Sector-Wise Foreign Direct Investment Flow in India

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Abstract - Financial year-wise data of FDI inflows in the top twelve sectors contributing more than 2.5% share each to cumulative FDI inflows in India were subjected for trend and growth analysis. In the general rising trend of FDI inflows in all sectors was observed except some up and down during 2000-01 to 2019-20. The compound annual growth rate of FDI Inflows in all sectors except computer software and hardware have declined in the decade of 2001-10 in comparison to 2011-20. The FDI inflows in services, computer software and hardware, telecommunication, automobiles, drugs pharmaceuticals, chemicals, trading, power, hotel and tourism, metallurgy, construction infrastructure, and construction development sectors are projected to grow at the compound annual growth rate of 4.44%, 3.84%, 2.38%, 4.23%, -0.70%, 3.27%, 3.86%, 4.95%, 5.18%, 0.96%, 2.3%, and 3.18% respectively whereas FDI inflows in drugs and pharmaceuticals sector are likely to decline at the compound annual growth rate of (-0.70%) from 2020-21 to 2029-30.

Keywords - ARIMA, compound growth rate, sector-wise FDI, trend

I. INTRODUCTION

Before the launch of economic reforms in 1991, the flow of foreign direct investment (FDI) to India was very low in comparison to other developing countries of the world due to restrictive policies and regulated practices. With the opening of the economy to globalization in 1991, India started attracting FDI inflows and became competitive in attracting FDI inflows. With the announcement of the New Economic Policy of India in June 1991, the Government initiated a series of measures to attract FDI inflows in India. The promotion of foreign investment was an integral part of all industrial policy thereafter. The Government of India's favorable policy regime and robust business environment in the country ensured FDI inflows at an increased rate. FDI bridged the gap between savings and investment and played a significant role in providing necessary investment in India. Indian firms benefited in terms of advancement of skill up-gradation, improved working environment, better management, and marketing network.

Many initiatives were undertaken by the Government, including relaxation in FDI norms in different sectors. FDI up to 100% is allowed under automatic routes in different sectors. During the last two decades, the effects of FDI inflows have attained diverse results in different sectors. However, FDI inflows have been largely concentrated to a few sectors only. According to the Fact Sheet on Foreign Direct Investment, the total amount of FDI inflows in India from April 2000 to March 2020 are the US \$ 470118.99 million. The share of FDI inflows in the services sector, computer software and hardware, telecommunications, trading, construction development (townships, housing, built-up structure, and construction -development projects), automobile industry, chemicals (other than fertilizers), construction (infrastructure) activities, drugs and pharmaceuticals, hotel and tourism, power, and metallurgical industries sectors from April 2000 to March 2020 are 17.45%, 9.56%, 7.93%, 5.87%, 5.46%, 5.15%, 3.75%, 3.58%, 3.51%, 3.25%, 3.19%, and 2.85% respectively. The contribution of these twelve sectors to cumulative FDI is 71.55%. The share of FDI inflows in the remaining 50 sectors is 25.95% and of miscellaneous industries is 2.5%. Therefore, the top twelve sectors contributing more than 2.5% share each to cumulative FDI inflows in India were considered for this study.

II. REVIEW OF LITERATURE

Rajalakshmi and Ramachandran (2011) studied the growth of FDI inflows in India in the automobile sector with special reference to passenger cars. ARIMA, linear, and compound models were used for future prediction using time series analysis. Wellington and Jammu (2014) examined FDI inflows in the top ten sectors and top ten states for the period of 2000-2010. Reltionships between the GDP of states and FDI inflows in the states were developed. The growth rate and trend pattern of FDI inflows in the top ten states by straight lines were established. Rajeswari and Akilandeswari (2015) analysis of sector-wise FDI inflows in India showed that the highest FDI was received in electrical equipment followed by the services sector, telecommunications, chemicals, food processing, paper and pulps, mechanical and engineering industry, textiles and drugs, and pharmaceuticals from 1991 to 1999 whereas during the periods of 2000 to 2014 service sector was ranked first followed by construction

development, telecommunication, computer software, and drugs and pharmaceuticals, automobile, hardware, power, miscellaneous industries, metallurgical industries. Murugesan (2016) examined the trend and growth of sector-wise FDI inflows in India in the post-liberalization period (1990-91 to 2011-12). It was concluded that sector-wise inflows of FDI have contributed to economic growth in India. Siddiqui and Ahmed (2017) examined the cause and impact of FDI inflows on growth in services, telecommunication, chemicals, metallurgy, drugs and pharmaceuticals, automobiles, and tourism sector over the time period ranging from 2000-2014. It was concluded that the service and telecommunication sectors are major recipients of FDI inflows in India, whereas metallurgy and service sectors contribute maximum to GDP on the Indian economy. Joo and Dhar (2018) investigated the effects of FDI inflows on the growth of the Indian Economy by examining the relationship between GDP and FDI inflows. The effect of FDI inflows in nine major sectors (services, computer hardware and software, telecommunications, automobile industry, chemicals, drugs and pharmaceuticals, power, metallurgy, and petroleum and natural gas) on GDP was observed. It was found that the service sector has the most positive impact on GDP, followed by the automobile industry and petroleum and natural gas. Mathusamy and Karthika (2019) studied the performance sector-wise of FDI equity inflows in India using a sample of ten sectors for the period of 2016-17 to 2018-19. The construction development sector has the highest compound annual growth rate of 26.59%, followed by trading (24.04%), computer hardware and software (20.66%), automobiles industry (17.69%), and chemicals (12.45%). Singh (2019) analyzed secondary data of FDI inflows from 2000 to 2018. The service sector and Construction development sector registered an overall growth rate of 32% and 6% respectively in FDI inflows from 2000-2018. Meena and Singh (2020) analyzed the current scenario, scope, and rate of FDI inflows in India and also presented the sector-wise distribution of FDI inflows. Rani and Ghosh (2020) studied the trends of FDI inflows in India and its sectorwise distribution in the country. It was revealed from the study that the trend of FDI inflows in India is generally on the rising side. The service sector attracted the maximum FDI inflows from all nations over the period of study.

III. RESEARCH METHODOLOGY

Time series data of financial year-wise FDI inflows in twelve sectors accounting 71.55% of total FDI inflows in India from April 2000 to March 2020 was collected from the Reserve Bank of India website and Department of Industrial Promotion and Policy (DIPP), Ministry of Commerce and Industry website for the period of 2000-2020. The data for Construction Infrastructures and Construction Development is available from 2003-04 and 2005-06, respectively. Annual growth rate (AGR), compound annual growth rate (CAGR), and percentage, along with bar charts, were used to analyze time-series data. ARIMA models were used to forecast FDI inflows in

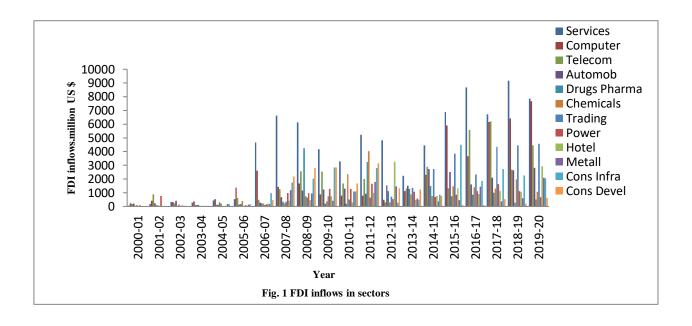
different sectors beyond the study period. The following objectives are achieved in the present study:

- 1. To analyze sectors specific FDI inflows in India
- 2. To project sector-specific volume of FDI inflows up to the financial year 2029-230.

IV. DATA ANALYSIS AND DISCUSSION

A. Trend of FDI inflows in sectors

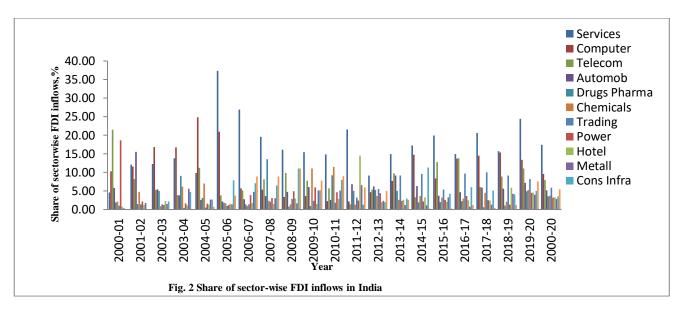
According to statistics of the Department of Industrial Promotion and Policy, the cumulative FDI inflows in India from April 2000 to March 2020 are the US \$ 469,998 million. The cumulative FDI inflows between April 2000 and March 2020 in the services sector, computer software and hardware, telecommunications, trading, construction development, automobile industry, chemicals, construction (infrastructure) activities, drugs and pharmaceuticals, hotel and tourism, power, and metallurgical industries sectors in the US \$ million are 82003 (17.45%), 44911 (9.56%), 37271 (7.93%), 27595 (5.87%), 25662 (5.46%), 24211 (5.15%), 17569 (3.75%), 16847 (3.58%), 16501(3.51%),15289 (3.25%), 14988 (3.19%) and 13402 (2.85%) respectively. The collective share of FDI inflows from April 2000 to March 2020 of service, computer software and hardware, telecommunications, trading, construction development, and automobile industry sectors, all having more than 5% of share each, from April 2000 to March 2020 is 51.42%. The share of chemicals, construction infrastructure, drugs and pharmaceuticals, hotels and tourism, power and metallurgical industries is between 2.5% and 5%, and the total share is 20.13%. The financial year-wise FDI inflows in these sectors are shown in Figure 1. Figure 1 shows consistently increasing trends of FDI inflows across all the sectors though Up and down were observed in a few years. A sudden decrease was observed in FDI inflows in all the sectors during 2003-04. A gradual decrease was observed in FDI inflows in all sectors in 2009-10 and 2010-11 due to USA subprime crises leading to a slow down in the global economy. The sudden decrease in 2013-14 was the European crisis resulting in a decline in the world economy. The sudden increase in FDI inflows across all the sectors during 2006-07 is the result of positive changes made in FDI policy by the Government of India such as FDI up to 100% under automatic route in the sector of townships, housing, builtup infrastructure, and constructing development, sector caps in the service sector were raised, and cap of 49% was increased to 74% in telecommunication sectors in 2005-06. The gradual increase in FDI inflows from 2011-12 to 2019-20 is the result of the raising of investment cap across different sectors and the change of approval route from the government to automatic from 2010-11 to 2017-18. India signed Bilateral Investments Promotion Agreements and Double Taxation Avoidance Treaty with many countries. However, there was a decline in FDI inflows in telecommunication, drugs and pharmaceuticals, power, hotel and tourism, construction infrastructure and telecommunication, drugs and pharmaceuticals, power, hotel and tourism, construction infrastructure, and construction development in the year 2018-19. In general, there is a rising trend of FDI inflows in all sectors under the study from 2000-01 to 2019-20.



B. Share of different sectors in total FDI inflow in India

The share of sector-wise FDI inflows in India is shown in Figure 2. The service sector has been receiving the highest FDI inflows in India. The service sector, the major driver of economic growth in India, contribution to gross FDI inflows in India is 17.45% for the period of study. The share of FDI inflows in the service sector varied from 4.62% (2000-01) to 37.34% (2005-06). The contribution of the service sector to gross FDI inflows in India has been steadily rising from 2000-01 to 2019-20, though there was a fall in 2004-05 and from 2005-06 to 2011-12. The percentage contribution is more than 17.45% in 9 out of 20 years. It is more than 10% in all the years except 2000-01, 2004-05 and 2012-13. In five years (2005-06, 2006-07, 2011-12, 2017-18 and 2019-20), the share is more than 20%. Computer software and hardware sector contribution to gross FDI inflows in India is 9.56% during the period of study. In the case of computer software and hardware, the range of share in total FDI flow is 2.17% (2011-12) to 24.82% (2004-05). In 11 out of 20 years, the percentage contribution is more than 9.56%. The percentage contribution is more than 15% in five years (2002-03 to 2005-06 and 2018-19) and more than 20% in 2004-05 and 2005-06. The share rose more sharply up to 2005-06, and it was stagnant from 2006-07 to 2013-14. Telecommunication is another important sector in which tremendous growth has taken place. The telecommunication sector contribution to gross FDI inflows in India is 7.93% during the period of study. The

share of the telecommunication sector is more than 7.93% in 10 years, more than 10% in five years, and more than 20% in one year, and it shows the gradual expansion of the telecommunication sector in India. In the case of the trading sector, the minimum (0.43%) share was in 2003-04, whereas the maximum share was 10.06% in 2017-18. The trading sector contribution to gross FDI inflows in India is 5.87% during the period of study. The percentage contribution was more than 5.87% in 6 years 2013-14, 2014-15, and 2016-17 to 2019-20). A higher percentage contribution was observed in (later part of the study period. The FDI inflows gained momentum from the year2012-13 in the trading sector. In the case of construction development, the percentage contribution varied from 0.24% (2015-16) to 11.01% (2008-09). The construction development sector contribution to gross FDI inflows in India is 5.46% during the period of study. The percentage contribution was more than 5.46% in 7 years (2006-07 to 2011-12 and 2019-20). The automobile industry sector, one of the high performing sectors of the Indian Economy, range of share is 2.21% (2005-06) to 15.53% (2001-02). The automobile industry sector contribution to gross FDI inflows in India is 5.15% during the period of study. The share was more than 5.15% in 11 years and more than 10% in one year. The percentage contribution to total FDI flow is higher from 2011-12 to 2019-20 and is lower from 2003-04 to 2010-11.



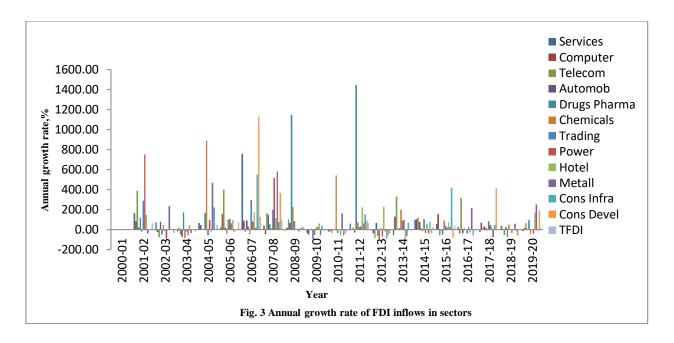
The range of share of drugs and pharmaceutical, chemicals, power, hotel and tourism, metallurgical industries and construction infrastructure are 1.01% to 13.53%, 0.91% to 11.51%, 1.26% to 18.62%, 0.79% to 14.53%, 0.34% to 6.5% and 1.27% to 11.04% respectively. The year-wise share of drugs and pharmaceutical, chemicals, power, hotel and tourism, metallurgical industries, and construction infrastructure sectors was more than the share of these sectors in the study period in 8,7,7,4,9 and 12 years respectively. The share was higher from 2010-11 to 2013-14 in drugs and pharmaceutical, from 2012-13 to 2019-20 in trading, and 2005-06 to 2010-11, 2014-15 to 2019-20 in construction development sectors.

C. Annual and compound growth rate of sector-wise FDI inflows in India

The annual growth rate of FDI inflows in different sectors is shown in Fig 3. The highest(20.49%) annual growth rate of total FDI inflows in India was observed in the year 2006-07, whereas the lowest (-33.46%) was observed in 2002-03. The negative annual growth rates were observed in 6 years of the study period in the case of total FDI inflows in India. The highest annual growth rates computer software and hardware, service. telecommunication, automobiles, drugs and pharmaceuticals, chemicals, trading, power, hotel and tourism. metallurgical industries, construction infrastructure and construction development were 758.93% (2006-07),157.14% (2015-16),399.2% 06),144.57%(2007-08), 1446%2011-12), 890% (2004,05), 296.55% (2006-07), 750.56% (2001-02), 228.2% (2012-13), 580.35% (2007-08), 552.32% (2006-07) and 1128.95% (2006-07) respectively whereas lowest annual growth rate are -53.96% (2013-14), -48.0% (2009-10), -74.46% (2002-03), -71.67% (2003-04), -94.98% (2009-10), -92.77% (2012.13), -49.19% (2016-17), -92.21% (2002-03), -85.09% (2013-14), -74.17% (2017-18), -89.84% (2012-13) and -51.59% (2012-13) respectively. The negative annual growth rate was observed in

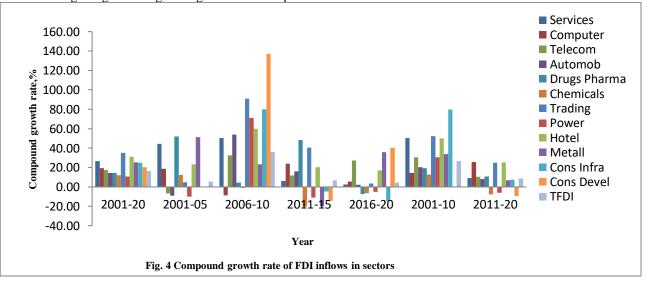
7,6,8,5,7,9,5,6, 5,9,6, and 7 years of the study period in and software hardware. service. computer telecommunication, automobiles, drugs and pharmaceuticals, chemicals, trading, power, hotel and tourism, metallurgical industries, construction infrastructure, and construction development sectors respectively. The highest annual growth rate was observed during the period of 2004-05 to 2007-08 in 8 out of 12 sectors whereas the lowest annual growth rate was found in 5 sectors during the period of 2012-13 to 2013-14, in two sectors in 2009-10, in 3 sectors in 2002-03 to 2003-04 and in 2 sectors in 2016-17 to 2017-18.

The study period of 2001-20 was subdivided into four time periods of five years each, i.e2001-05, 2006-10, 2011-15 and 2016-20 and two time periods of ten years each, i.e., 2000-10 and 2011-20. The compound annual growth rate of FDI inflows in India and FDI inflows in 12 sectors was calculated for the time periods and is shown in Figure 4. It is clear from Figure 4 that the compound annual growth rate of total FDI inflows in India for the study period is 16.24%, whereas, for the period of 2001-05, 2006-10, 2011-15 and 2016-20 are 5.50%, 36.06%, 6.82%, and 4.55%. The compound annual growth rate of software hardware, services, computer and telecommunication, automobiles, drugs pharmaceuticals, chemicals, trading, power, hotel and tourism, metallurgical industries, construction infrastructure, and construction development for the study period is 26.53%, 19.22%, 17.46%, 14.30%, 14.26%, 11.93%, 35.19%, 10.64%, 31.13%, 25.12%, 24.84%, and 20.42% respectively. The compound annual growth rate of eight sectors, namely services, computer software and hardware, telecommunication, trading, hotel, metallurgy, construction infrastructure, and construction development, was more than the compound annual growth rate of total FDI flow in India during the study period as shown in Figure 4. The highest compound annual growth rate of 50.38%, 32.40%, 53.93%, 91.04%, 71.005, 59.92%, 79.98%, and 137.04% was observed during the period of 2006-10 for services, telecommunication, automobile, trading, power, hotel



and tourism, construction infrastructure and construction development respectively whereas the highest compound annual growth rate of 24.10% (2011-15), 48.28% (2011-15), 12.27% (2001-05) and 51.24% (2001-05) was observed in computer software and hardware, drugs and pharmaceuticals, chemicals and metallurgical industries. Thus, all sectors received the highest compound annual growth rate in 2001-05 and 2006-10. The compound annual growth rate of FDI flow in services, computer software and hardware, telecommunication, automobiles, drugs and pharmaceuticals, chemicals, trading, power, hotel and tourism, metallurgical industries, construction infrastructure, and construction development is 4.55%, 2.66%, 5.36%, 27.41%, 2.55%, -7.23%, -6.37%, 3.53%, -5.01%, 17.12%, 35.74%, 14.66%, and 40.42% respectively in the time period of 2016-20. Services, computer software and hardware, telecommunication, automobiles, drugs and pharmaceuticals, chemicals, trading, power, hotel and metallurgical industries, tourism, construction infrastructure, and construction development sectors recorded single-digit or negative growth in compound

annual growth rate in the time period of 2016-20. Telecommunication, hotels and tourism, metallurgical industries, construction infrastructure, and construction development sectors recorded double-digit growth. The compound annual growth rate of total FDI flow in India in the first decade of the 21st century (2001-2010) is 26.49%, whereas in the second decade of the 21st century (2011-20) is 8.86%. The compound annual growth rate of FDI flow services, computer software and hardware, telecommunication, automobiles, drugs and pharmaceuticals, chemicals, trading, power, hotel and tourism, metallurgical industries, and construction infrastructure sectors in the first decade of the 21st century(2001-2010) is 50.29%, 14.36%, 30.44%,

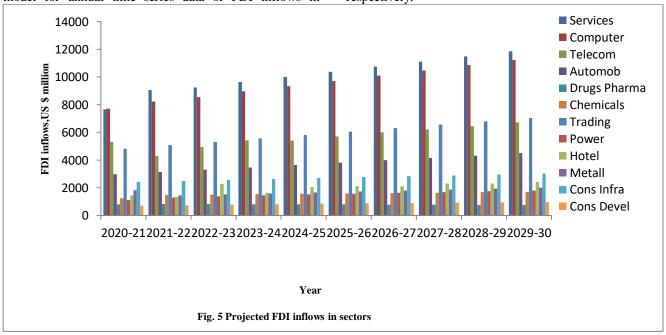


20.28%, 19.46%, 12.67%, 52.28%, 30.47%, 50.07%, 33.70% and 79.71% respectively whereas in case of second decade of 21st century (2011-20), the compound annual growth rate are 9.07%, 25.69%, 10.31%, 8.08%, 10.71%, -7.69%, 24.63%, -6.18%, 25.30%, 6.74% and 7.35% respectively. The comparison clearly shows that total FDI flow in India and FDI flow in all sectors except computer software and hardware have declined in the second decade of the 21st century. The chemicals, power, and construction development recorded negative growth of compound annual growth rate during this period. Thus, there is an urgent need to revisit the FDI inflow policy in India by the policymakers to look at the factors which are not conducive to FDI inflows in certain sectors.

D. Projection of sector-specific volume on FDI inflow in India

The annual time series data of FDI inflows in India in computer software hardware. services, and telecommunication, automobiles, drugs and pharmaceuticals, chemicals, trading, power, hotel and tourism, metallurgy, construction infrastructure, and construction development sectors for the period of 2000-01 to 2019-20 were modeled using ARIMA models to project FDI inflow in these sectors up-to 2029-30. The auto correlogram and partial auto correlogram were used for the identification of the orders of ARIMA models. Based on this, the ARIMA models used in this study for projection of specific volumes in the 12 sectors of the economy are ARIMA (110), ARIMA (011), ARIMA (111), ARIMA (211), ARIMA (112), ARIMA (121), ARIMA (212), and ARIMA (012). The Akaike Information Capital (AIC) was used to find the best fit model of annual time series data of FDI inflows in different sectors. Based on the minimum value of Akike Information Criteria, the best ARIMA model for annual time series data of FDI inflows in

services, computer software and hardware, telecommunication, automobiles, drugs pharmaceuticals, chemicals, trading, power, hotel and tourism, metallurgical industries, construction infrastructure, and construction development sectors are ARIMA(112), **ARIMA** (110),ARIMA(212), ARIMA(111), ARIMA(012), ARIMA(012), ARIMA(011), ARIMA(111), ARIMA(212), ARIMA(012), ARIMA(011) and ARIMA(112) respectively. The projection of FDI inflows in different sectors is shown in Figure 5. The FDI inflows in services, computer software and hardware, power, hotel and tourism, metallurgical industries, construction infrastructure, and construction development sectors are ARIMA(112), ARIMA(110), ARIMA(212), ARIMA(111), ARIMA(012), ARIMA(012), ARIMA(011), ARIMA(111), ARIMA(212), ARIMA(012), ARIMA(011) and ARIMA(112) respectively. The projection of FDI inflows in different sectors is shown in Figure 5. The FDI inflows in services, computer software and hardware, telecommunication, automobiles, drugs pharmaceuticals, chemicals, trading, power, hotel and tourism, metallurgy, construction infrastructure, and construction development sectors are projected to grow at a compound annual growth rate of 4.44%, 3.84%, 2.38%, 4.23%, -0.70%, 3.27%, 3.86%, 4.95%, 5.18%, 0.96%, 2.3% and3.18% respectively whereas FDI inflows in drugs and pharmaceuticals are likely to decline at a compound annual growth rate of (-0.70%). The FDI inflows in services, hardware, computer software and telecommunication, automobiles, drugs and pharmaceuticals, chemicals, trading, power, hotel and tourism, metallurgical industries, construction infrastructure, and construction development sectors in 2029-30 are likely to be US\$ million 11858, 11241, 6717. 4501, 757, 1705, 7052, 1812, 2429, 2003, 3037 and 965 respectively.



V. CONCLUSION

The trend of growth of FDI inflows in the top twelve sectors attracting the highest FDI inflows in India during the period of 2000-01 to 2019-20 was analyzed in terms of share of total FDI inflows, annual growth rate, and compound annual growth rate. It is observed that the growth of total FDI flows in India and FDI inflows in all sectors under study have declined in the period of 2011-20 in comparison to 2001-10. The chemical, power, and construction development sectors showed a negative compound annual growth rate in the time period of 2011-20. The FDI inflows in services, computer software and hardware, telecommunication, automobiles, drugs and pharmaceuticals, chemicals, trading, power, hotel and tourism. metallurgical industries. construction infrastructure, and construction development sectors are projected to grow at a compound annual growth rate of 4.44%, 3.84%, 2.38%, 4.23%, -0.70%, 3.27%, 3.86%, 4.95%, 5.18%, 0.96%, 2.3%, and 3.18% respectively whereas FDI inflows in drugs and pharmaceuticals are likely to decline at the compound annual growth rate of (-0.70%). The FDI inflows in services, computer software and hardware, telecommunication, automobiles, drugs and pharmaceuticals, chemicals, trading, power, hotel and tourism, metallurgical industries, construction infrastructure, and construction development sectors in 2029-30 are likely to be US\$ million 11858, 11241, 6717, 4501, 757, 1705, 7052, 1812, 2429, 2003, 3037 and 965 respectively.

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