CHAPTER 4

ANALYSIS OF THE EXTENT AND DEPTH OF GLOBALIZATION IN INDIA

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India introduced gradual dozes of liberalization and globalization in the late 1980s and thereafter, embarked upon economic reforms, introduced in a phased manner, as a response to the economic crisis in 1991 which originated as a balance of payments crises. The reforms covered a vast array of sectors and over time, there was a deepening and broadening of the openness of the Indian economy. With more than 30 years since these reforms have played themselves out, it entails an inquiry into the nature of globalization of the Indian economy as it has evolved, its varied dimensions, and the width and depth across these dimensions.

This chapter presents the analysis of the extent and depth of globalization in India across five dimensions of globalization, viz., Economic, Financial, Political, Technological, and Social. Each of the dimensions has its own sub-dimensions, referred to as indicators which are used to measure the extent and depth of globalization. This chapter presents the findings related to the primary and secondary level analysis of globalization which has been organized into four broad sections. Section 4.1 presents the trends and flow of each indicator of all five dimensions of globalization. Section 4.2 deals with the analysis of the nature of globalization by constructing dimensional indices to derive a combined or composite measure of the underlying indicators. Section 4.3. deals with the construction of a composite index of overall globalization. Section 4.4 discusses the inter-association between the dimensions of globalization using dimensional index values.

The analytical work in this chapter is carried out in order to provide detailed analysis of each indicator of all five dimensions using appropriate statistical tools. The present study uses a multidimensional approach to construct a composite index. The study uses the approach from all the literature reviewed with appropriate modifications in constructing the index. Each dimension, namely, economic, financial, political, technological, and social globalization are examined in alternate and multiple ways to gauge the depth and breadth of globalization.

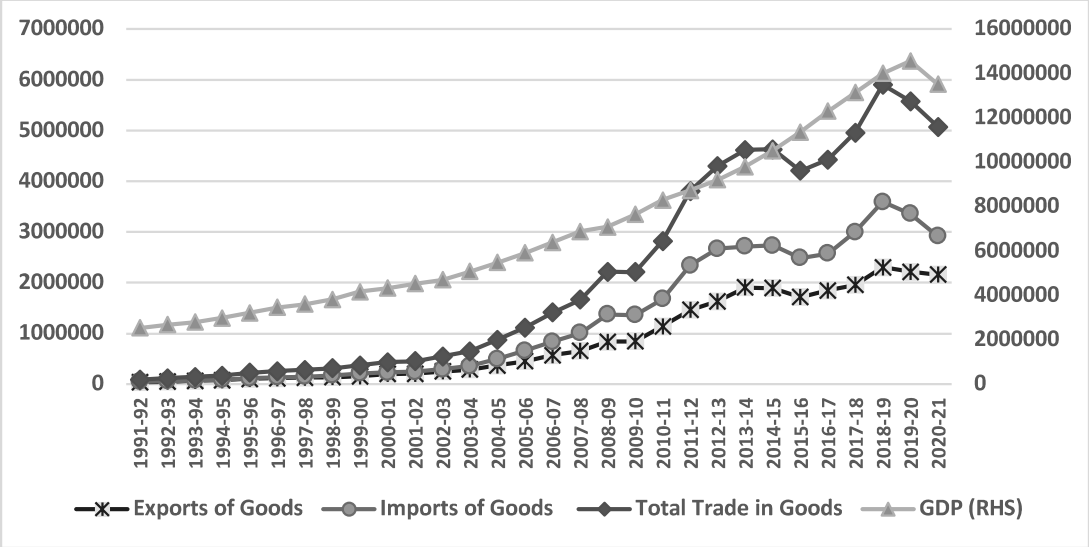
4.1. TRENDS AND GROWTH OF INDICATORS OF GLOBALIZATION

The analysis of the dimensions of globalization is incomplete without the analysis of the trends and growth rates of the individual indicator. The trend and growth rates show the flow of the indicators over time and provide an overview of how they have changed over the study period of 31 years from 1990-91 to 2020-21. This analysis has been divided into five sub-sections, each dealing with the particular dimension of globalization.

4.1.1. ECONOMIC GLOBALIZATION

The core of globalization starts with economic globalization which makes up the basic foundational steps of the economy towards globalization. Economic globalization refers to the cross-border flow of goods and services, and it is analyzed through the bilateral and multi-lateral flow of goods and services. The analyses of economic globalization start with the trend and flow of the variables used as its indicators. These include trade in services to GDP, export of services to GDP, import of services to GDP, trade to GDP, export to GDP, import to GDP, import duties to imports, import penetration, revealed comparative advantage of India in trade in services, and India's trade to World trade.

Fig. 4.1 Merchandise Trade and GDP



Source: RBI Bulletin

The merchandise trade of goods increased more than 54 times from Rs.91893 crores in 1991-92 to Rs.5075001 crores in 2020-21 (Fig. 4.1). It shows an increase at a compound

annual growth rate (CAGR) of 14.83 percent over the study period. The export of goods has increased by a CAGR of 14.36 percent and the import of goods increased at a CAGR of 15.22 percent. India's merchandise trade has been in deficit throughout the study period. The imports of goods increased by nearly 60 times and exports of goods increased by 48 times which explains the negative trade balance. The GDP at constant prices has increased from Rs. 2541123 crores in 1991-92 to Rs.13512740 crores in 2020-21. The trends on foreign trade of India using their absolute values provide a perspective of how the foreign sector of India has performed. However, it is not these absolute values but rather their relative values with reference to GDP that quantify the degree of globalization.

Merchandise Trade

Fig. 4.2 depicts the trends in trade openness in terms of trade in goods in relation to the real economy over the study period.

Fig. 4.2 Merchandise Trade to GDP

Source: RBI Bulletin

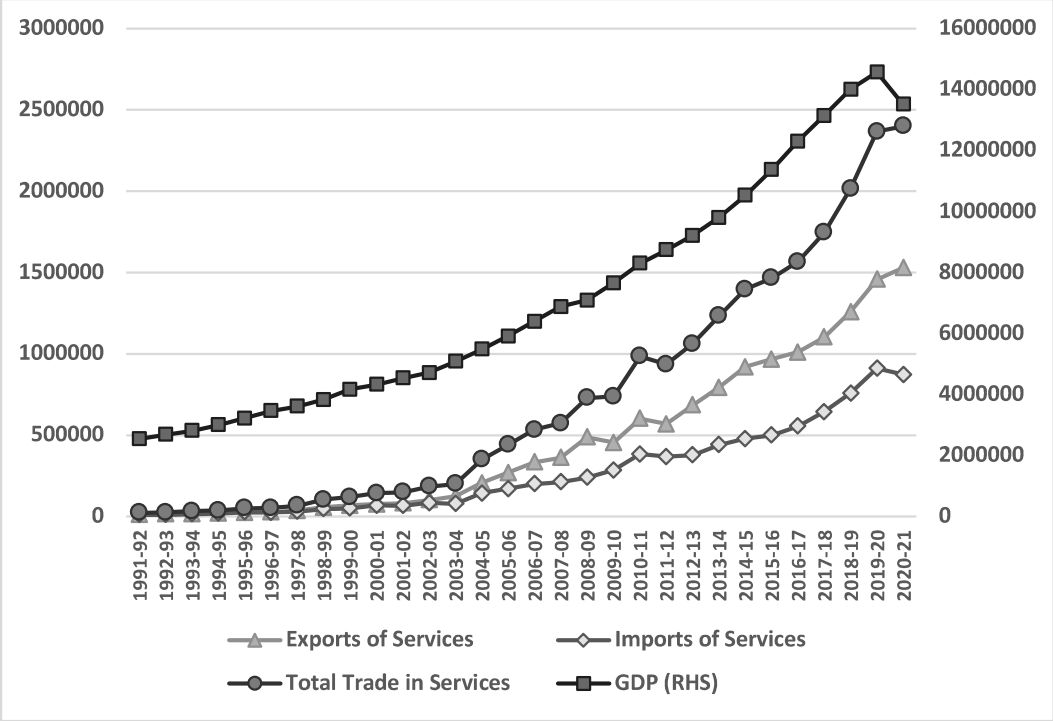
The openness measure – merchandise trade of goods as a proportion of GDP has increased at a compound annual growth rate (CAGR) of 8.4 percent over the study period. The exports of goods to GDP ratio increased from 1.73 percent in 1991-92 to 15.98 percent in

2020-21. From nearly the same base, the import deepening of trade in goods increased much more to 21.58 percent in the year 2020-21. This is borne out from the fact that exports of goods have increased by a CAGR of 7.96 percent while imports of goods increased by a CAGR of 8.78 percent. This has led to India's merchandise trade balance to be in negative. There is a surge in the negative trade balance of (-) Rs.3809 in 1991-92 to (-)Rs.756914 in 2020-21, which shows that India's imports are greater than its exports.

Trade in Services

The service sector is a dominant sector in India's GDP, which covers a variety of industries. The service sector is a key driver of India's economic growth, which is in surplus in India's Balance of Payment (BOP).

Fig. 4.3 Trade in Services and GDP



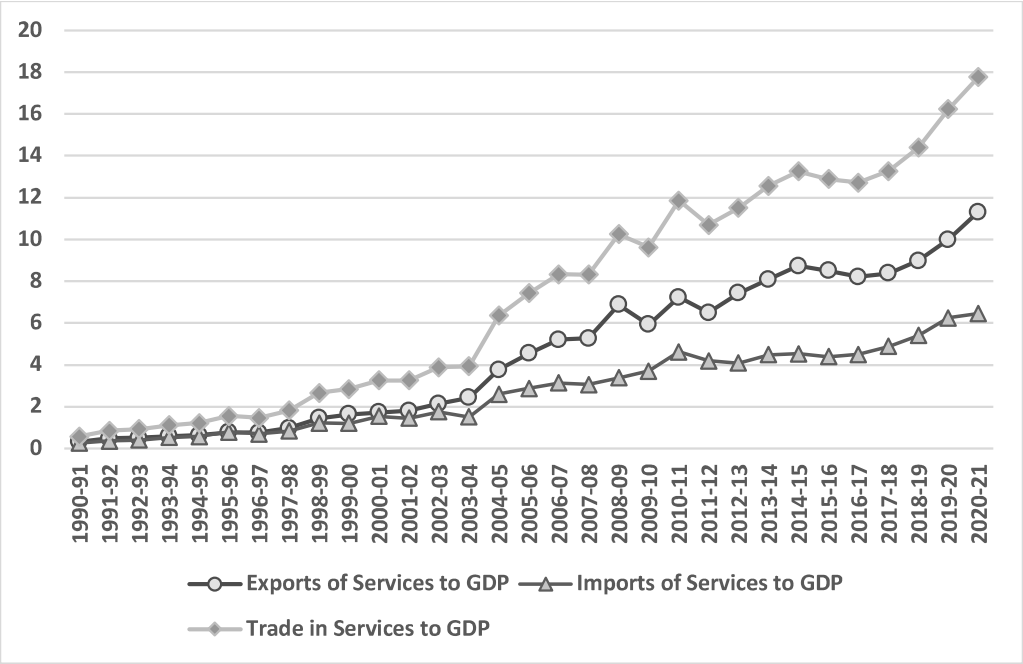
Source: RBI Bulletin

India's trade in the service sector has been in surplus with the export of services exceeding their imports. The trade in services as depicted in Fig. 4.3 has increased at a compound rate of 17.64 percent per annum. The export of services has grown by 122.77 times and the import of services by 93.56 times over the study period. Over the same period, GDP has

increased by 431.76 percent. While these figures indicate the rapid rate of trade expansion, the economic dimension of globalization, as in the case of merchandise trade, is represented by the ratio of services trade to GDP.

In Fig. 4.4 the exports of services to GDP have been depicted which exhibit growth at a CAGR of 11.43 percent from 0.49 percent of GDP in 1991-92 to 11.31 percent in 2020-21. The imports of services to GDP has increased with a CAGR of 10.45 percent. The total change in trade in services to GDP was from 0.85 percent in 1991-92 to 17.76 percent in 2020-21, and the CAGR of trade in services is found to be 11.05 percent.

Fig. 4.4 Trade in Services to GDP

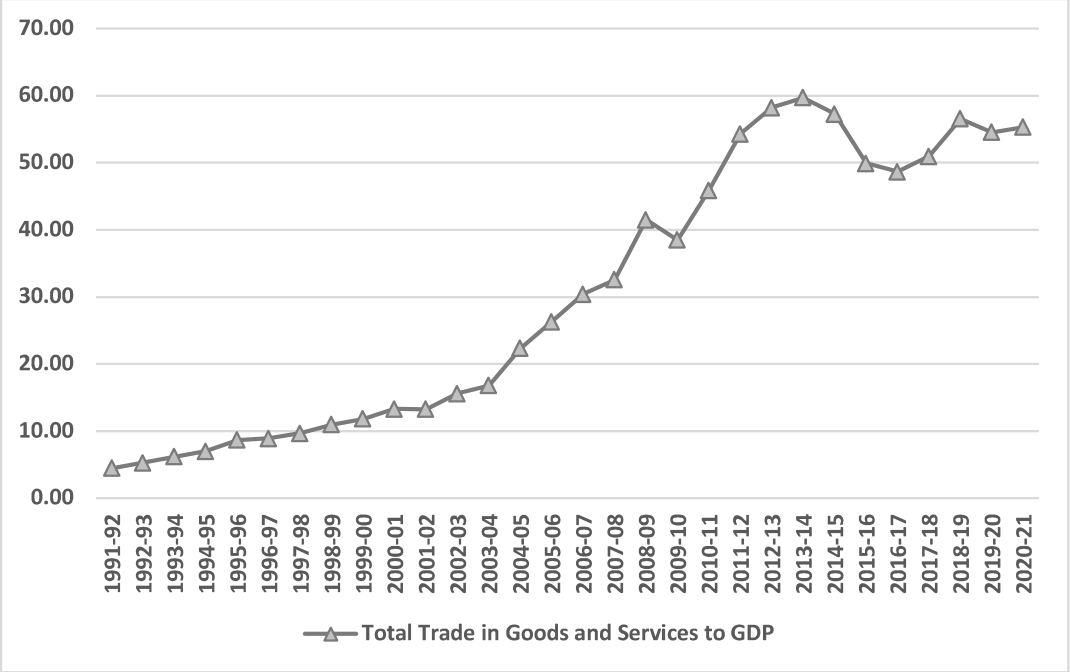


Source: Calculations based on data sourced from RBI Bulletin

Total Trade in Goods and Services

The ratio of total trade in goods and services to GDP while having a positive slope over the study period recorded a CAGR of 9.07 percent (Fig. 4.5). A different picture emerges when the decadal trend is observed. The first and second decades exhibit a steeper rise in the total trade in goods and services with a CAGR of 12.9 and 13.18 percent. Barring the third decade, exhibits a flat trend in the ratio with a 1.88 percent CAGR.

Fig 4.5 Total Trade in Goods and Services

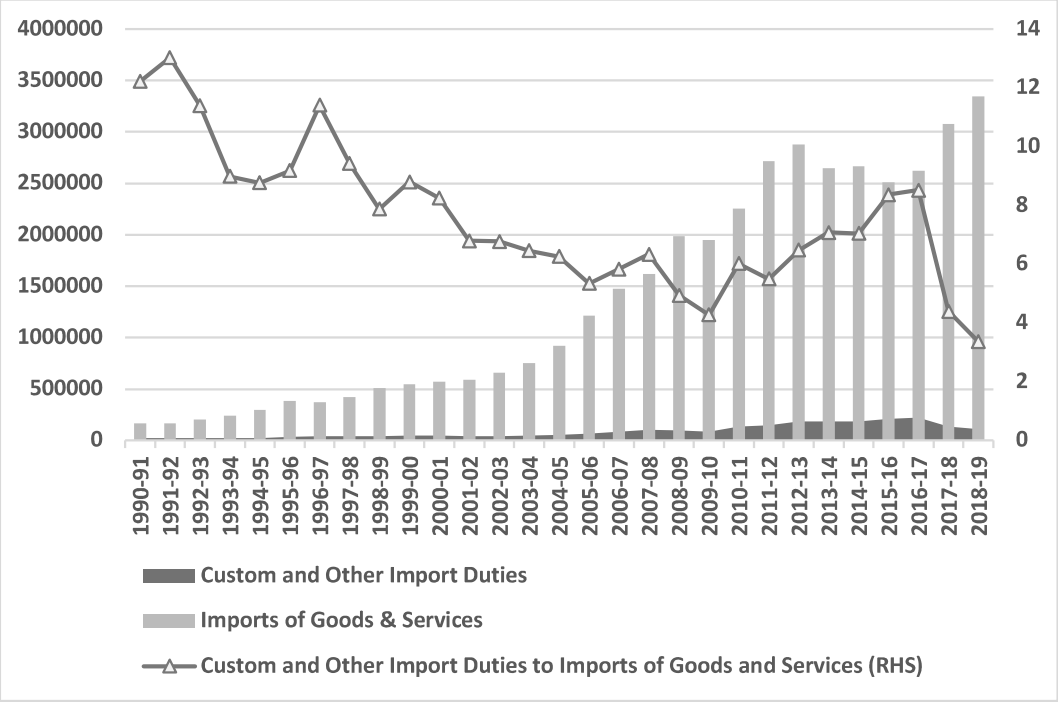


Source: Calculations based on data sourced from RBI Bulletin

Custom and Other Import Duties to Imports

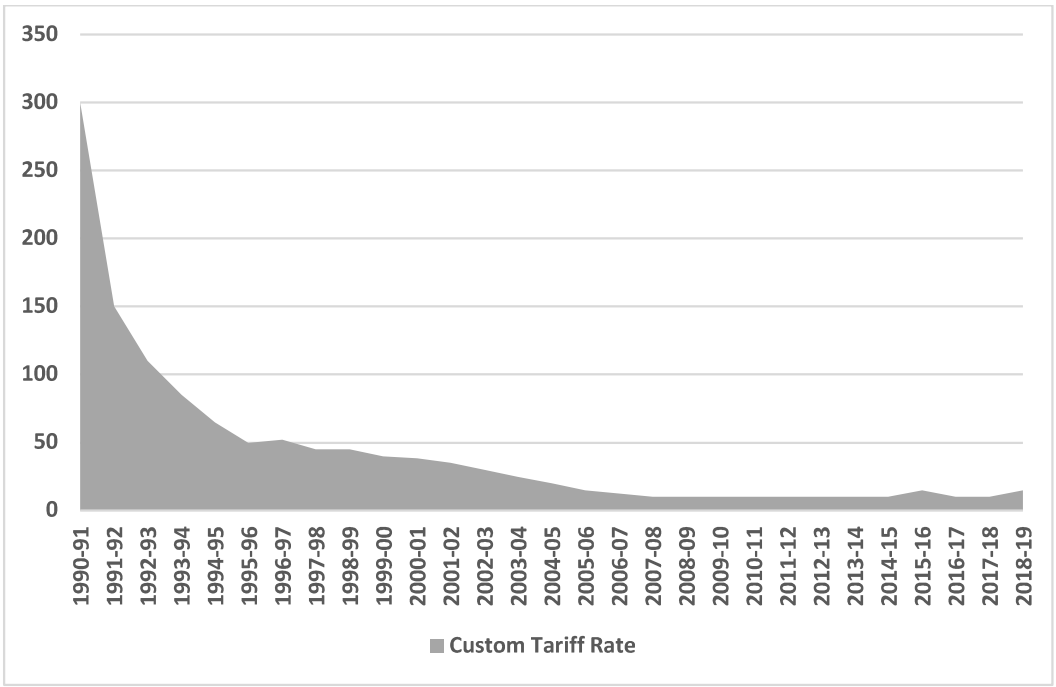
The custom and other import duties as a ratio to total imports is an alternative measure of trade openness, particularly, when the ratio shows a declining trend. The peak custom tariff rate was 300 percent in 1990, which was reduced gradually to 15 percent in the year 2018-19. This records a CAGR of (-)10.14 percent (Fig. 4.6 (b)). For the Indian economy, this ratio shows a negative trend, indicating increased levels of trade openness. The ratio is found to have reduced at a negative CAGR of 4.89 percent, as depicted in Fig. 4.6 (a). The proportion of import duties was 13.02 percent of total imports in the year 1990-91, which has reduced to as low as 3.36 percent by the year 2018-19. In other words, over the study period there is nearly 75 percent reduction in the ratio of import duties to imports which reflects remarkable openness. The reduction in import duties have resulted in an increase in the level of imports from Rs. 45,851 crores in 1990-91 to Rs.29,15,958 crores in 2020-21, a surge of nearly 63 times over the 31-year period.

Fig. 4.6 (a) Import Duties to Imports



Source: Calculations based on data sourced from RBI Bulletin

Fig. 4.6 (b) Custom Tariff Rate

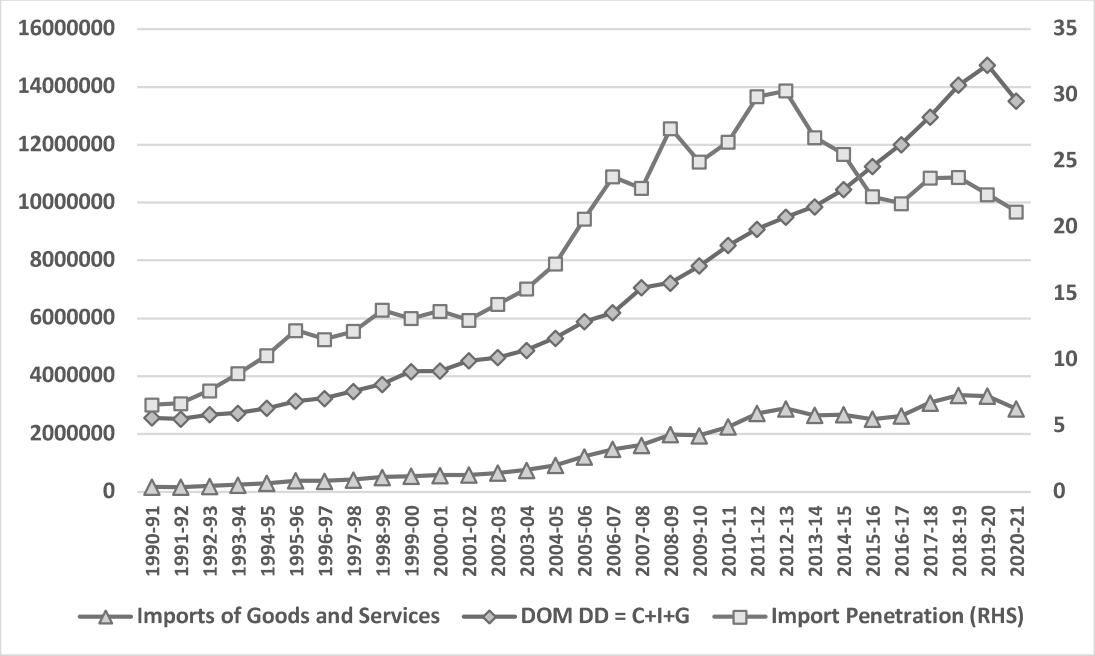


Source: Union Budget

Import Penetration

Import penetration refers to the ratio of imports to the sum of domestic demand in terms of private consumption expenditure, investment expenditure and government expenditure (C + I + G). Over the study period import penetration in domestic demand has increased from 6.68 percent in the year 1990-91 to 21.19 percent in 2020-21 (Fig. 4.7). This amounts to a CAGR of 4.46 percent. A rise in import penetration implies that the increase in demand for goods and services is met by the foreign sector rather than by the domestic producers. It is an indicator of trade openness as it hints at reducing import barriers and improved competitive structure in the domestic economy. For the domestic producers it implies tough competition from imports.

Fig. 4.7 Import Penetration



Source: Calculations based on data sourced from RBI Bulletin

Revealed Comparative Advantage of India in Services Exports

As India has exhibited much dynamism in services exports, it warrants an assessment of how India has fared vis-à-vis the rest of the world as far as export of services is concerned. In this context, increased economic globalization can also be captured in terms of deepening the trade in services in Indian exports vis-à-vis the world exports in services. This can be captured in terms revealed

comparative advantage of India in Services Export (RCA_{Is}), in this case, with reference to services. It is measured as follows:

$RCA_{Is} = (E_s/E_t)_I/(E_s/E_t)_W$

where,

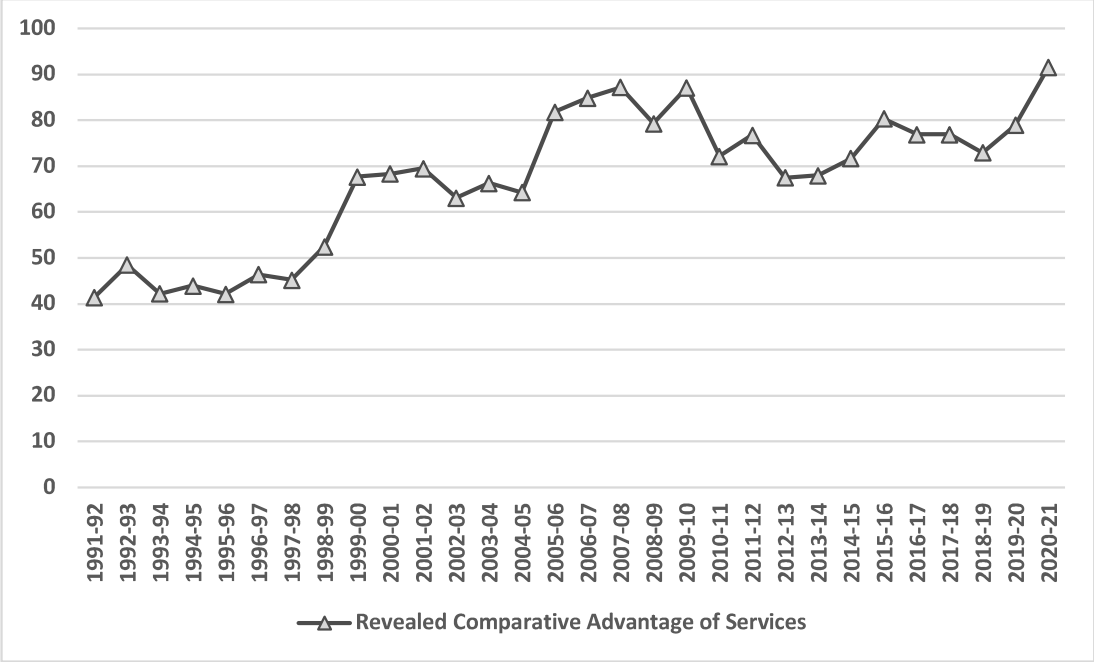
RCA_{Is} = Revealed Comparative Advantage of India in Export of Services

$(E_s/E_t)_I$ = Export of Services by India/Total Exports of India

$(E_s/E_t)_W$ = World Export in Services/Total World Export

An increase in the ratio RCA_{Is} would mean that there is a greater deepening of Indian services exports compared to the rate at which services exports of the world are rising as a ratio to world exports of all goods and services. The findings are presented in Fig. 4.8.

Fig. 4.8 Revealed Comparative Advantage of India in Services Exports



Source: Calculations based on data sourced from RBI Bulletin

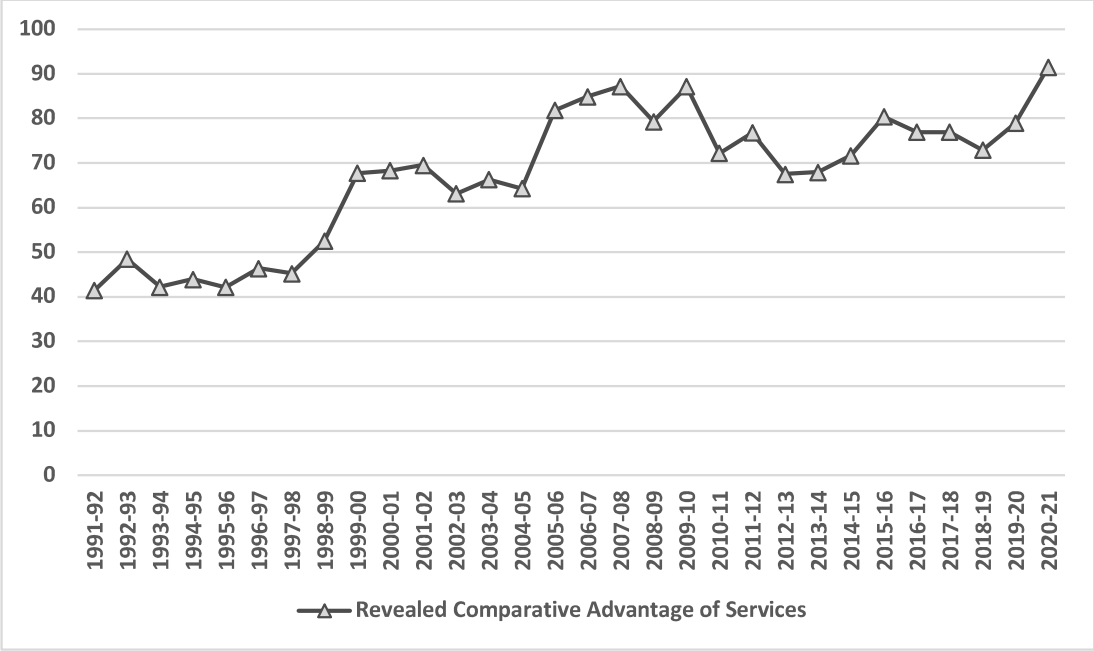
The data for India over the study period reveals that the revealed comparative advantage of India in the export of services vis-à-vis the world has deepened from 41.44 percent in the year 1991-92 to more than twice in the year 2020-21, at 91.55 percent. The ratio has grown at a CARG of 2.77 over the study period. Thus, Indian export in services is robust

which is also substantiated by its growth from Rs.0.12 trillion to Rs.1.5 trillion over the study period, a jump of 11.5 times. During the same period, the world export in services grew substantially from Rs.48327.16 trillion to Rs.1027326.41 trillion, that is, a 20-fold increase. Though world exports in services have grown much more than those of India, the measure of RCA goes a step further by indicating the nature of deepening of globalization in India, vis-à-vis the world, and the data reveals greater deepening of the services exports in India compared to the world.

India's Trade to World Trade

The measures used so far to indicate economic globalization of India have been within the context of the Indian economy in the sense that most indicators have GDP of India as the base. In other words, the indicators so far measure economic globalization in terms of deepening of the foreign sector in relation to the size of the real economy of India as represented by GDP. Another important indicator of deepening economic globalization of India is the ratio of India's foreign Trade to World Trade (Fig.4.9).

Fig. 4.9 India's Trade to World Trade



Source: Calculations based on data sourced from WDI

While the ratio has remained somewhat flat over the study period, it remained relatively higher in the range of 0.15 and 0.18 percent between the years 2005-06 and 2011-12, only to decline thereafter. For that period, the CAGR was nearly two percent. For the overall period though the CAGR was negative at (-)0.27 percent. It suggests that there is a vast scope for a large country like India to increase its presence on the global trade scene. This may partly be attributed to India's domestic pre-occupation, failure to appreciate the full potent of trade policy, and inadequate development of the manufacturing sector, among other things (Puri, 2017). Much effort is also required to improve the benefits from its regional and bilateral trade agreements. In recent years, India has increased its engagements with several countries on bilateral and regional terms which is expected to increase the share of India in world trade in the future.

4.1.2 FINANCIAL GLOBALIZATION

Financial globalization refers to globalization arising out of foreign capital flows in the form of foreign direct investment, and foreign portfolio investment also referred to as foreign institutional investment. Inward foreign capital flows, in particular, can augment domestic capital formation and contribute toward the growth of the economy, and forms a very significant component of globalization. It contributes not only in terms of addition to output but also generates employment, particularly, when it is green field investment. Foreign capital flows also add to the foreign exchange reserves of the country, which are very crucial for an emerging economy like India.

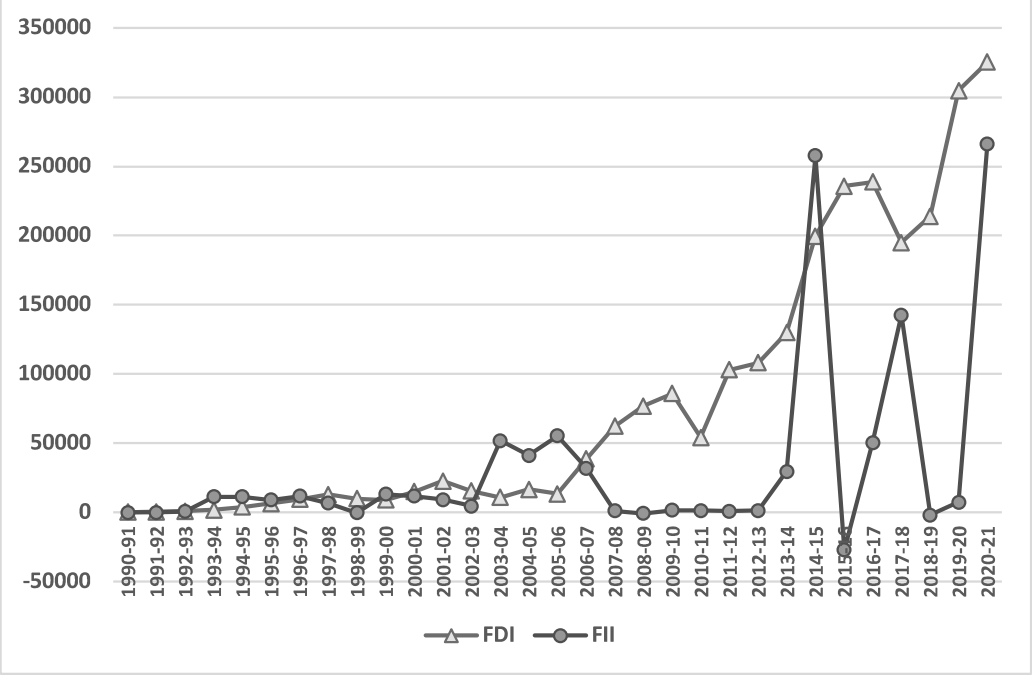
With this premise, this section examines the trend in financial globalization in India. The analysis is carried out using the indicators viz., Foreign Direct Investment to GDP ratio (FDI/GDP), ratio of Foreign Institutional Investment to GDP (FII/GDP) which represents the portfolio investment, and the volume of total foreign capital inflows in relation to the size of the real economy (FII+FDI/GDP). Apart from these indicators, other variables used to represent financial globalization include, Sectoral Foreign Direct Investments (FDI), FDI inflows to Gross Fixed Capital Formation (FDI/GFCF), External Debt to GDP, and Foreign Exchange Reserves to Imports. It is informative to observe the long run trend in the absolute values of the variables such FDI and FII. However, it may be borne in mind

that it is not the absolute values of these variables but their size vis-à-vis the real economy as measured by GDP that provides the measure of globalization.

Foreign Direct Investment

FDI refers to real investment in productive activity by foreign investors with a long-term interest. It is the key element in international economic integration and is a more stable long-lasting link between the economies. More specifically, FDI is known as the cross-border investment in which an investor resident in one country establishes influence over an enterprise in another economy. Ownership of ten percent or more voting power in an enterprise of one country by an investor of the other country is technically considered as FDI. With the introduction of economic reforms in India, there has been a gradual opening up of sectors for foreign investments. This has resulted into several instances of foreign investments through mergers and acquisitions as well as joint ventures and independent investment across the sectors, leading to remarkable growth of FDI in India. The cross-border mergers and acquisitions in India surged to $27 billion in the year 2020 (World Investment Report, 2020).

Fig. 4.10 Foreign Capital Flows

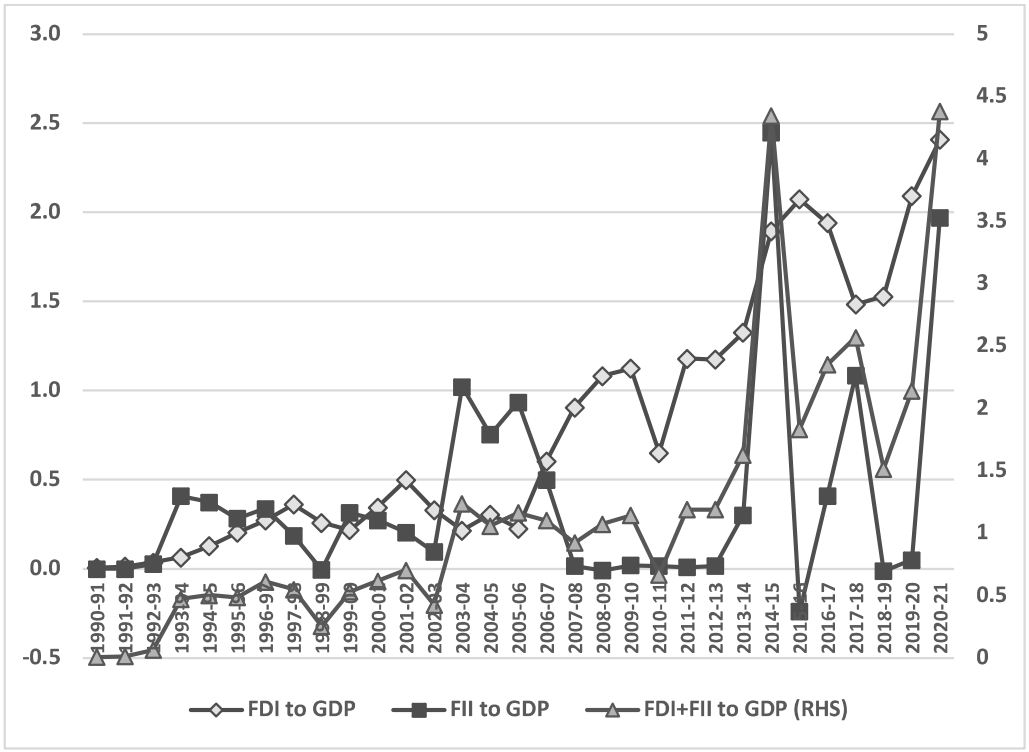


Source: RBI Bulletin

The absolute values of FDI and FII increased after the economic reforms of 1991. The FDI was Rs.172 crores in 1990-91 and Rs.325382 crores in 2020-21; an increase of 1890 times over the study period. The FII inflow and outflow started with the introduction of economic reforms in 1991, which increased by a whopping 26646 times. The FII increased from Rs.10 crores in 1990-91 to Rs.266474 crores in 2020-21. The FDI flows increased by 28.59 percent CAGR and FII increased by 40.45 percent in the study period (Fig. 4.10).

Fig. 4.11 depicts that the FDI to GDP ratio has increased from less than one percent of the GDP in the year 1991 to 2.40 percent in the year 2021. Though in percentage terms FDI appears to be miniscule, it has registered a robust CAGR of 20.06 percent. For most sectors of the economy, limits to FDI up to 100 percent were allowed around the year 2000. Agriculture, Animal Husbandry, Auto Components, Asset Reconstruction Companies, Single Brand Product Retailing, Pharma Sector, Railway Infrastructure, and E-commerce activities have the permission of 100 percent FDI through automatic route since the year 2000 (Budget, 2000).

Fig. 4.11 Ratio of Foreign Capital Flows to GDP



Source: Calculations based on data sourced from RBI Bulletin

The ratio of FDI to GDP shows a clear upward trend from the year 2005-06 onwards which is substantiated by the sharp upward trend in FDI flows from the same year as depicted in Fig. 4.9. From Rs.13425 crores in the year 2005-06, FDI flows increased 24 times in 15 years to reach the level of Rs.325382 crores in 2020-21. It is noteworthy that the degree of financial globalization has increased even as the decade of 2000 saw higher GDP growth rates.

There is observed a further surge in FDI to GDP ratio in the later years, particularly, since 2014-15 which may be attributed to the change in government at the centre and the adoption of programmes like Make-in India and lately, the Production Linked Incentives Scheme (PLI) and most FDI inflows being brought under the automatic route. Making a decadal comparison brings out interesting trends in the FDI/GDP ratio as presented in Table 4.1.

Table 4.1 Decadal Comparison of FDI/GDP Inflows in India

Year	FDI/GDP (%)	CAGR
1990-91 to 1999-00	0.01 to 0.22	40.98
1999-00 to 2009-10	0.22 to 1.12	17.67
2009-10 to 2020-21	1.12 to 2.41	7.30
1990-91 to 2020-21	0.01 to 2.41	20.06

Source: Computations based on data sourced from RBI Bulletin

As per the Press Information Bureau (Sept, 2022), the year 2021-22 has attracted the highest ever FDI worth $83.6 billion. Not only so, but there is a greater diversity in the direction of inward FDI which is now spread over 100 countries. The diversity in FDI is also witnessed in terms of the wide coverage of most states and union territories of India as the recipients. There is wide sectoral diversity also observed with over 57 sectors receiving FDI inflows. Thus, not only has there been a deepening of financial globalization in India, there has been a broadening of financial globalization over the years, which is expected to become more pronounced in the future as India is poised to become a more competitive contender for foreign investment.

Foreign Institutional Investment (Portfolio Investment)

Foreign portfolio investment or foreign institutional investment refers to the foreign investment flowing into the secondary market of India, comprising debt and equity market. They are also known as footloose investment as they are not as reliable as FDI and may take a flight abroad on the slightest hint of quick profit opportunities available in their home countries or elsewhere. However, despite monthly fluctuations in inward FII in India, over the long run time horizon their flows have been positive. From around 0.40 percent of the GDP at the beginning of the study period, it has surged to 1.97 percent of GDP in the year 2020-21, growing at the CAGR of 5.46 percent. However, given the nature of FII flows, it can be observed in Fig. 4.11 that there is a greater degree of fluctuation in it compared to that in the FDI ratio. The fluctuations are particularly pronounced during the time period consistent with the global financial crisis, the *taper tantrum* post 2013 in reaction to the proposed monetary tightening by the US central bank and the recessionary phase in the Western world.

Total Foreign Capital Flows

From a low of 0.01 percent of GDP, total foreign capital flows (FII+FDI) to GDP ratio increased to 4.38 percent in the year 2021 (Fig. 4.11). In other words, it registered a robust four-fold increase in financial globalization. Over the study period, foreign capital flows to GDP have increased at a CAGR of 22.47 percent. It can also be observed that the total foreign capital ratio shows relatively moderate fluctuations compared the ratio of FII to GDP on account of the robust growth of reliable FDI flows.

Sectoral Foreign Direct Investments (FDI)

FDI has not only grown in the overall sense but the sectoral composition has also undergone drastic change over the years. Sectoral FDI is another interesting variable to measure financial globalization. It measures the opening up of the sectors of the Indian economy. The opening up of the sectors is seen in the gradual increase in the ceiling of FDI and finally, allowing 100 percent foreign investment through the government approved or automatic routes. Table 4.2 shows the number of sectors in which 100 percent

FDI was allowed in the corresponding years. It clearly shows that financial globalization has widened over the years.

The sectoral FDI shown in 4.2 reflects the cumulative figures of openness in terms of the FDI limit. In the first decade of reforms practically all sectors had FDI limit lower than 100 percent. While it did mark the opening up of foreign investment in high priority industries typically requiring huge investment and advanced technology, FDI was not permitted up to 100 percent either through government or automatic route in any sector.

Table 4.2 Number of Sectors with 100 Percent FDI Limit

Year	Sectoral FDI	Year	Sectoral FDI
1990-00	0	2013-14	7
2000-06	1	2014-15	11
2007-08	2	2015-16	14
2008-09	4	2016-17	23
2009-10	4	2017-18	24
2010-11	4	2018-19	28
2011-12	6	2019-20	33
2012-13	7	2020-21	40

Source: Website of Make in India

This reflects the restriction toward the foreign investments even after the LPG reforms. The complete sectoral openness started from the year 2000 in agriculture and animal husbandry. In 2007 one more sector i.e., capital goods was allowed for 100 percent FDI. Now many sectors have been allowed 100 percent foreign investment as shown in table 4.3.

Table 4.3: Sectors with 100 Percent FDI Limit

Sector	Sector	Sector
Auto-components, Automobiles	Chemicals	E-commerce Activities
Biotechnology (Greenfield)	Cash & Carry Wholesale Trading (including sourcing from MSEs)	Duty Free Shops
Agriculture & Animal Husbandry	Capital Goods	Credit Information Companies

Air-Transport Services	Broadcasting Carriage Services	Construction of Hospitals
Airports (Greenfield + Brownfield)	Broadcast Content Services (Up-linking & down-linking of TV channels	Construction Development
Asset Reconstruction Companies	Tourism & Hospitality	Food Processing
Coal & Lignite	Electronic Systems	Gems & Jewellery
Healthcare (Greenfield)	Pharmaceuticals (Greenfield)	Medical Devices
Industrial Parks	Petroleum & Natural gas	Core Investment Company
IT & BPM	Services under Civil Aviation Services such as Maintenance & Repair Organizations	Food Products Retail Trading
Leather	Textiles & Garments	Mining & Minerals separations of titanium bearing minerals and ores, Its value addition and integrated activities
Manufacturing	Single Brand Retail Trading	Print Media (publications/ printing of scientific and technical magazines/ speciality journals/ periodicals and facsimile edition of foreign newspapers)
Mining & Exploration of metals & non-metal ores	Roads & Highways	Satellite (Establishment and operations)
Other Financial Services	Renewable Energy	Plantation sector
Ports & Shipping	Railway Infrastructure	White Label ATM Operations and Insurance & Insurance Intermediaries

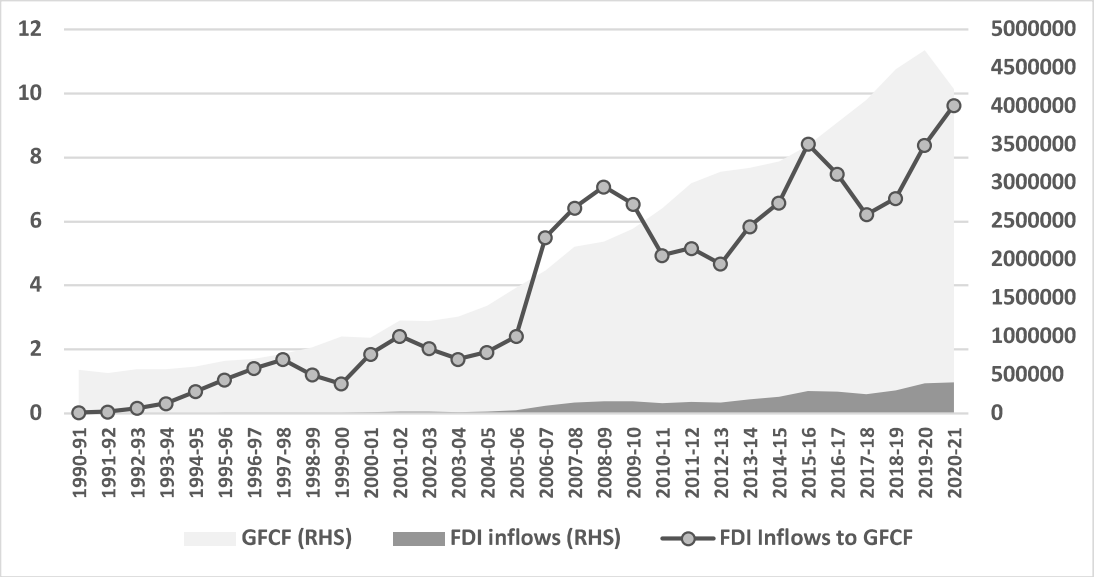
Source: Website of Make in India

Foreign Direct Investment to Gross Fixed Capital Formation Ratio

The purpose of examining the ratio of FDI to GFCF is that it represents the relative size of inward foreign capital formation vis-à-vis domestic capital formation. An increase in the ratio would indicate that there is a greater financial integration of the economy with deepening of foreign investment, thus, representing financial globalization.

It shows that the output in the economy is being produced by increased contribution of foreign capital in relation to domestic capital. Fig. 4.12 reveals that FDI/GFCF has increased at a robust rate of 21.22 percent on a compound annual basis over the period 1990-91 to 2020-21. From as low as 0.03 percent in the year 1991, the FDI/GFCF percentage stood at 321 times higher in the year 2021 which is a remarkable growth.

Fig. 4.12 FDI Inflows to GFCF



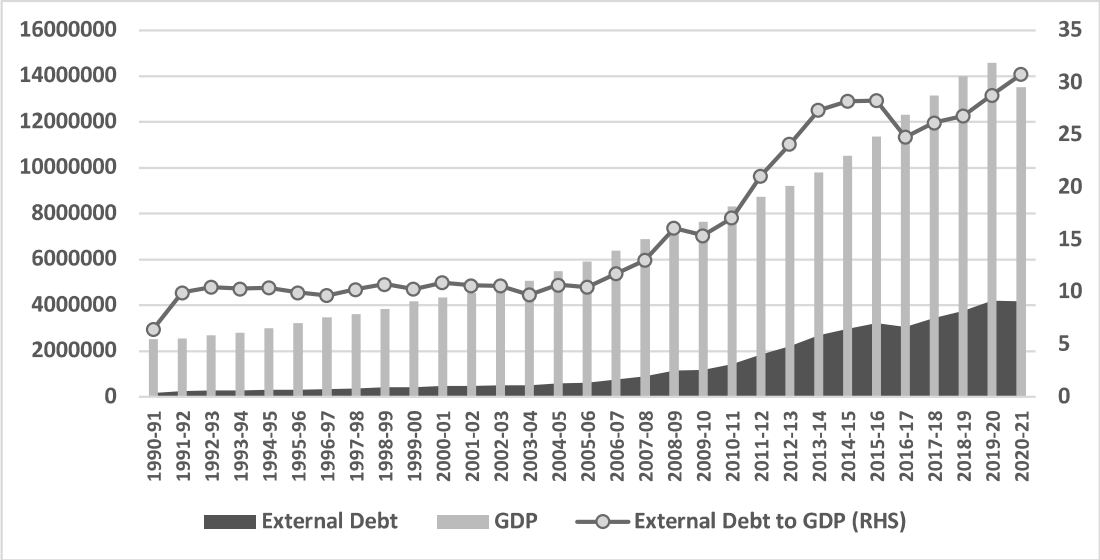
Source: Calculations based on data sourced from RBI Bulletin

External Debt Ratio

External debt plays an important role for any economy as an additional source of finance. It comprises sovereign and non-sovereign debt. External debt is raised from multilateral organizations such as the International Development Agency, Asian Development Bank, the World Bank, International Finance Corporation, the International Monetary Fund, etc. Further it includes debt raised from external commercial borrowings, NRI deposits, trade credit, which form the largest components of non-sovereign debt, and which in turn comprise the major share of India's external debt. Sources of external debt typically include loans, deposits, trade credit, bonds and notes. The ability of the government and the private sector to raise external debt and the volume of external debt raised signifies financial integration of the economy with the global financial system.

Considering the data on external debt, its ratio to GDP increased nearly five times from 6.48 percent the year 1990-91 to 30.8 percent in the year 2020-21 as depicted in Fig 4.13. On a compound annual basis, India's external debt to GDP has increased at the rate of 5.33 percent. Interestingly, if the study period is divided into equal halves, the first part comprising 1990-91 to 2005-06 and the second part comprising 2005-06 to 2020-21, the trend in the external debt ratio reveals a noteworthy trend. In the first half of the period, the ratio of external debt exhibited a flat trend, hovering around ten percent, and growing at a CAGR of 3.26 percent. However, in the second half of the period, there is a consistent upward trend from 10.49 percent to 30.8 percent, clocking a CAGR of 7.44 percent which is more than double the rate of growth in the first half. It indicates that the capacity of the economy to raise external debt has improved substantially which not only points towards greater global integration of the economy but also demonstrates robustness of the economic growth of India. Moreover, this increase in external debt has come about without compromising on its sustainability, and has been managed in a prudent manner. The status report on India's external debt (MoF, GoI, 2022) asserts that debt vulnerability indicators of India are comfortable and moderate compared to other countries in the low- and middle-income group. This speaks volumes about the growing but measured financial globalization of the Indian economy.

Fig. 4.13 External Debt to GDP



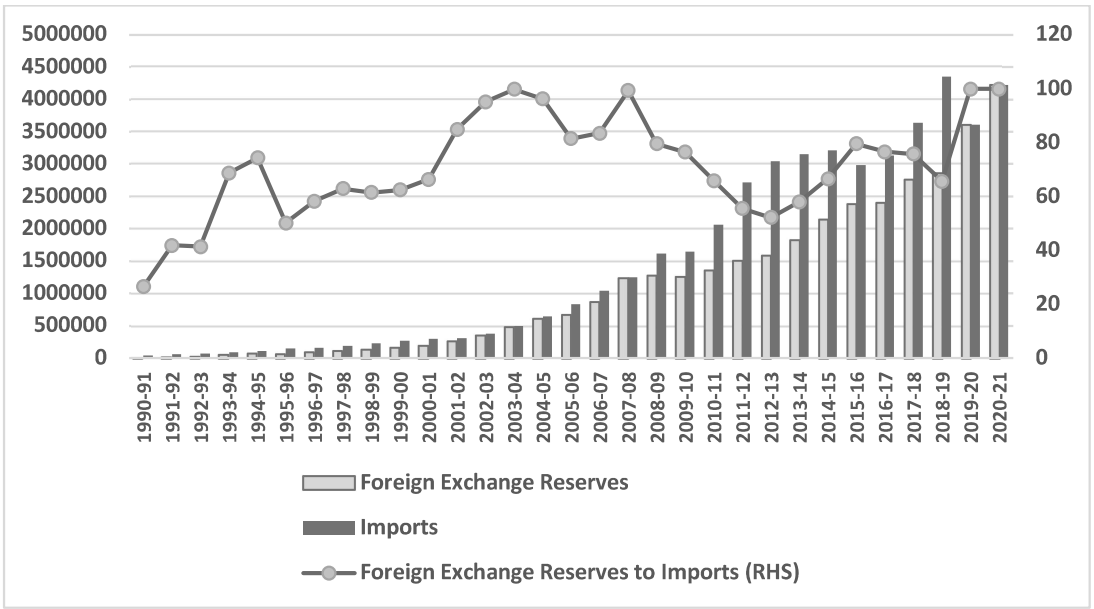
Source: Calculations based on data sourced from RBI Bulletin

Foreign Exchange Reserves to Imports Ratio

Another interesting measure of financial globalization is the ratio of foreign exchange reserves to imports, which shows how much reserves have been accumulated so as to support the imports. If the foreign exchange reserves are able to cover greater value of imports, it indicates that the economy has a comfortable position as far as the external sector is concerned. Not only does the ratio indicate the level of financial globalization but also the qualitative aspect of financial globalization.

As indicated in Fig. 4.14, the foreign exchange reserves to imports ratio has increased from 26.43 percent in the year 1990-91 to 100 percent in the year 2020-21, the latter implying that for the given year, the accumulated reserves can pay for the import bill of the entire year. The peak of 100 percent coverage is observed in the years 2003-04, 2007-08, 2019-20 and 2020-21, although post the global financial crises there was gradual decline in the ratio to nearly 50 percent, precisely, 52 percent. Of the 31-year observations, for 28 years, the ratio has been above 50 percent, and above 60 percent for 23 out of 31 years, which shows a comfortable position for the country. Over the period of examination, the ratio has grown at a CAGR of more than three percent.

Fig. 4.14 Foreign Exchange Reserves to Imports



Source: Calculations based on data sourced from RBI Bulletin

It is also noteworthy that this improvement in import coverage has come about even as imports have increased substantially from Rs.43198 crores to Rs.4223878 crores over the study period, that is, close to 100 times. It may be noted that the foreign exchange reserves have grown much faster from Rs.11416 crores to Rs.4218953 crores in the study period, amounting to an increase of more than 368 times. The robustness of this growth needs to be appreciated in the backdrop of the critical balance of payments situation that built up in the 1980s culminating into the 1991 economic crises that left India with foreign exchange reserves to support only three weeks of import. In contrast, currently, India has enough foreign exchange reserves to manage more than a years' import payments. This provides critical support in the times of extreme global uncertainties. Interestingly, imports of India have surged, particularly, from the mid-2000s, and have been much higher than the reserves of foreign exchange, compared to the previous years, although the pace of growth in both have been nearly the same in terms of CAGR.

4.1.3 POLITICAL GLOBALIZATION

Global trade and capital flows do not occur naturally. Even as business motives have been the driving forces since ancient times, shaping the evolution of globalization from times as old as humanity, it cannot have occurred without the tacit or explicit support of the formal or informal authorities in the then existing social order. In modern day parlance, this is demonstrated in the explicit policy making and designing of strategies involving geopolitical relations. A measure of globalization is, thus, incomplete without taking into account countries' active diplomatic involvement with each other as they seek to build up bilateral, regional or multilateral alliances. This is captured by the indicator – political globalization – which is a measure of the degree of political cooperation between the countries. Political globalization increases with policies and decisions made at global level with integration between the nations.

In the present study, the analysis of India's political globalization has been done using indicators such as the ratio of trade with partner countries to India's total trade, India's membership in foreign organizations, participation in trade agreements and in the United Nation peace making agreements. All, except the first indicator, are taken in absolute numbers.

Participation in Trade Agreements

Trade agreements, whether bilateral, regional, or multilateral, increase trade opportunities, expand the size of markets, increase the opportunities to exploit differences in skills and endowments, and reduce the likelihood of conflicts between member countries. Over the years, India has entered into several trade agreements with different countries. Some of these agreements are bilateral, such as, Chile-India, India-Afghanistan, India-Bhutan, India-Japan Comprehensive Economic Partnership Agreement (CEPA), India-Malaysia, India-Mauritius CEPA, India-Nepal, India-Sri Lanka, India-Thailand Comprehensive Economic Cooperation Agreement (CECA), India-Singapore CECA, India-Australia CECA, India-Canada CEPA, India-South Korea CEPA, India-New Zealand, India-Gulf Cooperation Council (GCC), India-Israel, and India-Eurasian Economic Union (EAEU). Some other trade agreements have been with groups of countries that have integrated into some or the other forms of regional economic integration. These include agreements like Association of South East Asian Nation (ASEAN)-India, Asian Pacific Trade Agreement (APTA), BRICS, South Asian Free Trade Agreement (SAFTA), South Asian Preferential Trade Agreement (SAPTA), South Asian Association for Regional Cooperation (SAARC), Southern Common Market (MERCOSUR)-India, and Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC).

Table 4.4 India's Trade Agreements

Year	Trade Agreements (Nos.)	Year	Trade Agreements (Nos.)
1990-92	2	2005-06	17
1992-93	3	2006-07	19
1993-94	4	2007-08	20
1994-98	5	2008-09	21
1998-03	7	2009-11	22
2003-04	11	2011-15	24
2004-05	13	2015-21	25

Source: Ministry of Commerce

These agreements with trading blocs give India access to all member countries of the bloc, thereby increasing the scale of political globalization. Table 4.4 presents the cumulative trade agreements corresponding to the years within the study period. It can be seen that the number of trade agreements have been increasing during the second half of the study period, that is, from 2005-06 onwards. It is expected that such an increase resulting from good political relationships would be reflected in an increased proportion of trade happening with trade agreement countries.

Trade with Trade-Agreement Countries to India's Total Trade

Fig. 4.15 presents how India's trade with trade agreement countries have fared with reference to total trade of India. During the study period there has been an increase in the number of trade agreements by India from merely two in the years 1990-92 to 25 in the years 2015-21. It can be observed that over the years 1990-2005, the first 15 years of the study period, India's trade with trade agreement countries was less than four percent of the total trade of India. This is substantiated by the lower number of trade agreements of India with other countries as depicted in Table 4.3. The volume of trade with trade agreement countries increased from Rs.1192.9 crores in the year 1990-91 to Rs.938188 crores in 2020-21, growing at the CAGR of 24.88 percent.

Fig: 4.15 Trade with Trade Agreement Countries to India's Total Trade

Source: Calculations based on data sourced from RBI Bulletin

In the second half of the study period, that is, 2005-06 onwards, there is a steep increase in the trade proportion with trade agreement partners. From as low as seven percent, it peaked in the year 2018-19 at a nearly five-fold higher proportion than in 2005-06. The spike in the trade agreements can be seen from 2003-04 with a number of 11 agreements which can be attributed to have led to higher volume of trade in the subsequent years. For instance, the trade agreement of India-Thailand Comprehensive Economic Cooperation Agreement (CECA) in 2003-04 increased the trade by Rs.10124 crores in 2005-06 from Rs.6620 crores in 2003-04; the joining of Myanmar as a partner in BIMSTEC in the year 2005-06 increased the total trade by Rs.32396 crores from Rs.22684 crores. Myanmar itself contributed Rs.2818 crores in 2005-06 which led to an increase in the contribution of BIMSTEC. India-South Korea CEPA, India-Singapore CEPA and India-Indonesia CECA increased the trade in 2005-06 by Rs.28295 crores, Rs.38868 crores and Rs.19428 crores, respectively, with the start of the bilateral trade agreement between the all the three countries in 2005-06.

The decline in the proportion of trade with trade agreement partners after the peak reached in 2018-19 may be attributed to the fall in trade with majority of the trade agreement partners such as SAARC, BRICS, India-Bhutan FTA, India-Nepal trade treaty, India-Indonesia CECA, India-Singapore CECA, India-Japan CEPA, etc. The trade war between the trading partners forced the countries to adopt retaliatory measures. The India-Nepal border rift, India-China border rift, India-Malaysia rift over the palm oil, India-US trade war over the duties led to reduction in trade.

Notwithstanding the decline in the last couple of years of the study period, it is expected that trade agreements which form important components of political globalization would flourish in the coming years with increased engagement of India in diplomatic relations with a vast array of countries. It is also common knowledge that in recent times, India has entered into several bilateral agreements, such as India-Mauritius Comprehensive Economic Cooperation and Partnership Agreement (CECPA), India-UAE CEPA, IND-AUS Economic Cooperation and Trade Agreement (ECTA) with Australia and there are on-going talks with several other countries such as the UK and the EU.

India's Membership in Foreign Organizations

Global and regional issues of concern for countries are represented at the global level, and in this regard, membership to international organizations helps a country to participate in the decision-making process, put forth their concerns and address those issues more effectively. These institutions play an important role by providing funding and technical support, and impart knowledge of good governance and provide a forum to discuss and effect favorable changes in restrictive policies and practices. India's membership in foreign organizations has doubled to 62 by the year 2020-21 from exactly half the number, at 31 in 1990-91. These include membership to international financial institutions, sector specific organizations, and organizations related to culture, health and knowledge domain. Table 4.5 presents the various international institutions of which India is a member country.

Table 4.5 India's Membership in Foreign Organization

Year	International Organization
1922	International Labour Organization (ILO)
1944	International Civil Aviation Organization (ICAO)
1945	International Monetary Fund (IMF)
1945	Food and Agriculture organization of the US (FAO)
1945	United Nations (UN)
1948	World Health Organization (WHO)
1949	International Criminal Police organization (INTERPOL)
1950	United Nations Human Right Council (UNHRC)
1957	International Atomic Energy Agency (IAEA)
1959	International Maritime Organization (IMO)
1966	Asian Development Bank (ADB)
1970	Non-Allied Movement (NAM)
1964	Group of 77 (G-77)
1972	Group of 24 (G-24)
1979	International Fund for Agricultural Development (IFAD)

1980	United Nations Industrial Development Organization (UNIDO)
1982	Africa Development Bank (AFDB)
1982	South Asian Cooperative Environmental Program (SACEP)
1989	Group of 15 (G-15)
1994	United Nations Programme on HIV/AIDS (UNAIDS)
1994	Multilateral Investment Guarantee Agency (MIGA)
1995	World Trade Organization (WTO)
1996	ASEAN Regional Forum (ARF)
1997	Organization for Economic Cooperation and Development (OECD)
1998	World Intellectual Property Rights (WIPO)
1999	Group of 20 (G-20)
2000	Mekong Ganga Cooperation (MGC)
2002	European Organization for Nuclear Research (CERN)
2002	International Organization for Standardization (ISO)
2003	United Nations Educational, Scientific and Cultural Organization (UNESCO)
2005	East Asia Summit (EAS)
2005	Group of 5 (G-5)
2006	Organization for the Prohibition of Chemical Weapons (OPCW)
2008	International Organization for Migration (IOM)
2009	United Nations World Tourism Organization (UNWTO)
2013	Indian Ocean Rim Association (IORA)
2013	Bank of International Settlements (BIS)
2014	Pacific Alliance
2017	Shanghai Cooperation Organization (SCO)
2017	Wassenaar Arrangement
2020	International Olympic Committee (IOC)

Source: Compilation from Websites of G20, World Bank, IMF, United Nations, WTO, ADB, WHO

India's Membership in Peace-Making Agreements

A peace-treaty is an agreement between two countries or governments to formally end the war situation between them. The countries with bilateral trade agreements are least likely to be involved in conflict with each other. The number of India's peace-making agreements in the United Nations (UN) has also increased from 17 to 30 over the study period. The Border Defence Cooperation Agreement between India and China, the Agreement on the Establishment of a Working Mechanism for Consultation and Coordination on India-China Border Affairs, Agreement between India and China on Confidence-Building Measures in the Military Field along the Line of Actual Control in the India-China Border Areas, and the Protocol between India and China on Modalities for the Implementation of the same, Agreement on the Maintenance of Peace and Tranquillity along the Line of Actual Control in the India-China Border Areas, the Lahore Declaration, Joint Statement between the Governments of India and Pakistan, Memorandum of Understanding between the Governments of India and Pakistan, Indo-Lanka Accord, etc., are some of the peace-making agreements. Peace treaties tend to increase trade interdependence and reduce the inter-state political conflict. Trade openness reduces the probability of conflict with trade partners by increasing bilateral trade agreements.

4.1.4 TECHNOLOGICAL GLOBALIZATION

Technological globalization represents the speedy diffusion of technology from developed to developing countries. As trade and capital flows between countries increase, particularly, capital flows, it tends to bring in new technology and has its spillover effects on technological development in the country. Diffusion of technology also percolates down to the population in terms of increased adoption of mobile phones and internet in routine life. Rapid increase in the network of mobile phone users and mobile phone technology opens up new avenues of opportunities to integrate economic activities ranging from consumption and exchange, savings and investments, production and distribution enabled by the connectivity through the mobile phone-internet ecosystem. This forms a significant component of technological globalization. Further, it also encourages firms to undertake research and development activities with or without alliances with foreign parties.

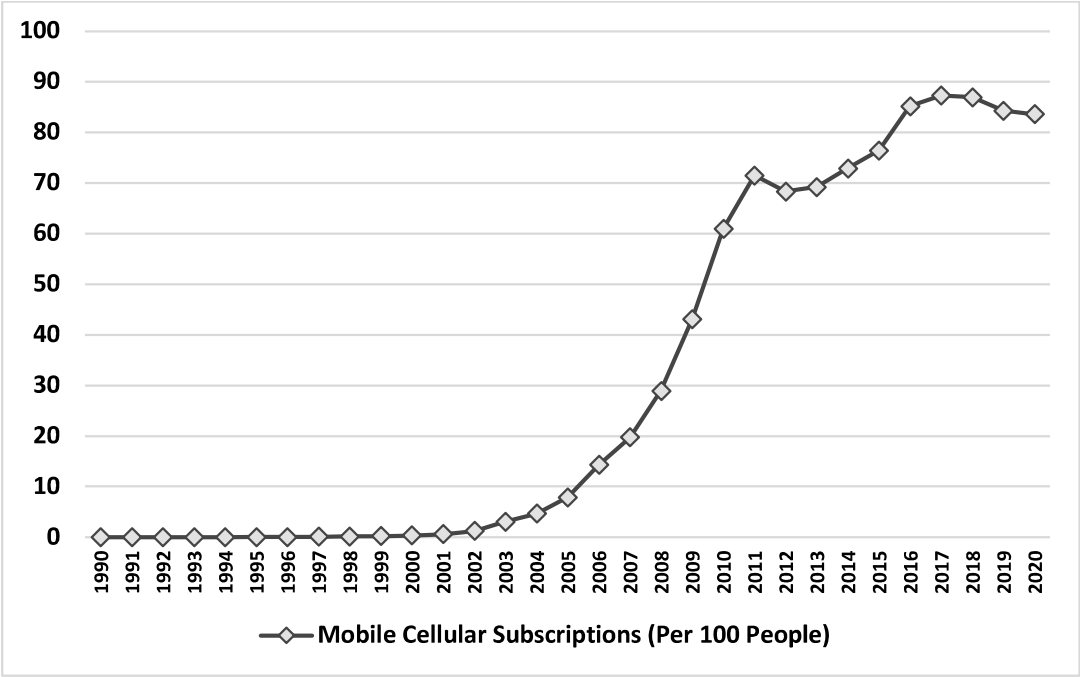
In the present study the analysis of technological globalization is carried out using indicators such as mobile cellular subscription per 100 persons, global commodities as percentage of population, Research and Development expenditure as percentage of GDP, and patent applications by non-residents as percentage of population. Technological globalization is also indicated by the number of joint ventures, mergers and acquisitions, licensing, etc. that tends to bring along technology transfers. However, on account of lack of sufficient data these have not been included in the study.

Mobile Cellular Subscription Per 100 Persons

Mobile phone penetration is measured as the mobile cellular subscription per 100 persons. It improves communication and promotes economic activity and productivity in different sectors, such as agriculture, health, education, finance, and also increases social inclusion etc. The improvement in service quality and network coverage, i.e., the availability of 3G and 4G connections has increased the subscriptions. This increase in the penetration has made basic mobile services such as voice, texts, internet services available to billions of people in India.

It can be observed in Fig. 4.16, that the mobile subscription was close to nil in the first five years of the study period. Even for the entire first decade, ending 2000, mobile phone subscription per 100 persons was merely 0.33. It may be borne in mind that it was the initial time when mobile phones were first introduced in India, and incoming calls too were charged at high rates, let alone outgoing call charges. For the entire first decade of the study period, mobile cellular subscription per 100 persons shows less than one person owning a mobile phone or 33 persons over 10000 owning a mobile. It is only in the year 2002, that registers at least one person per 100 persons as owning a mobile phone. Around the second decade of the study period, more specifically the period from 2002 to 2011, marks the years from one person per 100 persons owning a mobile to the interim peak number of 71 per 100 persons in the year 2011. It scores 70 times increase in a ten-year time period registering a CAGR of more than 60 percent over the decade. In the third and last decade of the study period, spanning 2011 to 2020, mobile phone penetration increased from 71.49 to 83.60, after peaking at 87.32 in the year 2017.

Fig. 4.16 Mobile Cellular Subscription (Per 100 People)



Source: Calculations based on data sourced from WDI

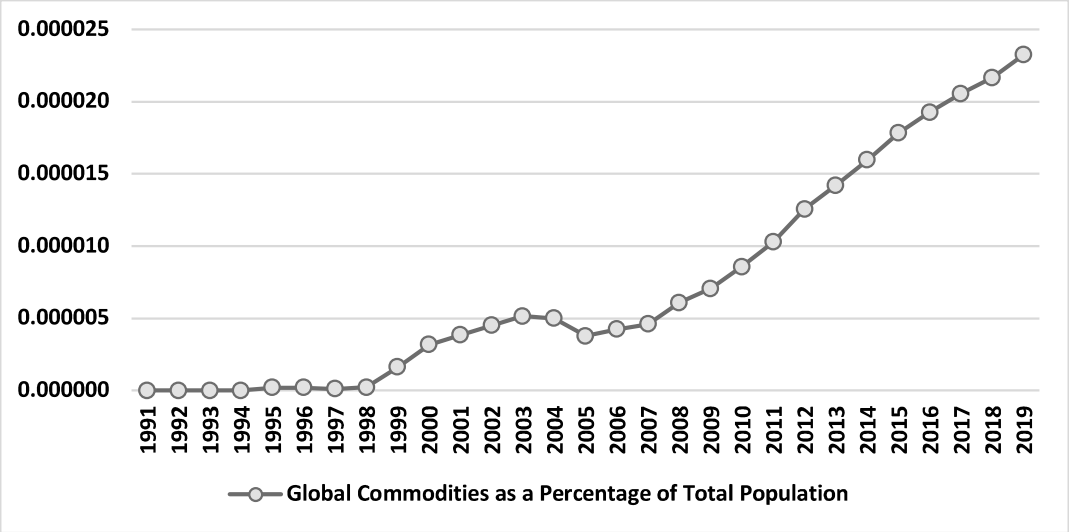
Comparing these figures for developed countries, it may be said that India is on its way to reach higher levels of technological globalization as measured by mobile phone penetration. However, there is a long way to catch up with the world average mobile phone penetration of 107 for the year 2021. Mobile cellular subscription per 100 persons stands at 107 for the US, 121 for China, 123 for the European Union countries and 163 for Japan for the year 2021.

Global Commodities as a Percentage of Population

The economic reforms introduced in 1991 have opened up the Indian economy by liberalizing and subsequently, abolishing the license system and opening up many other ways for global alliances in India. This opening up allows the global brands to directly utilize the resources, increase market access and global competition, and facilitates technological transfers to the host countries. The technological globalization can, thus, also be captured through the access to global commodities in the domestic market of India. The global commodity access is measured through global commodities as a percentage of population. In order to measure this indicator, the number of outlets of the global brands

McDonald's and Ikea to the total population has been used. The other global brands available in India lack data availability, limiting the scope of measuring technological globalization on a narrow range of global commodities. Other important global brands available in India include such as Kentucky Fried Chicken (KFC), Apple, Samsung, Starbucks, Prada, Rado, Gucci, etc.

Fig. 4.17 Global Commodities as a Percentage of Population



Source: Calculations based on data sourced from WDI

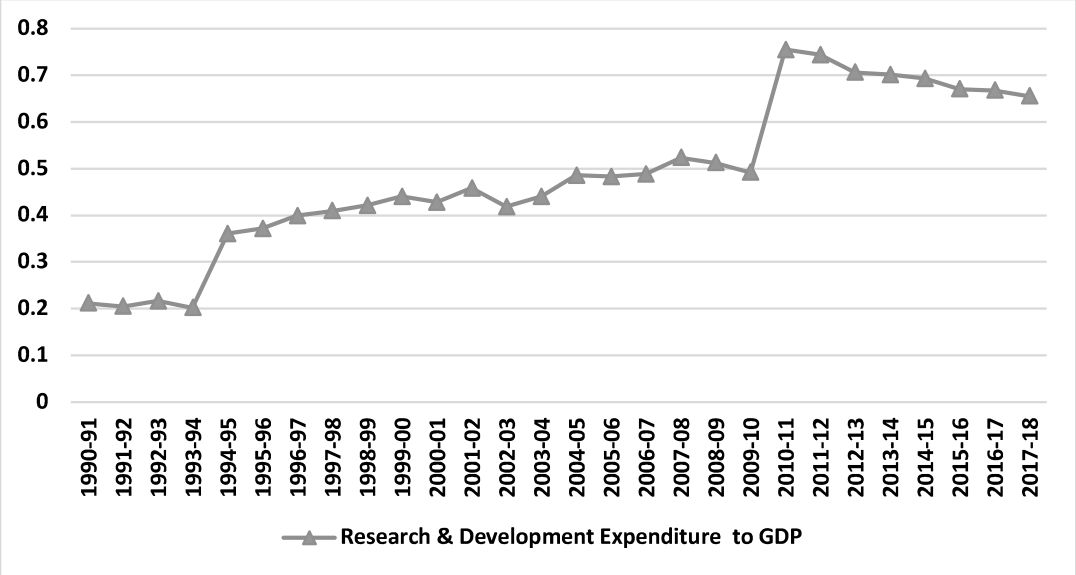
The global commodities as a percentage of the population has also shown an increase in the study period. The initial period from 1991 to 1998 showed, practically, no change as the outlets of McDonald's opened in India from 1995 onwards, and its pace was much slower as a proportion of the total population. The increase in the number of outlets started from 1999 onwards, spreading to smaller cities over the years. Over the roughly 20-year period, 2000 to 2020, the number of outlets of McDonald's increased more than ten times.

Research and Development Expenditure to GDP

The spillover effects of technological globalization can be further accessed through the research and development expenditures. This indicator is measured as the proportion of research and development expenditure to GDP. This includes the R&D funding by Central Government, State Governments and the industry to national laboratories, universities, in-house R&D laboratories and non-profit organizations. Such funding helps to undertake

extramural research in areas of interest (Report of Department and Science and Technology Statistics, 2019).

Fig. 4.18 Research and Development (R&D) Expenditure to GDP



Source: Calculations based on Department of Science and Technology

Research and Development undertaking bodies at the national level include Department of Atomic Energy (DAE), Department of Space (DOS), Defense Research and Development Organization (DRDO), Council of Scientific and Industrial Research (CSIR) and Indian Council of Agricultural Research (ICAR). Globalization stimulates the spread of technology and knowledge across nations. Global technical knowledge can be built through investment in education, human capital, domestic research and development and the increase of intellectual property rights.

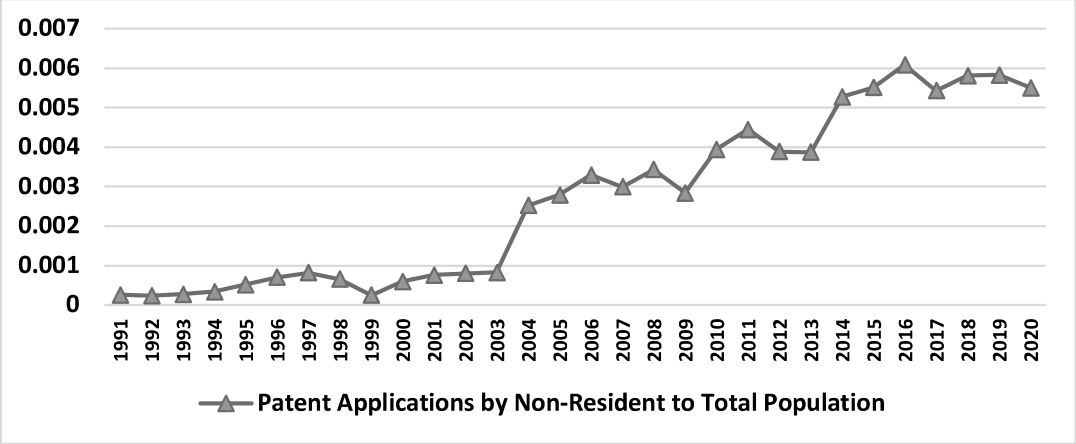
The ratio of R&D expenditure to GDP has improved since 1990-91 from 0.21 percent to 0.65 percent in 2017-18. The increase in the ratio suggests an increase in industrial output with the expansion of firms' R&D facilities. A sudden surge of 75 percent was seen in 2010 (Fig. 4.18).

Patent Applications by Non-Residents to Total Population

Technological globalization can also be measured in terms of patent applications. The number of patent applications by non-residents to the total population gives a quantitative

measure of the technological progress in a country. The increase in the number of patent applications depicts the competitive advantage, and cross-border collaborations. D. Guellec, B. van Pottelsberghe de la Potterie (2001) states that "an increasing share of technology is owned by firms from a different country than the one of the inventors' which mainly reflects that companies have research facilities abroad." According to them, two dimensions form important components of technological globalization; one being, "cross-border ownership of technology (an invention made in country A is owned by a firm based in country B)", and the second being, "international generation of knowledge (cooperation between industrial R&D laboratories located in different countries)." This explains why technological globalization is measured in terms of patent applications by non-residents, and also why cross-border mergers and acquisitions, involving technology sharing, are significant modes of internationalization.

Fig. 4.19 Patent Applications by Non-Residents to Total Population



Source: Calculations based on World Development Indicators

The patent application by non-residents as a percentage of total population has increased from 0.00026 in 1991 to 0.0055 in 2020, registering a robust CAGR of 31.46 percent (Fig. 4.19). Increase in the technological globalization indicator is of great significance as innovation and technological development are important for economic growth of a country. While in the first decade of the study period, the ratio of patent applications has been negligible, from 2003 onwards there has been a rapid increase in the same, indicating more

and more foreign companies bringing in advanced technologies, through alliances or without, in India.

4.1.5 SOCIAL GLOBALIZATION

Social globalization pertains to human interactions, life and work of people, exchange of ideas, information and culture among countries. Increase in trade, investments, technology, cross-border production systems, information and communication, and capital market liberalization grows the interconnectedness of peoples and their cultures, and would bring societies and citizens closer to each other. Thus, social integration increases along with economic, financial, and political integration. Social globalization has positive connotations, and is therefore, captured by indicators such as remittances to GDP, foreign exchange earnings from tourists to foreign exchange reserves, inbound and outbound tourists to total population, Indian students going abroad to enrolment in HSC education, work permit abroad to total population, and students coming to India to enrolment in higher education.

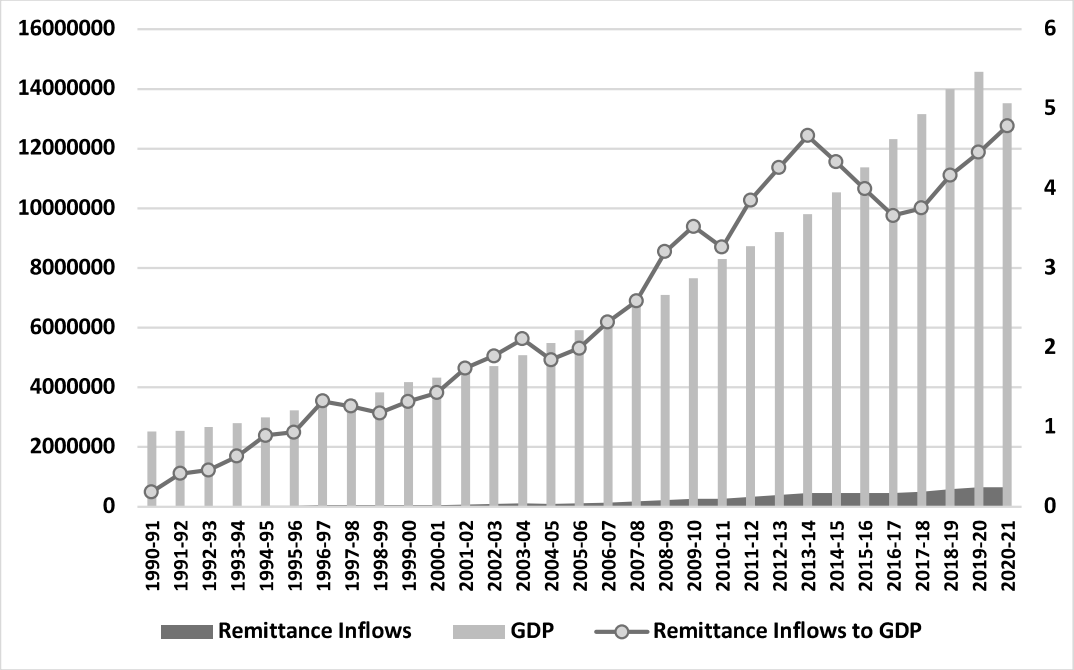
However, on the flip side, with the deeper spread of social globalization there is an increasing concern that globalization has increased unemployment, inequality, and poverty, etc. The concern is debated at the global level with divergent viewpoints. It cannot be denied that to be economically, politically and financially sustainable the concerns related to social integration need to be addressed. The greater mobility and immigration would increase the knowledge spillovers, human capital investments, enhance skills, give greater access to information, and increase the exchange earnings, and enrolment ratios.

Remittances Inflows to GDP

Remittances are the money and goods sent by workers living abroad to their families in the home country. Remittance Inflow to GDP is a measure of social globalization which shows the contribution of remittances as part of transfer payments beyond the creation of current output as measured by the GDP of a country. The global migration has increased over the study period resulting in increased remittance inflows in India. Remittances are a stable source of foreign exchange, recorded in the current account of the Balance of Payments.

Increase in remittance inflows boost country's BOP and lowers the borrowings of government and households.

Fig. 4.20 Remittance Inflows to GDP



Source: Calculations based on data sourced from RBI Bulletin

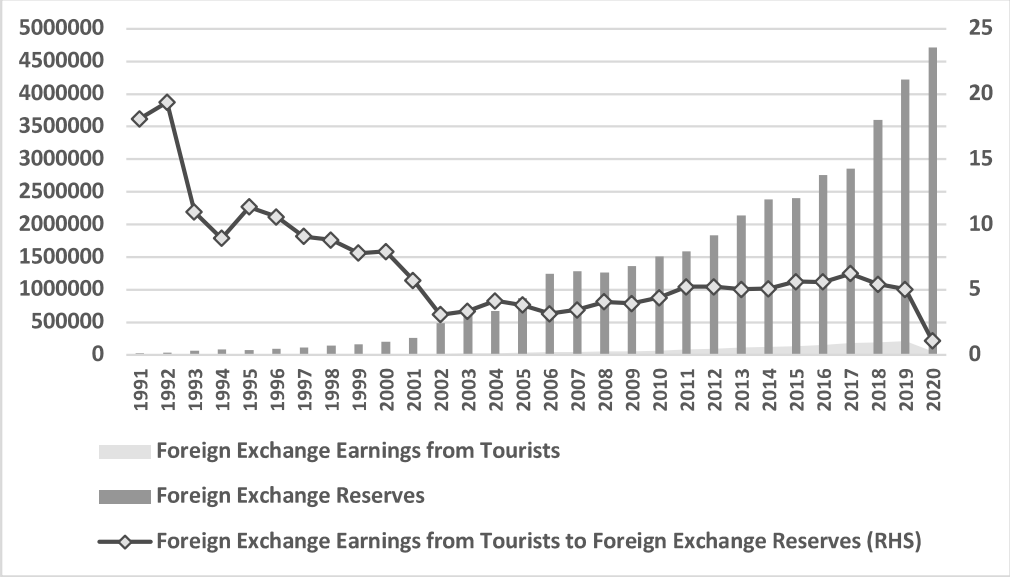
The inflow of remittances increased from Rs.4595 crores in 1990-91 to Rs.646656 crores in 2020-21. The inflow of remittances to GDP in India increased at the CAGR of 11.55 percent over the study period 1990-91 to 2020-21 (Fig.4.20). The economic reforms introduced in India in 1991 have resulted in an increase in the GDP over the study period. While migration from India has been witnessed long before reforms were introduced, the opening up of the economy has led to greater migration as relaxation of exchange controls have facilitated Indians to go abroad, thus deepening and widening social globalization. Thus, the remittances inflows in the country have also increased with the increase in the migration. While the remittances ratio exhibits an upward trend, it declined between 2013 and 2016 which may be attributed to the decline in crude oil prices and shrink in economic growth of Gulf Cooperation Council (GCC) countries which in turn led to unemployment. The proportion of Indians to Oman's total immigrants is the highest at around 58 percent, and other GCC countries like the United Arab Emirates, Bahrain, Qatar and Kuwait have

around 36 percent each. Even in Saudi Arabia, which has the largest number of migrants, Indians account for around one fifth of all migrants (Report of UNDESA, 2015).

Foreign Exchange Earnings from Tourists as Ratio to Foreign Exchange Reserves

The ratio of foreign exchange earnings from tourists to foreign exchange reserves is another measure of social globalization, which shows the contribution of tourism to the country's foreign exchange reserve. The accumulation of reserves helps to support the imports of the country, and it indicates how comfortable the external sector position of the country is.

Fig. 4.21 Foreign Exchange Earnings from Tourists to Foreign Exchange Reserves



Source: Calculations based on data sourced from Reports of Department of Tourism

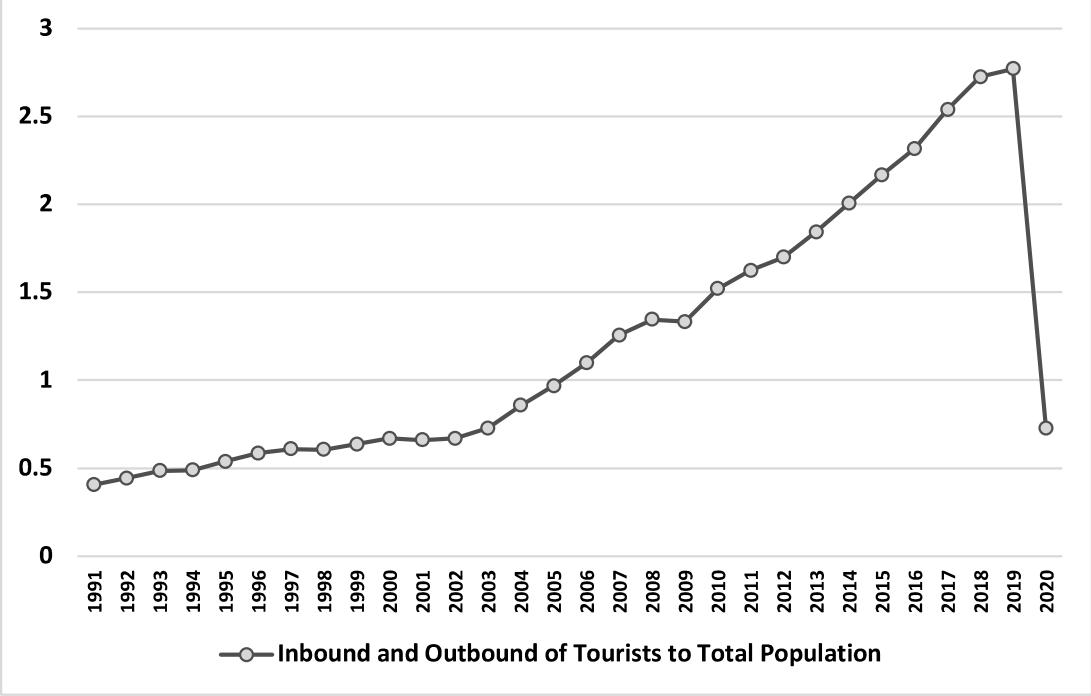
The foreign exchange earnings from tourism are found to be very low in the entire study period, although they have grown from Rs.4318 crores in the year 1990-91 to Rs.50136 in 2019-20. This amounts to a ten-fold increase or a CAGR of 8.8 percent over the 30-year period. However, as a social globalization measure when taken as a ratio to foreign exchange reserves, it shows a decline. This is because the foreign exchange reserves have increased a whopping 196 times from 1991 to 2020. But, the ratio of the two showed a decline with a -9.32 percent on a compound annual basis (Fig. 4.21). The steep fall in the ratio is seen from 1991 to 2002 which records a negative CAGR of 14.89 percent. However, from 2002-03 onwards there is a mild upward trend, although fluctuating within a small

range. In terms of CAGR it comes to -5.73 percent from 2002 to 2020. Over this period, the contribution of foreign exchange earnings from tourism has hovered between three and five percent, having peaked at six percent in the year 2016-17. It suggests that there is a scope for improving tourist activity in India.

Inbound and Outbound Tourists to Total Population

Another measure of social globalization is the ratio of inbound and outbound tourists to the total population of the host country. It measures social globalization by way of increasing tourism. Increase in the inbound and outbound tourism leads to cultural exchange, social interaction and exposure to local cultures, and induces government policies such as green tourism, digital tourism, vibrant villages schemes, *dekho apna desh, swadesh darshan* scheme, etc. It is expected that tourism would bring demographic shifts like increasing migration, of a greater number of flights, increase in the embassies to different countries, and one stop shopping access.

Fig. 4.22 Inbound and Outbound of Tourists to Total Population



Source: Calculations based on data sourced from Reports of Department of Tourism

The data reveals that the ratio of inbound and outbound tourists to total population has surged from 1991 to 2019, with a CAGR of 7.33 percent, excluding the year 2020 which is an outlier. In the year 2020, there was a drastic fall in tourism due to the outbreak of Covid-19 which started from China in November 2019 (Fig. 4.22).

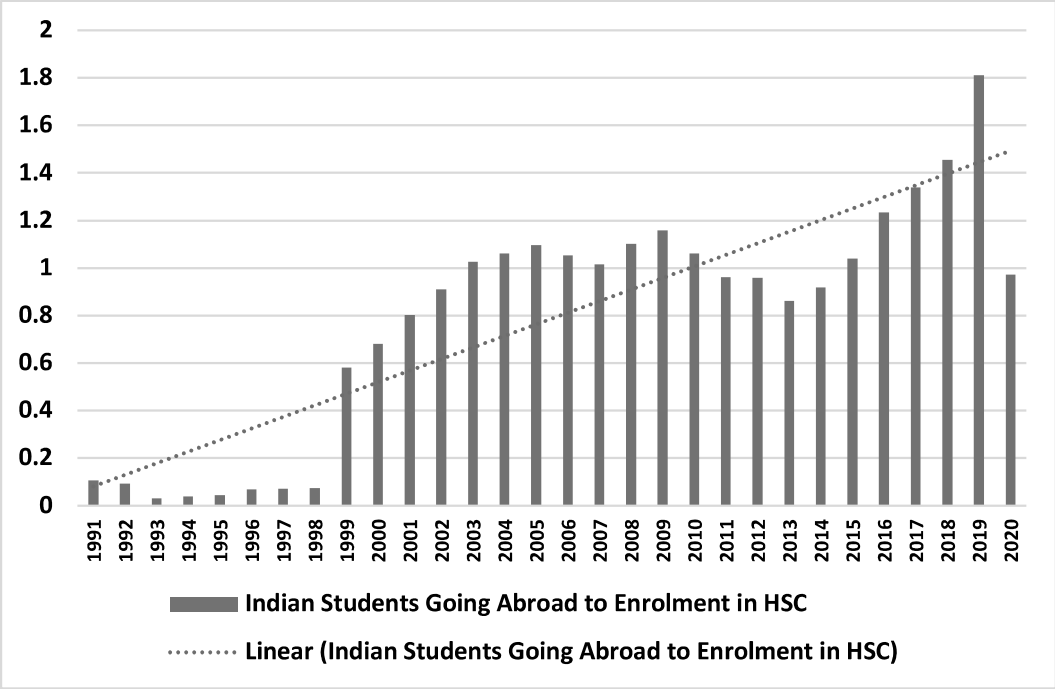
Ratio of Students Going Abroad to Enrolment in HSC Education in India

The number of students going abroad as a ratio to enrolment in HSC level education in India is an indicator of social globalization. An increase in the ratio implies that a greater number of students are going abroad for advantages like high quality education, better job prospects and bringing competition among the domestic talents. Indian students going abroad will have access to different cultures, with a proactive approach towards better growth prospects, skill enhancement, and increase in human capital. A large number of students are found to prefer more English-speaking nations such as, US, UK, Australia, New Zealand, Canada, and Ireland. Foreign governments are liberalizing immigration rules and rules related to the working hours of students to ease the burden of their education loan, along with studies.

However, one fallout of more students going abroad is also that it tends to brain drain, as Indian's studying abroad are more likely to settle abroad and adopt their cultures and lifestyle. The Government of India is also trying to curtail the brain drain as it reduces the number of young talents available in the domestic economy. The country is left with a greater proportion of unskilled workers. The foreign investors would use the unskilled workers to produce at least cost which would reduce the opportunity for domestic producers to gain and also would not allow income levels to increase. Thus, the government of India has initiated various skill-based institutions such as Shri Vishwakarma Skill University, Symbiosis Skills and Professional University, Bhartiya Skill Development University, Rajasthan ILD Skills University (RISU), and Delhi Skill and Entrepreneurship University, etc. Also, various skill development programmes have been initiated such as, Pradhan Mantri Kaushal Vikas Yojna, SANKALP, craftsman training scheme, and Pradhan Mantri Kaushal Kendras, etc. The government is also trying to reduce the migration by inviting foreign universities to set up campuses in India, and improving the quality standards of higher education in India with the implementation of National

Education Policy (NEP) 2020. In the 2022 Union Budget the Finance Minister announced the establishment of two foreign universities' offshore campuses, viz., Australia's two universities Deakin and Wollongong in Gujarat International Finance Tech (GIFT) city. Certain Indian universities are collaborating with different foreign universities such as Indian Institute of Science (IISc)-Bangalore, with University of Adelaide, Indian Institute of Technology-Kanpur with the University of California, and Ashoka University with the University of British Columbia, etc.

Fig. 4.23 Indian Students Going Abroad to Enrolment in HSC



Source: Calculations based on data sourced from Department of Education Reports

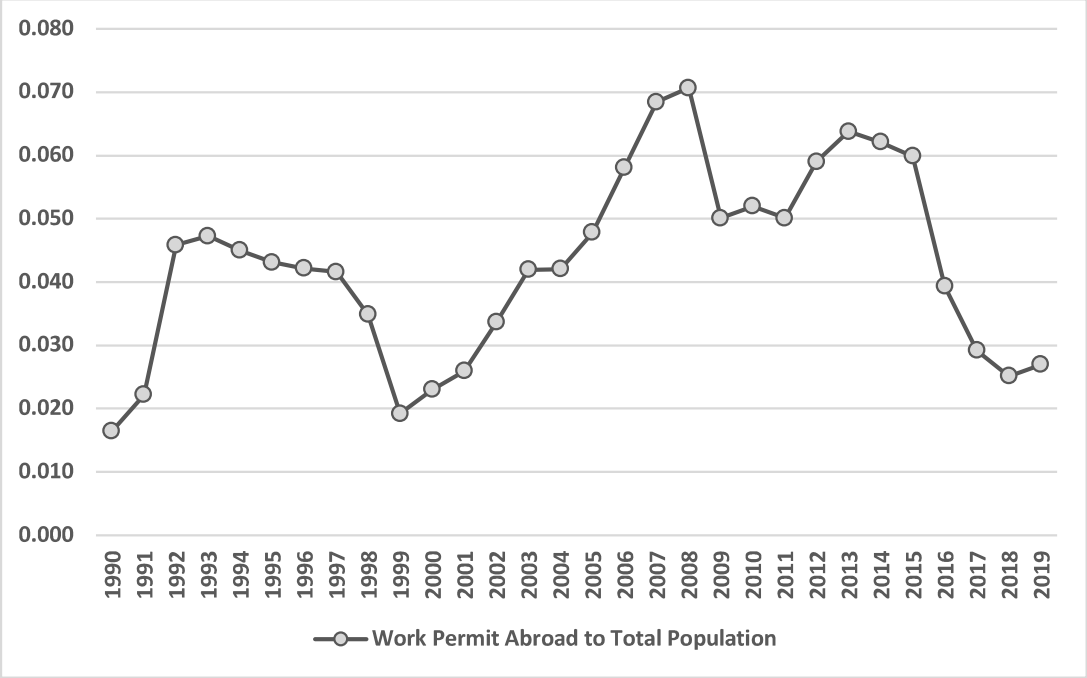
The number of students going abroad from India has increased by more than 39 times from 6466 in 1991 to 261406 in 2020 (Fig. 4.23). The number of students going abroad was highest in the year 2019 at 461792. This creates opportunities to acquire new skills, get exposure to different cultures and increase the country's remittances inflows. There was a decline in the number of students going abroad with 261406 in 2020 compared to 461792 students in 2019 due to the outbreak of Covid-19 in November 2019. On account of the decline in the last year of the study period, the CAGR in the variable falls from 10.93 percent to 7.8 percent when the year 2020 is included in the calculation.

Work Permit Abroad as a Ratio to Total population

Another measure of social globalization is the ratio of work permit abroad to total population. The international labour flow is a stronger indicator of social globalization as it depicts the transferability of human capital. The increase in the work permits would also lead to increase in remittances, reinforcing other forms of social globalization. In the chain of effects, it would ultimately increase trade, capital flows, capital formation in the country, and result into an improvement in standard of living of people.

The number of people working abroad has increased from 143565 in 1990 to 368048 in 2019. On account of this, the ratio of work permits abroad to the total population has changed from 1990-2019 at a CAGR of 1.40 percent (Fig. 4.24). Over the period 1990 to 1997, the work permit ratio increased and then remained more or less stable, recording a CAGR of 29.5 percent. However, it declined sharply from 0.042 to 0.019 between the years 1997 and 1999 at a CAGR of –32.74 percent.

Fig. 4.24 Work Permit Abroad to Total Population



Source: Calculations based on data sourced from Reports of Department of Tourism

This sharp decline may be attributed to the introduction of a new definition for a highly skilled temporary worker visa viz., non-immigration H1-B visa. Subsequently, from the

year 1999 to 2015, the work permit ratio exhibits a healthy upward trend from a low value of 0.019 to 0.06, having peaked at 0.071 in the year 2008. This amounts to a CAGR of 7.45 percent. The slowdown in the work permits was further experienced from 2013 to 2019 with a decline of 16.73 percent due to the Gulf job crises, H1-B visas, abolished Tier 1 post work visa in UK and the outbreak of Covid-19 crisis (Ministry of External Affair (MEA) report, 2016).

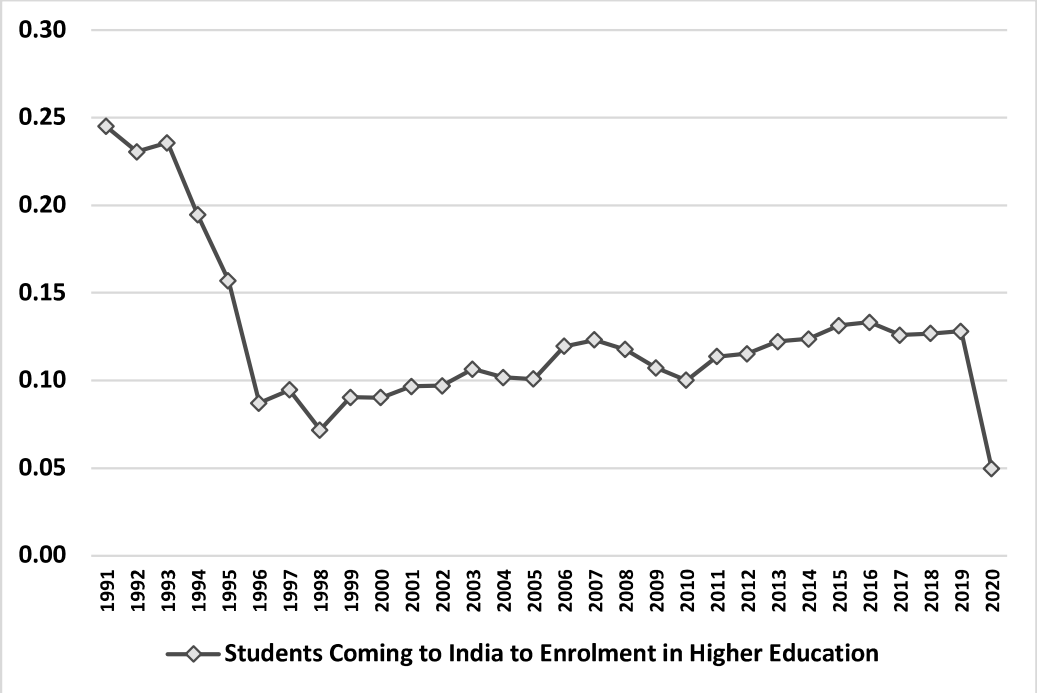
Ratio of Students Coming to India to Enrolment in Higher Education in India

The number of students coming to India as a ratio to enrolment in higher education in India is a measure which shows the trend in the social dimension of globalization. An increase in the foreign students' enrolment in higher education is expected to improve the quality of education, encourage innovative teaching through training programs for teachers for using different technology-based teaching skills, using English as a medium of instruction instead of regional languages, give exposure to inventions and discoveries, bring in diverse cultures, and increase the wide range of courses to compete with advanced standards of education. The increase in the number of foreign students would encourage quality-based education policies by the regulatory authorities such as the National Education Policy (NEP) 2020, Academic Bank of Credit (ABC), National Institute Ranking Framework (NIRF), Accreditation of Institutes by accreditation bodies such as, National Assessment and Accreditation Council (NAAC), Accreditation Board (AB), and National Board of Accreditation (NBA), to improve the quality of educational institutions, etc.

The findings in this regard reveal that the number of students coming to India has increased by from 12899 in 1990-91 to 49348 in 2019-20, a growth of nearly four times over the entire period. On account of Covid-19, however, the number declined to 20561 in 2020 (AISHE Reports). However, in terms of the ratio to enrolment in higher education in India, as a measure of social globalization, there is decline from 0.24 to 0.05. The fall can be attributed to the increase in the enrolment in higher education in India which forms the base of the ratio. Over the 30-year period, students' enrolment in higher education in various bachelors and master's programmes in India has increased nearly seven-fold from 52.66 lakhs in 1991 to 413.8 lakhs in 2020. However, from the year 1998 till the Covid-19 pandemic, there has been a steady rise in the number of students coming to India as a ratio

to enrolment in higher education, growing at a CAGR of 2.77 percent. In recent years 2022-23 onwards again a surge in foreign students coming to India can be seen which may be attributed to scholarship schemes like General Cultural Scholarship Scheme (GCSS), India's Indian Council for Cultural Relations (ICCR), etc.

Fig. 4.25 Students Coming to India to Enrolment in Higher Education



Source: Calculations based on data sourced from Reports of Department of Tourism

4.2 DIMENSIONAL INDICES OF GLOBALIZATION

This section seeks to gauge the depth and breadth of globalization based on the indicators of various dimensions of globalization. It enquires into how the individual dimensions have grown over time during the study period from 1990-91 to 2019-20. In the literature on globalization, different combinations of dimensions and their indicators with alternative methodologies have been used. The first index on globalization was developed by a management consulting firm AT Kearney, in 2001 in association with Carnegie Endowment for International Peace's 'Foreign Policy' using 14 variables related to economic integration, personal contact, technology and political engagement. They used the subjective weighted approach, where the variables are weighted based on their

perceived importance. However, the subjective method has the drawback of being biased and therefore, later on the KOF (Konjunkturforschungsstelle of ETH Zurich, in Switzerland) globalization index was developed in 2002, which sought to overcome this lacuna. To measure the degree of globalization the KOF index used the statistical method of Principal Component Analysis (PCA) to weigh the dimensions included in the index. It was updated by Dreher (2006) and further revisited using 43 variables (Dreher et al. 2008). Kluver and Fu (2004) calculated a cultural globalization index which was re-visited by Raab et al. (2008) to include social dimension.

Randolph (2005) developed the G-Index proposed by the World Market Research Centre which captures the connectedness between national and foreign economies. The Centre for the Study of Globalisation and Regionalisation (CSGR) constructed the CSGR index on globalization based on 16 variables measuring economic, social and political dimensions of globalization (Lockwood and Redoano, 2005) for 62 countries. The Maastricht globalization index was first developed by Martens and Zywietz (2006) which was revisited by Figge and Martens (2014) to include environmental dimension. The present study also uses the same approach of weighted average applying the PCA techniques to weigh the indicators of dimensions of globalization.

Vujakovic (2010) introduced the New Globalization Index (NGI) by distinguishing globalization from regionalization. Regionalization included factors such as geographical distance between countries. The index also included some new variables such as trade mark and patent application by non-residents, environmental agreements, outbound student mobility, etc. Ghemawat and Altman (2016) distinguished the depth and breadth variables of globalization in the DHL Connectedness Index developed by DHL courier service firm. Bo & Pau (2008), Huh & Park (2019) and Carveth et. al. (2019) have constructed indices based on economic integration where they sub divided the variables based on extra-regional and intraregional dimensions.

The present study captures globalization using five dimensions, namely, economic, financial, political, technological and social. Each dimension is measured using alternative indicators, as presented in section 4.1 of this chapter. In order to get an overall measure of each dimension, firstly, individual dimensional indices have been constructed. The

methodology for construction of dimensional indices is as elaborated in Chapter 3. Accordingly, the technique of PCA has been used to derive the weights for each indicator of a dimension, after normalizing the values of the indicators.

The PCA is a dimensionality reduction method, which dimensionally reduces the information of a large dataset to a smaller one. It is applied to the variables which are in their standard form. Therefore, in order to construct the dimensional index, all variables of the dimension are firstly normalized to get their values between zero and 100.

The technique of PCA when applied to the variables, constructs the principal components. These components are the new variables that are developed based on the mixture of the initial indicators using the covariance matrix between the indicators. The principal components are the eigenvectors of the covariance matrix of the data. The principal components dimensionally reduce each indicator based on the eigenvalues. The eigenvalues tell us about the amount of variability in principal components corresponding to the eigenvectors. The first principal component has the highest eigenvalue, followed by the second component has the second highest eigenvalue, and so on. Following the construction of the dimensional indices, only those components having eigenvalue greater than one, and components which explain the total variance in globalization variables by at least 10 percent individually and cumulatively more than 60 percent of total variance, are taken into account. The criteria of eigenvalue greater than one gives an indication of how many principal components should be retained. The higher percent of variance reflects the percentage of the information that the principal component carries. Thus, the higher the percent of variance, the higher the percentage of information, and the less is the information loss.

The information of the principal components and eigenvalues can be gathered through the table of total variance explained in the dimensional index. The initial eigenvalues in the table of total variance explained show all the principal components generated for the dimension. How many principal components out of these are to be retained is shown in the extraction sum of square loadings.

Further, the rotated sum of square loadings is calculated, which gives the new eigenvalues after rotation using the Kaiser-Varimax Rotation technique. Varimax rotation is an

important step in PCA which is used to increase the interpretability, treating multicollinearity, and to simplify the results. If the components are not rotated the effects of the PCA will be diminished.

To weigh the indicators of a dimension, firstly, the component matrix is formed, which explains the importance of the indicator based on the correlation between indicator and the principal component. The importance of the indicators can be extracted based on the correlation values. Only correlation values greater than +/- 0.5 are considered in the technique of PCA. These correlation values help to identify the component score coefficient matrix. The component score coefficient matrix is the weights provided to each indicator. Secondly, the scores are then multiplied with the actual values of the indicators to form the dimensional index.

Thirdly, the weighted mean of the dimension is derived as a ratio of summation of weighted indicators to aggregate weights of all indicators. This weighted mean is the dimensional index value for a given year. Lastly, the weighted average values are normalized so that, they range between zero to 100. The value zero in a particular year does not mean that the value of the dimensional globalization is nil in that year. Similarly, the value of 100 against any year does not imply cent percent globalization of that particular dimension. It may be borne in mind that there is no concept like 100 percent globalization as there is no upper limit to any dimension of globalization. Rather, the values zero and 100 are standardized values and imply the lowest and highest values of the indicators for the country. Repeating this process for each dimension, the five-dimensional indices of globalization have been constructed. The indices not only provide an overview of how the dimensions have grown over time but the values derived for the dimensional index also indicate their contribution to the overall globalization of the economy. The dimensional indices are presented in section 4.2.1.

4.2.1 DIMENSIONAL INDEX OF ECONOMIC GLOBALIZATION

The dimensional index of economic globalization is calculated using the weighted average method, based on the Principal Component Analysis (PCA). Following the methodology discussed in the section 3.5 and 4.2 individual dimensional index is calculated. One can observe from Table 4.6 the principal components which holds the information about the

indicators of economic globalization. The initial eigenvalue table shows ten principal components identified using the principal component analysis technique, out of which only those components were selected whose eigenvalues are greater than one. In the economic dimension of globalization, the extracted sum of square loadings represents that one principal component has an eigenvalue greater than one, and it explains 83.75 percent of variance in the dimension. The other principal components together explain 16.25 variance as the eigenvalue of these components are less than one. It shows that 16.25 percent of information is lost. The dimensional index of economic globalization is developed based on the first principal component, which carries maximum information of all the indicators of economic globalization.

Table 4.6: Economic Globalization - Total Variance Explained

Total Variance Explained						
Components	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.375	83.750	83.750	8.375	83.750	83.750
2	0.822	8.218	91.969			
3	0.458	4.582	96.551			
4	0.241	2.414	98.965			
5	0.074	0.745	99.710			
6	0.018	0.183	99.893			
7	0.008	0.078	99.971			
8	0.003	0.029	100.000			
9	5.022E-009	5.022E-008	100.000			
10	3.622E-009	3.622E-008	100.000			
Extraction Method: Principal Component Analysis						

Source: Computation on SPSS

The next step in the PCA technique is to decide the importance of indicators which is gauged through the component matrix in Table 4.7. The Component Matrix represents the correlation between the indicators and the principal component. The principal component I is found to have a high positive correlation with indicators such as, export of services to GDP, import of services to GDP, trade in services to GDP, import penetration, import to GDP, trade to GDP, export to GDP, and comparative advantage of services. The principal component I has a moderate positive relation with India's trade to world trade and a moderately negative correlation with import duties to imports.

The Component Score Coefficient Matrix in Table 4.8 shows the weights provided to each indicator of economic globalization. These weights are multiplied with the year wise actual values of the indicators and then aggregated using the weighted mean technique.

Table 4.7: Economic Globalization Component Matrix

Component Matrix	
Indicators	Component
	1
Export of Services to GDP	0.981
Import of Services to GDP	0.979
Trade of Services to GDP	0.974
Import Penetration	0.973
Import to GDP	0.968
Trade to GDP	0.966
Export to GDP	0.960
Revealed Comparative Advantage of Services	0.811
Import Duties to Imports	-0.757
India's Trade to World Trade	0.733
Extraction Method: Principal Component Analysis	

Source: Computation on SPSS

Table 4.8: Economic Globalization Component Score Coefficient Matrix

Component Score Coefficient Matrix	
Indicators	Component
	1
Trade of Services to GDP	0.116
Export of Services to GDP	0.117
Import of Services to GDP	0.117
Trade to GDP	0.115
Export to GDP	0.115
Import to GDP	0.116
Import Duties to Imports	-0.090
Import Penetration	0.116
Revealed Comparative Advantage of Services	0.097
India's Trade to World Trade	0.087
Extraction Method: Principal Component Analysis Rotation Method: Varimax with Kaiser Normalization Component Scores	

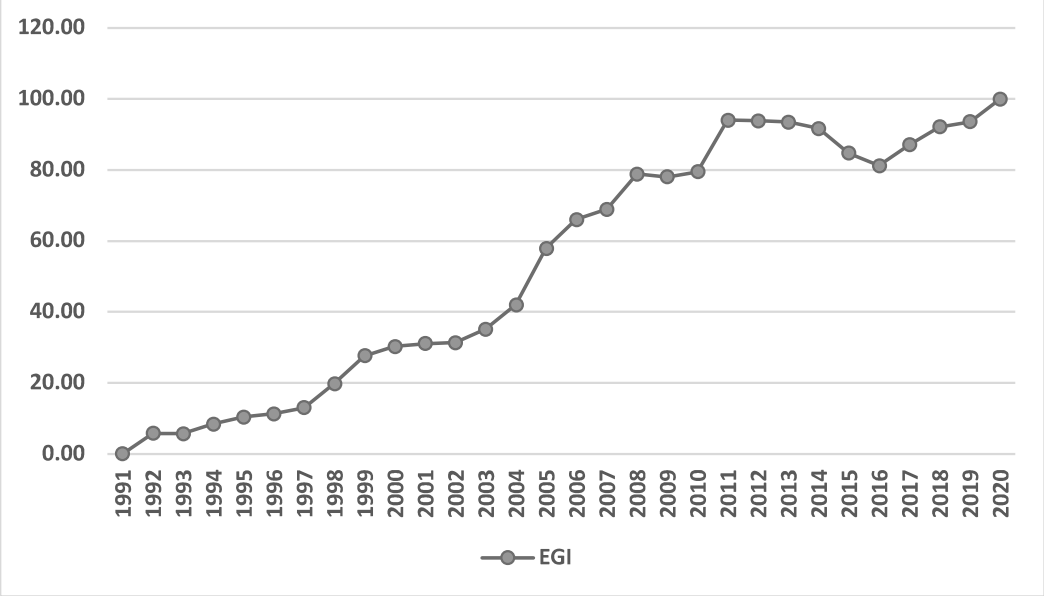
Source: Computation on SPSS

The final values of the dimensional index of economic globalization are obtained applying the normalization technique. The economic globalization index has improved over the

study period as the underlying indicators of economic globalization have improved overtime.

The import duties have reduced over time as seen in section 4.1, which causes an increase in the import of goods and services. The performance of India's merchandise trade and trade in services has also improved. Likewise, there is also an improvement over the years in the share of India's trade in the world trade. India's revealed comparative advantage in services has also increased within the study period from 1991 to 2020.

Fig. 4.26 Index of Economic Globalization



Source: Researcher's Work

The index of economic globalization increased from 1991 to 2020 at a CAGR of 11.1 percent. The index value for the first year of the study period, 1990-91 is zero and it has increased to 100 in the final year of the study period, that is, 2019-20. This indicates that there has been a steady and continuous improvement in economic globalization of the Indian economy. The improvement in the first decade is more pronounced with 22.84 percent compared to the second and third decades which have registered 11.34 percent and 2.57 percent CAGR.

4.2.2 DIMENSIONAL INDEX OF FINANCIAL GLOBALIZATION

Following the same methodology as explained in the construction of the economic globalization index, the other dimensional indices have been constructed. This section discusses the analysis of the dimensional index of financial globalization. From the Table 4.9, one can observe the eigenvalues of the two principal components, which have been identified as providing the maximum explanation of the variance in financial globalization. These two principal components hold the information about the underlying indicators of financial globalization. The PCA technique developed seven components in total, however, only two principal components have eigenvalues greater one. The first component explains 67.035 percent and the second component explains 16.201 percent of variance in the dimension. Together, the two components explain 83.236 percent of variance. It may be noted that in ignoring the remaining principal components, 16.764 percent of data has been lost. The rotation sum of square loadings shows the variance of the data after rotation. The first component explains 57.35 percent of the variance and the second component explains 25.883 percent variance in the dimension and cumulatively they explain 83.236 percent of the variance.

Table 4.9: Financial Globalization Total Variance Explained

Components	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.692	67.035	67.035	4.692	67.035	67.035	4.015	57.353	57.353
2	1.134	16.201	83.236	1.134	16.201	83.236	1.812	25.883	83.236
3	.854	12.206	95.442						
4	.236	3.372	98.814						
5	.060	.859	99.673						
6	.023	.327	100.000						
7	7.502E-009	1.072E-007	100.000						
Extraction Method: Principal Component Analysis.									

Source: Computation on SPSS

The Component Matrix in Table 4.10 gives the values of the coefficients of correlation between the seven indicators and the first and second principal components. The first principal component is found to have a high positive correlation with FDI to GDP, FDI+FII to GDP, foreign debt to GDP, FDI inflows to GFCF, and sectoral FDI and weak correlation

with FII to GDP and foreign exchange reserves to imports. The second principal component has moderately positive correlation with FII to GDP. It also has low positive correlation with foreign exchange reserves to imports, and FDI+FII to GDP, and low negative correlation with FDI to GDP, foreign debt to GDP, FDI inflows to GDP, and sectoral FDI.

The Component Matrix shown in Table 4.9 explains the importance of the principal components based on the correlation between the indicators and principal components. The highlighted values in the Component Matrix under principal component I are the indicators having high correlation with the principal component I. Similarly, the highlighted values under the principal component two are the indicators having high correlation with the second principal component. It implies that the correlation of these indicators under principal component II is low with the first principal component.

Table 4.10: Financial Globalization Component Matrix

Component Matrix		
Indicators	Components	
	1	2
FDI to GDP	0.964	-0.231
FDI+FII to GDP	0.934	0.275
Foreign Debt to GDP	0.920	-0.305
FDI Inflows to GFCF	0.906	-0.236
Sectoral FDI	0.898	-0.140
FII to GDP	0.493	0.772
Foreign Exchange Reserve to Imports	0.419	0.491
Extraction Method: Principal Component Analysis		

Source: Computation on SPSS

The Component Score Coefficient Matrix shown in Table 4.11 presents the weights provided to each indicator of financial globalization which are then multiplied with the actual values of the indicators, and finally aggregated using the weighted mean technique. In other words, firstly, the indicators are identified based on their correlation with the principal components, and these indicators then get their weights under the respective principal components as the component score coefficients. The weights of the identified indicators are then used in the subsequent steps.

Table 4.11: Financial Globalization Component Score Coefficient Matrix

Component Score Coefficient Matrix		
Indicators	Components	
	1	2
FDI+FII to GDP	0.073	0.305
FDI Inflows to GFCF	0.265	-0.103
FDI to GDP	0.274	-0.094
FII to GDP	-0.203	0.658
Foreign Debt to GDP	0.294	-0.157
Foreign Exchange Reserve to Imports	-0.108	0.428
Sectoral FDI	0.226	-0.028
Extraction Method: Principal Component Analysis Rotation Method: Varimax with Kaiser Normalization Component Scores		

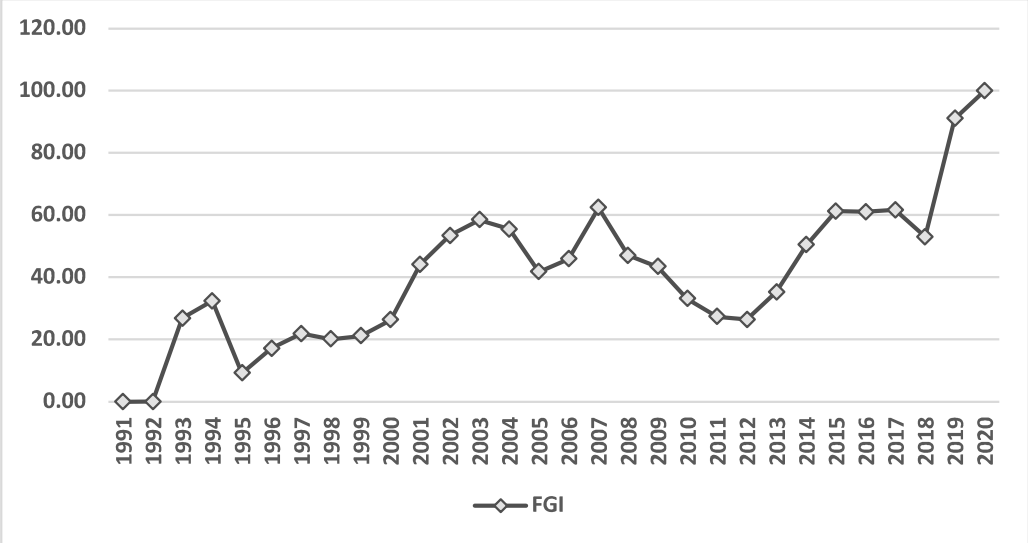
Source: Computation on SPSS

The values of dimensional index for financial globalization are derived applying the normalization technique. The index of financial globalization is found to be volatile over the study period (Fig. 4.26), although it was found to be the lowest in the first year, 1990-91, and the highest in the last year of the study period, that is, 2019-20. The volatility in the index can be traced to the fluctuations in the underlying indicators such as FDI, FII, and FDI inflows to GFCF. The indicators, foreign debt to GDP and foreign exchange reserves to imports showed an increase during the entire study period. The volatility in the indicators is experienced due to macro-economic instability such as, current account deficit, currency devaluation, global financial crisis, stock market volatility, and prolonged downturn in the economic activities due to factors such as, increase in interest rates, political rift between the countries, market volatility, etc.

India experienced a growth of 37.08 percent on compound annual basis in its financial globalization index from 1990-91 to 2020-21 (Fig. 4.27). In the first decade of the study period, the index of financial globalization increased at the CAGR of 145.37 percent which is a remarkable growth that can be attributed to the opening up of the Indian economy to foreign investment flows. However, the second decade of the study period registered a dismal growth of 2.58 percent on compound annual basis. This decline in the growth rate can be attributed to the volatility experienced on account of the US subprime mortgage

crises which led to the global financial crises. The financial globalization index has shown an increase by 11.70 percent CAGR in the third decade as compared to the second decade.

Fig. 4.27 Index of Financial Globalization



Source: Researcher's Work

4.2.3 DIMENSIONAL INDEX OF POLITICAL GLOBALIZATION

The analysis of the dimensional index of political globalization is presented in this section. One can observe from Table 4.12 the principal components which hold the information about the indicators of political globalization. The PCA technique identified four principal components in total, of which only one component satisfied the criteria of eigenvalues greater than one. Therefore, only one principal component has been extracted which carried maximum information, and thereby, provides explanation for 93.704 percent of variance in the dimension, as shown in the extracted sum of square loadings. The other principal component together explains 6.296 percent variance in the dimension as the eigenvalue of these components are less than one. Thus, 6.296 percent of information is lost in the process.

The next step in PCA is deciding the importance of the indicators which is gauged through the Component Matrix (Table 4.13) which represents the values of the correlation between the indicators and the principal component. The principal component I is found to have a high positive correlation with indicators such as, participation in trade agreement,

membership in foreign organization, Peace-Making agreements and India's trade with trade agreement member-countries.

Table 4.12: Political Globalization Total Variance Explained

Components	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.748	93.704	93.704	3.748	93.704	93.704
2	.182	4.562	98.266			
3	.040	.997	99.262			
4	.030	.738	100.000			
Extraction Method: Principal Component Analysis.						

Source: Computation on SPSS

Table 4.13: Political Globalization Component Matrix

Component Matrix	
Indicators	Component
	1
Participation in Trade Agreements	0.987
Membership in Foreign Organizations	0.983
United Nation Peace Making Agreements	0.961
Trade with Trade Agreement Member Countries	0.941
Extraction Method: Principal Component Analysis.	

Source: Computation on SPSS

Table 4.14: Political Globalization Component Score Coefficient Matrix

Component Score Coefficient Matrix	
Indicators	Component
	1
Trade With Trade Agreement Member Countries	0.251
United Nation Peace-Making Agreements	0.256
Membership in Foreign Organizations	0.262
Partnership in Trade Agreements	0.263
Extraction Method: Principal Component Analysis Rotation Method: Varimax with Kaiser Normalization Component Scores	

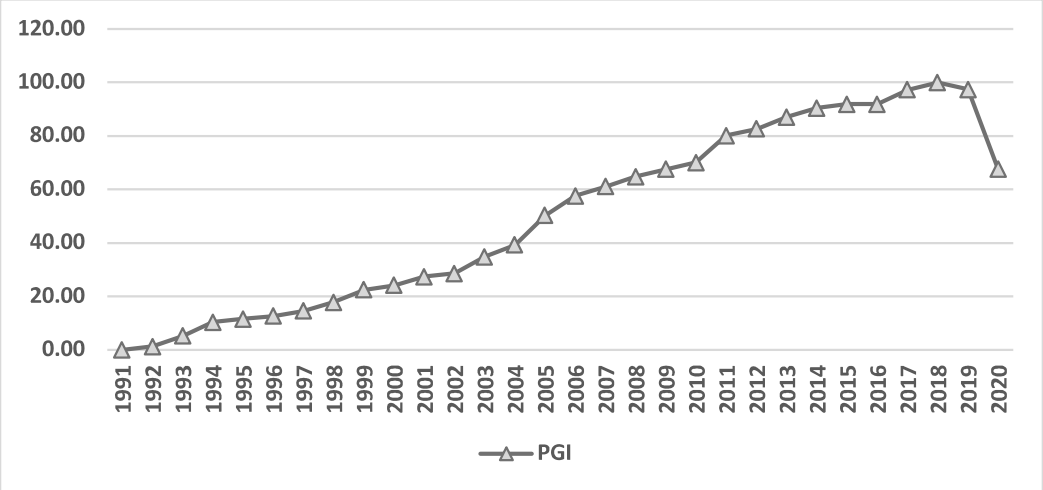
Source: Computation on SPSS

The Component Score Coefficients in Table 4.14 are the weights provided to each indicator of political globalization. These weights are multiplied with the year wise actual values of the indicators and then aggregated using the weighted mean technique. The values of the

dimensional index of political globalization are obtained applying the normalization technique. Accordingly, the index of political globalization index has grown steadily over the study period (Fig. 4.28). India's political relation with other countries has improved resulting into increase in the number of trade agreements, participation in the trade with trade agreement member countries, participation in foreign organizations and participation in peace-making agreements as represented in the section 4.1. In the year, 2019-20, the political globalization index shows a decline on account of decrease in the volume of trade with trade agreement partner/member countries as a consequence of the Covid-19 situation which had already started in November 2019 in China.

The political globalization index value is zero in 1991 which represents the lowest level of political globalization. In the year 2020 the index value is 67.50 percent which represents a moderate level of political globalization this year. The highest index value of 100 for political globalization was reached in the year 2018. Excluding the last two years of the study period, the growth of political globalization of the Indian economy has been at a robust CAGR of 18.69 percent. The political globalization index in the first decade has increased with 46.09 percent CAGR which is much higher than in the second and third decades which registered CAGR of 12.61 percent and 12.31 percent, respectively.

Fig. 4.28 Index of Political Globalization



Source: Researcher's Work

4.2.4 DIMENSIONAL INDEX OF TECHNOLOGICAL GLOBALIZATION

The construction of the dimensional index of technological globalization is presented in this section. One can observe from Table 4.15 that one principal component holds the maximum information about the indicators of technological globalization. Based on the initial eigenvalues, four principal components were identified using the PCA technique, however, only one principal component has eigenvalue greater than one. The extracted sum of square loadings represents that one principal component explains 92.113 percent of variance in the dimension. The other principal components together explain only 7.887 percent variance. Since these components are ignored for having eigenvalues less than one, it implies that 7.887 percent information is lost. The dimensional index of technological globalization is developed based on the first principal component, which carries maximum information of all the indicators of technological globalization.

Table 4.15: Technological Globalization Total Variance Explained

Components	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.685	92.113	92.113	3.685	92.113	92.113
2	.187	4.683	96.796			
3	.068	1.701	98.497			
4	.060	1.503	100.000			
Extraction Method: Principal Component Analysis.						

Source: Computation on SPSS

Table 4.16: Technological Globalization Component Matrix

Component Matrix	
Indicators	Component
	1
Patent Application by Non-Resident to Total Population	0.974
Mobile Cellular Subscription Per 100 Persons	0.974
Global Commodities as a Percentage of Total Population	0.963
Research and Development Expenditure to GDP	0.927
Extraction Method: Principal Component Analysis	

Source: Computation on SPSS

The significance of indicators based on their correlation with the principal component, as gauged through the Component Matrix, is shown in Table 4.16. The indicators – patent application by non-resident to total population, mobile cellular subscription per 100

persons, global commodities as a percentage of total population, Research and Development expenditure to GDP, are found to have a high positive correlation with the principal component I.

The Component Score Coefficient Matrix (Table 4.17) shows the weights of each indicator of technological globalization. These weights are multiplied with the year-wise actual values of the indicators and then aggregated using the weighted mean technique.

Table 4.17: Technological Globalization Component Score Coefficient Matrix

Component Score Coefficient Matrix	
Indicators	Component
	1
Research and Development Expenditure to GDP	0.252
Global Commodities as a Percentage of Total Population	0.261
Mobile Cellular Subscription Per 100 Persons	0.264
Patent Application by Non-Resident to Total Population	0.264
Extraction Method: Principal Component Analysis Rotation Method: Varimax with Kaiser Normalization Component Scores	

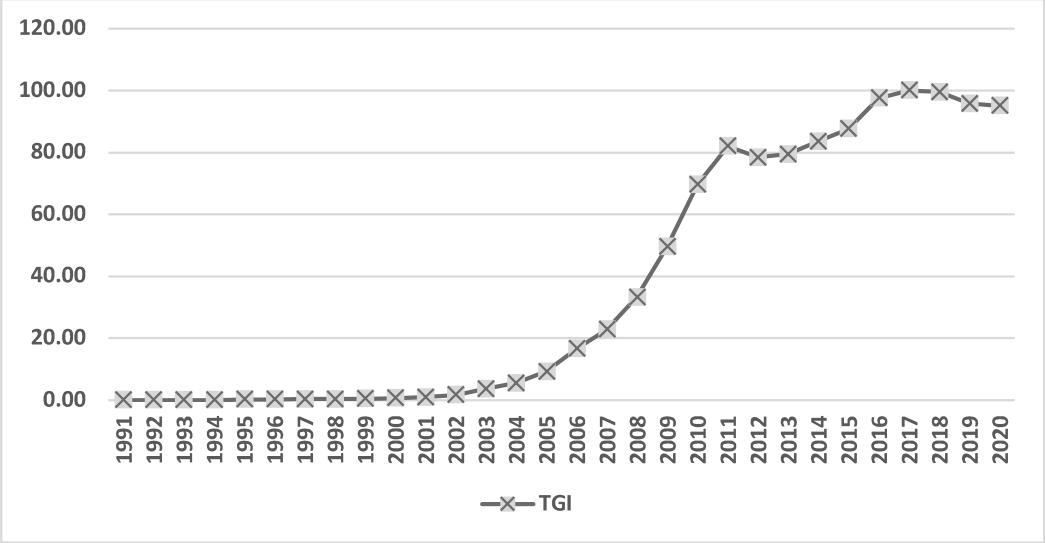
Source: Computation on SPSS

The values of the dimensional globalization index of technology are obtained applying the normalization technique. It can be in Fig. 4.29 that the first year of the study period, 1990-91, has the index value of zero, indicating the lowest level of technological globalization. Over the years, India's engagement with technological globalization has increased consistently and is observed to reach its highest level of 100 in terms of the index number in the year 2019-20. In the first decade of the study period, the level of technological globalization in India has been very low with index values ranging below one percent, although, in percentage terms there is a robust growth of 57.51 percent on compound annual basis between the years 1991 and 2001.

From the second decade onwards, most indicators of technological globalization have shown much rise. These include increased access to global commodities, mobile subscriptions, research and development expenditure and patent application by non-residents. In fact, the second decade shows steep rise in technological globalization in India from 0.94 percent to 82.06 percent between the years 2001 and 2011, growing at a

remarkable CAGR of over 56 percent. Over the entire study period too, technological globalization index has grown with at a high CAGR of 37.14 percent.

Fig. 4.29 Index of Technological Globalization



Source: Authors Work

4.2.5 DIMENSIONAL INDEX OF SOCIAL GLOBALIZATION

As discussed in section 4.1.5, social globalization pertains to human interactions, life and work of people, exchange of ideas, information and culture among countries. Increase in the flow of capital, technology and people grows the interconnectedness of peoples and their cultures and brings the societies and citizens closer to each other. This section analyses the index of social globalization. Based on the PCA technique, six principal components are developed, of which two are found to have eigenvalues greater than one as shown in Table 4.18. These two principal components hold maximum information about the indicators of social globalization. The first principal component explains 56.96 percent of variance in the social dimension, while the second principal component explains 20.74 percent of variance, which means together both the component carry 77.699 percent of information. 22.301 percent of information embodied in the excluded components was lost. The rotation sum of square loadings shows the variance of the data after rotation. The first component explains 56.312 percent of variance and the second principal component

explain 21.387 percent variance in the social dimension. The two principal components cumulatively explain 77.699 percent of variance.

Table 4.18: Social Globalization Total Variance Explained

Components	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.418	56.963	56.963	3.418	56.963	56.963	3.379	56.312	56.312
2	1.244	20.736	77.699	1.244	20.736	77.699	1.283	21.387	77.699
3	0.863	14.381	92.080						
4	0.262	4.372	96.452						
5	0.149	2.475	98.927						
6	0.064	1.073	100.000						
Extraction Method: Principal Component Analysis.									

Source: Computation on SPSS

The Component Matrix in Table 4.19 shows the coefficients of correlation of the six indicators of social globalization with reference to the two principal components. The indicators, namely, number of students going abroad as a ratio to those enrolled in HSC education in India, and remittances to GDP are found to have a high positive correlation with the first principal component, while moderate correlation is found between inbound-outbound tourist ratio to total population and the first principal component. The ratio of foreign exchange earnings from tourism to foreign exchange reserves has a high negative correlation with principal component I. Likewise, the indicator – foreign students coming to India in proportion to enrollment to higher education – has a moderately negative correlation with principal component I. A low degree of correlation is found between the first principal component and the indicator work permits abroad to total population. The second principal component has a moderately positive correlation with indicators like work permit abroad to total population, foreign students coming to India to enrolment in higher education and inbound and outbound tourists to total population. A low correlation is found between the second principal component and the indicators, students going abroad to enrolment in HSC, remittances to GDP, and foreign exchange earnings by tourists to foreign exchange reserves.

The Component Matrix reflects the importance of the principal component based on the degree of correlation that the indicators have with them. The highlighted values in the

Component Matrix refer to the indicators having high correlation with the respective principal components. It can be observed that indicators are captured within a given principal component based on their strong degree of correlation, and are exclusive between the two principal components.

Table 4.19: Social Globalization Component Matrix

Component Matrix		
Indicators	Components	
	1	2
Students Going Abroad to Enrolment in HSC	0.917	0.055
Remittances to GDP	0.915	0.166
Foreign Exchange Earnings by Tourists to Foreign Exchange Reserves	-0.855	0.280
Inbound And Outbound Tourists to Total Population	0.797	0.423
Work Permits Abroad to Total Population	0.149	0.698
Foreign Students Coming to India to Enrolment in Higher Education	-0.591	0.684
Extraction Method: Principal Component Analysis		

Source: Computation on SPSS

Table 4.20: Social Globalization Component Score Coefficient Matrix

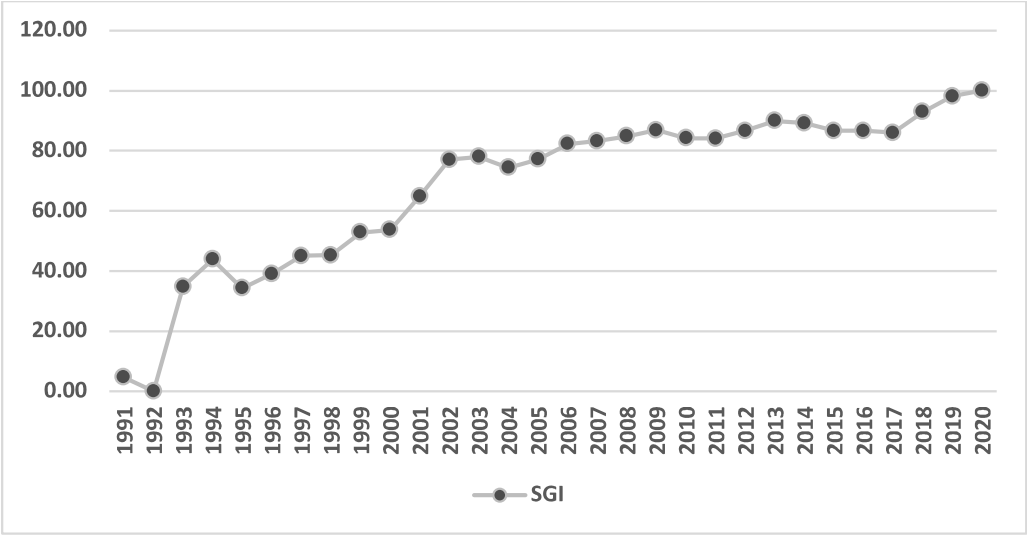
Component Score Coefficient Matrix		
Indicators	Components	
	1	2
Remittances to GDP	0.283	0.096
Foreign Exchange Earnings from Tourists to Foreign Exchange Reserves	-0.218	0.257
Students Going Abroad to Enrolment in HSC	0.272	0.008
Work Permits Abroad to Total Population	0.118	0.550
Inbound And Outbound of Tourists to Total Population	0.277	0.306
Foreign Students Coming to India to Enrolment in Higher Education	-0.098	0.568
Extraction Method: Principal Component Analysis Rotation Method: Varimax with Kaiser Normalization Component Scores		

Source: Computation on SPSS

Therefore, those indicators which bear high correlation with principal component I, are not included in principal component II with which they are weakly correlated, and vice versa. The Component Score Coefficient in Table 4.20 are the weights assigned to each indicator of social globalization which are then multiplied with the year-wise original values of the indicators. Subsequently, these values are aggregated using the weighted mean technique.

The values of the dimensional index of social globalization are obtained applying the normalization technique. As mentioned earlier, the purpose of normalization is to arrange the index values in a range of zero to 100, so as to reflect the degree of social globalization; zero indicating least globalization in the corresponding year and 100 implying the highest level of globalization in the corresponding year. The social globalization index is found to have improved over the study period from 1991 to 2020. During this period, the increase in inbound and outbound tourism has led to increase in the foreign exchange earnings from tourists as a percentage of foreign exchange reserves. Likewise, the number of students coming to India also increased with reference to the increase in enrolment in higher education in India. Other indicators, such as, work permits to total population and students going abroad to enrolment in HSC also increased in the same period, all contributing to the upward trend in the index of social globalization

Fig. 4.30 Index of Social Globalization



Source: Researcher's Work

Fig. 4.30 depicts the trend in the index of social globalization. The social globalization has increased 4.60 in the year 1991 and 100 in the year 2020. However, the lowest level of social globalization can be seen in 1992 as the value if the index was 0. The index of social globalization from 1991 to 1994 has a fluctuation, but from period 1995 to 2020 it can be observed the index has increased with a CAGR of 11.20 percent. High pace of growth in social globalization has been witnessed in the first decade of the study period, registering

a CAGR of 31.37 percent. In the second and the third decades the growth rates have been moderate, viz., 4.6 percent and 1.74 percent, respectively. The overall growth has been at an appreciable rate of 11.2 percent on compound annual basis.

4.4 COMPOSITE INDEX OF OVERALL GLOBALIZATION

Globalization is not about growth in individual dimensional aspects; rather it is the combination of all dimensions of globalization. This section attempts to gauge the depth of overall globalization in India, encompassing all indicators of its multiple dimensions. It seeks to enquire into how the individual dimensions have contribute to overall globalization during the study period from 1990-91 to 2019-20.

The present study has attempted to construct the overall globalization index incorporating five dimensions, namely, economic, financial, political, technological and social, which together encompass 31 variables as indicators of the various dimensions. The methodology adopted is the same as that for the dimensional indices of globalization discussed in sections 3.5 and 4.3.

For constructing the overall globalization index, all indicators are taken together, irrespective of the dimension to which they belong. Firstly, the indicators are normalized using the minimum-maximum method in order to obtain standard values ranging from zero to 100. Secondly, each indicator is assigned weights using the technique of PCA, which are then used to obtain their product with the original values of the indicators. Lastly, the summation of the weighted indicators is taken as a ratio to aggregate weights of all indicators. These weighted mean values for each year are the values of the composite index of overall globalization.

The composite index on overall globalization is constructed using weights obtained from the PCA technique. As stated earlier, the PCA technique dimensionally reduces the statistical information of indicators by preserving the information as much as possible. The PCA technique identifies the components, comprising various indicators, which hold maximum information for the composite index. Only those components that have eigenvalues greater than one, and which explain the total variance in globalization by at least ten percent, and cumulatively, more than 60 percent, are taken into account. This is

because, eigenvalues represent the total amount of variance that can be explained by a principal component.

Table 4.21: Overall Globalization Total Variance Explained

Components	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	22.360	72.130	72.130	22.360	72.130	72.130	17.965	57.952	57.952
2	3.119	10.060	82.190	3.119	10.060	82.190	5.779	18.641	76.594
3	1.846	5.956	88.146	1.846	5.956	88.146	3.242	10.460	87.053
4	1.282	4.136	92.282	1.282	4.136	92.282	1.621	5.229	92.282
5	0.839	2.706	94.988						
6	0.604	1.949	96.937						
7	0.324	1.045	97.982						
8	0.184	0.592	98.574						
9	0.138	0.446	99.020						
10	0.092	0.298	99.319						
11	0.058	0.186	99.505						
12	0.040	0.129	99.634						
13	0.032	0.105	99.739						
14	0.027	0.087	99.826						
15	0.014	0.046	99.871						
16	0.012	0.039	99.911						
17	0.008	0.025	99.935						
18	0.006	0.019	99.955						
19	0.005	0.015	99.970						
20	0.003	0.010	99.980						
21	0.002	0.007	99.988						
22	0.002	0.005	99.993						
23	0.001	0.003	99.996						
24	0.001	0.002	99.998						
25	0.000	0.001	99.999						
26	0.000	0.001	100.000						
27	1.877E-05	6.054E-05	100.000						
28	2.210E-16	7.128E-16	100.000						
29	6.762E-17	2.181E-16	100.000						
30	-1.075E-16	-3.468E-16	100.000						
31	-5.554E-16	-1.792E-15	100.000						
Extraction Method: Principal Component Analysis.									

Source: Computation on SPSS

The composite index of globalization is calculated using the weighted average method, based on the Principal Component Analysis (PCA). One can observe from Table 4.21 the principal components which hold the information about the indicators of globalization. The initial eigenvalue table shows 31 principal components identified, out of which only four principal components are extracted. The first component explains 72.13 percent variance in globalization, followed by the second component which explains 10.06 percent variance, third component which explains 5.95 percent, and the fourth principal component which explain 4.13 percent of the variance. These components together cumulatively explain 92.28 percent variance in overall globalization.

The extracted sum of square loading shows the total variance, that is, the cumulative variance of 92.282 percent, which is explained by the four principal components on extraction. The rotation sum of square loadings are the eigenvalues derived after rotation of components. Rotation changes the variance explained by the components. It can be seen in Table 4.21 that the first principal component now explains 57.952 percent of variance in globalization, while the second component explains 18.641 percent. The variance explained by the third and fourth components has increased to 10.46 percent and 5.229 percent, respectively, after rotation. Together they explain, cumulatively 92.282 percent of variance.

Table 4.22 presents coefficients of correlation between all the indicators and the four principal components. The matrix explains the importance of the principal components based on the correlation coefficient values. The PCA technique ignores indicators which have correlation coefficients lower than plus/minus 0.5. The indicators which have high correlation with the particular principal component, have been highlighted in the table. It is found that there is a high positive correlation of indicators such as the import, export and total trade in goods and services, and import, export and total trade in services as ratios to GDP with the principal component I. Import duties as ratio to imports, is found to have strong negative correlation with the first principal component; the negative value being justified by the nature of the indicator. Other indicators related to economic globalization which have high positive correlation with the first component, includes, import penetration in domestic demand, and revealed comparative advantages in services. The indicator,

India's share in world trade has moderately positive correlation. Indicators related to foreign investment such as FDI to GDP, FDI plus FII to GDP, FDI inflow as a ratio to GFCF, sectoral FDI, and the ratio of foreign debt to GDP are found to have strong positive association with the first component.

Table 4.22: Overall Globalization Component Coefficient Matrix

Indicators	Components			
	1	2	3	4
Export of Service to GDP	0.990	0.059	0.049	0.023
Import of Service to GDP	0.987	0.005	0.042	-0.058
Total Trade in Service to GDP	0.992	0.041	0.047	-0.005
Trade to GDP	0.967	0.119	0.154	0.049
Export to GDP	0.969	0.127	0.118	0.061
Import to GDP	0.964	0.114	0.175	0.041
Import Duties to Imports	-0.707	0.522	0.055	0.130
Import Penetration	0.923	-0.191	0.279	0.075
Revealed Comparative Advantage of Services	0.779	-0.477	0.024	-0.076
India's Trade to World Trade	0.597	-0.334	0.613	0.073
FDI+FII to GDP	0.768	0.172	-0.429	0.421
FDI inflow to Gross Fixed Domestic Capital Formation	0.935	-0.027	0.097	0.001
FDI to GDP	0.917	0.246	-0.075	0.019
FII to GDP	0.188	-0.007	-0.629	0.682
Foreign Debt to GDP	0.891	0.417	-0.039	0.016
Foreign Exchange Reserve to Imports	0.215	-0.754	-0.384	0.050
Sectoral FDI	0.763	0.408	-0.325	-0.285
Trade Agreement with Member Countries	0.957	0.277	0.012	-0.020
Participation in UN Peace Making Agreements	0.946	-0.272	-0.091	0.009
Membership in Foreign Organizations	0.983	-0.094	-0.092	-0.098
Participation in Trade Agreements	0.986	-0.040	0.118	0.033
R&D Expenditure to GDP	0.931	0.005	-0.017	-0.055
Global Commodities as a Percentage of population	0.905	0.277	-0.252	-0.127
Mobile Subscription Per 100 Person	0.925	0.341	0.031	-0.075
Patent Application by Non-Resident to Total Population	0.965	0.142	-0.018	0.002
Remittance to GDP	0.977	0.033	0.065	0.020
Foreign Exchange Earnings from Tourists to Foreign Exchange Reserve	-0.665	0.682	0.143	-0.014
Students Going Abroad to Enrolment in HSC	0.851	-0.360	-0.144	-0.168
Work Permits Abroad to Total Population (age 15-64)	0.423	-0.165	0.522	0.620
Inbound and Outbound of Tourist to Total Population	0.949	0.244	-0.103	-0.118
Student Coming to India to Enrolment in Higher Education	-0.340	0.604	0.204	0.217
Extraction Method: Principal Component Analysis				

Source: Computation on SPSS

Table 4.23: Overall Globalization Component Score Coefficient Matrix

Indicators	Components			
	1	2	3	4
Export of Services to GDP	0.043	-0.010	0.037	0.001
Import of Service to GDP	0.045	0.019	0.002	-0.046
Total Trade in Services to GDP	0.044	0.000	0.025	-0.015
Trade to GDP	0.044	-0.046	0.086	-0.018
Export to GDP	0.045	-0.045	0.077	0.001
Import to GDP	0.044	-0.046	0.091	-0.030
Import Duties to Imports	0.029	-0.185	0.032	0.065
Import Penetration	-0.009	0.017	0.170	-0.050
Revealed Comparative Advantage of Services	-0.029	0.154	0.021	-0.058
India's Trade to World trade	-0.053	0.004	0.308	-0.168
FDI+FII to GDP	0.017	-0.040	0.018	0.404
FDI Inflow to Gross Fixed Domestic Capital Formation	0.030	0.009	0.052	-0.030
FDI to GDP	0.071	-0.045	-0.028	0.043
FII to GDP	-0.056	-0.013	0.064	0.626
Foreign Debt to GDP	0.094	-0.097	-0.029	0.032
Foreign Exchange Reserve to Imports	-0.093	0.259	-0.069	0.151
Sectoral FDI	0.133	-0.009	-0.280	-0.053
Trade with member Countries	0.079	-0.059	-0.014	-0.009
Participation in UN Peace Making Agreements	0.000	0.103	0.000	0.036
Membership in Foreign Organizations	0.040	0.071	-0.062	-0.025
Participation in Trade Agreements	0.025	0.006	0.077	-0.018
R&D Expenditure to GDP	0.045	0.026	-0.021	-0.024
Global Commodities as a Percentage of Population	0.099	-0.005	-0.167	0.016
Mobile Subscription Per 100 Person	0.093	-0.071	-0.036	-0.048
Patent Application by Non-Resident to Total Population	0.059	-0.021	-0.005	0.012
Remittance to GDP	0.039	-0.005	0.044	-0.006
Foreign Exchange Earnings from Tourists to Foreign Exchange Reserve	0.068	-0.218	-0.010	-0.050
Students Going Abroad to Enrolment in HSC	0.007	0.161	-0.096	-0.055
Work Permits Abroad to Total Population (age 15-64)	-0.099	-0.119	0.505	0.195
Inbound and Outbound of Tourist to Total Population	0.090	-0.018	-0.101	-0.030
Students Coming to India to Enrolment in Higher Education	0.040	-0.236	0.129	0.068
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Component Scores.				

Source: Computation on SPSS

All indicators of political globalization, namely, the trade with trade agreement countries, participation in UN peace making agreements, membership in international organizations and participation in trade agreements have positive correlation with the first component.

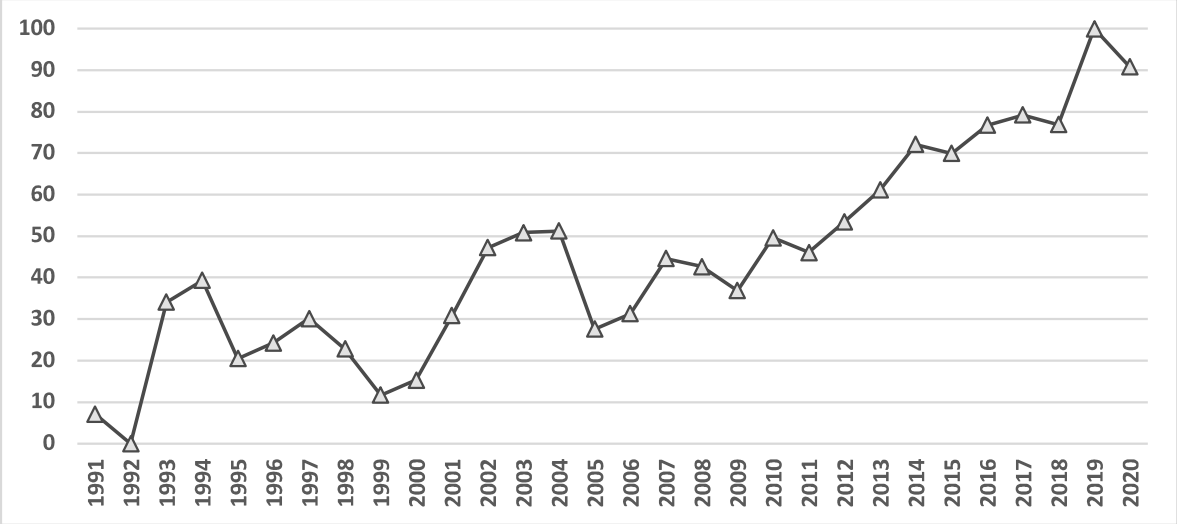
All indicators of technological globalization also have high positive correlation with the first component. There are mixed findings with respect to correlation between the first principal component and the indicators of social globalization. Some of the indicators have high positive correlation, while some have correlation less than 0.5, and are therefore ignored by the PCA technique. There are very few indicators bearing high correlation with principal components 2, 3 and 4, which is also reflected in the low eigenvalue they bear.

The Component Score Coefficient in Table 4.23 are the weights assigned to each indicator of globalization which are then multiplied with the year-wise original values of the indicators. subsequently, these values are aggregated using the weighted mean technique explained in the chapter 3. The weights are derived on the basis of the correlation matrix. The weights used in further steps would be of those indicators which are identified under the respective principal components based on their correlation values.

The Composite Index of Globalization

The overall globalization level in India, comprising all five dimensions has changed over time with an upward trend, although, in the first half of the study period there are fluctuations observed in the index as depicted in Fig. 4.31. The trend is a reflection of the underlying changes in various dimensions of globalization. The lower values of the index and the fluctuations therein may be attributed to the largely stagnant values of technological globalization and the ups and downs in the values of financial globalization. With restrictions on trade and foreign investments in the initial phase, characterized by gradual and cautious approach to opening up of the economy, the level of overall globalization is found to be very low, between seven and 15 percent in terms of the index values. The fluctuations in the index values also indicate lack of consistent outcomes of the policies of liberalization and globalization adopted for various sectors in India and the time lag in the impact to be felt. However, despite the low levels, the index value doubled in the first decade of the study period, registering a CAGR of 8.84 percent (Table 4.24).

Fig: 4.31 Composite Index of Globalization of India



Source: Researcher's Work

With the cumulative impact of reforms and the reinforcing inter-connectedness of various dimensions of globalization, the second decade witnessed rapid increase in overall globalization in India. This is evident in the upward of 40 percent increase in the CAGR to 12.47 percent. The level of overall globalization has also increased much more in the second decade; in the first decade the level doubled from its initial value, whereas, in the second decade the end value increased more than thrice compared to the value at the beginning of the second decade. Notwithstanding these improvements, events like the global financial crises, H1B visa crises, Gulf-region job crises, volatility in world stock markets and in the GDP rates of economies, inflation, and recession, have dented the upward trend in the globalization index.

Table 4.24 Growth in Composite Index of Globalization

Period	CAGR
1990-91 to 1999-2000	8.84
1999-00 to 2009-10	12.47
2009-10 to 2019-20	6.22
1990-91 to 2019-20	9.20

Source: Researcher's Work

The third decade again witnessed doubling of the index value from around 50 percent to 100 percent, although there was a ten percent decline in the last year, 2019-20, with the onslaught of the Covid-19 pandemic towards the end of the year 2019. The downturn was particularly in the social and political dimensions.

4.4 ASSOCIATION BETWEEN THE DIMENSIONS OF GLOBALIZATION

The in-depth analysis of various dimensions of globalization in terms in their indicators as well as construction of dimensional indices provide a good insight into how the Indian economy has gained both in terms of depth and breadth of globalization. Some of the indicators also manifest a relatively faster pace of globalization of the Indian economy compared to the rest to the world which exudes the reinforcing impact of the policies towards liberalization and globalization adopted by India over the years.

This section further investigates the inter-relationship between the dimensions of globalization on the premise that they are not water-tight compartments, rather one dimension tends to influence the other in a reinforcing manner. The inquiry can throw light on the direction in which policy interventions are required so that it can play a more effective role in achieving desirable level and pace of globalization of the economy, as also avoiding its negative impact. The analysis of the inter-relationship has been carried out in terms of pair-wise correlation between the dimensions of globalization with reference to India. The dimensional indices constructed using the PCA technique have been used to represent the individual dimensions, as these indices constitute combinations of the indicators underlying the dimensions.

While correlation does not imply causation between the variables, it indicates the likelihood that two variables are related in terms of co-varying together, either in the same or in the opposite direction. In order to apply correlation technique, firstly, the normality test is to be conducted. Since the sample size is small the Kolmogorov-Smirnov test of normality cannot be applied. The present study therefore, runs the Shapiro-Wilk normality test on the SPSS software. This test is appropriate for a sample size less than 50, with the condition that the null hypothesis of normal distribution of the variables is rejected only when the p value is less than 0.05 (Shapiro and Wilk, 1965; Razali and Wah, 2011). The

normality test gives direction regarding the type of test of correlation, whether parametric or non-parametric to be used.

Table 4.25: Normality Test

Dimensional Index	Shapiro-Wilk Test		
	Statistic	df	Sig.
Economic Globalization Index	0.875	30	0.002
Financial Globalization Index	0.964	30	0.384
Political Globalization Index	0.912	30	0.017
Technological Globalization Index	0.769	30	0.000
Social Globalization Index	0.857	30	0.001

Source: Computation on SPSS

Table 4.25 shows that only the financial globalization index is normally distributed. The p-values for the economic, political, technological and social globalization indices are less than 0.05, thus we reject the null hypothesis of normality.

Since the variables other than the FGI violate the important assumption of normality required for the parametric Pearson Product Moment Correlation Coefficient (PMCC) test, the present study uses the non-parametric Spearman Rank Correlation test to see the association between the dimensional indices. Spearman rank correlation doesn't require the condition that the variables should be normally distributed. It only assumes monotonic relation between the variables. In applying Spearman rank correlation technique, the null hypothesis is that there is no association between the dimensions, and it can be rejected only when p-value is less than 0.05. The present study hypothesizes that there is a positive correlation between various dimensions of globalization, so that, improvement in one dimension can bring about favourable changes in other dimensions as well. For instance, stronger political globalization is expected to result into deeper economic and financial globalization as an outcome. With this premise the present section investigates into pair-wise association between the various dimensional indices of globalization.

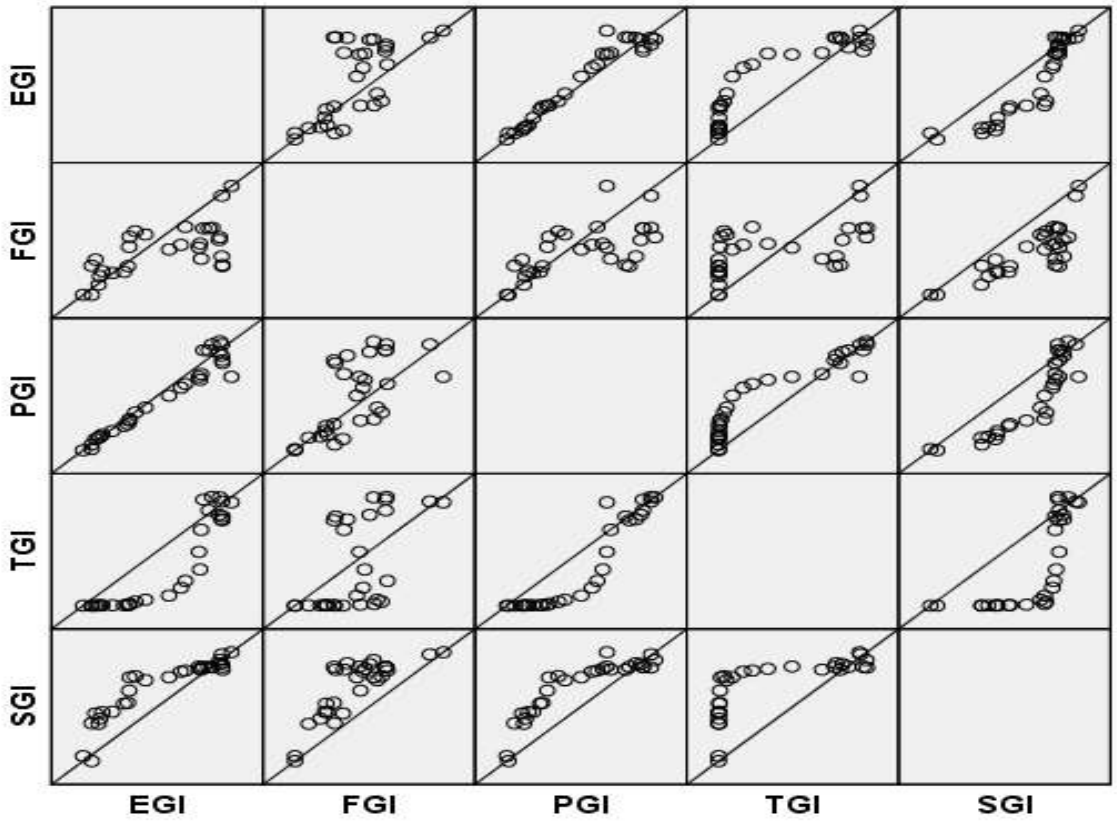
Table 4.26 shows the pair-wise Spearman '*rho*' i.e., correlation coefficient. Fig 4.32 presents the findings on correlation between dimensional indices of globalization.

Table 4.26: Correlation (Spearman ρ) Between Dimensional Indices of Globalization

Globalization Index	Economic Globalization Index	Financial Globalization Index	Political Globalization Index	Technological Globalization Index	Social Globalization Index
Economic Globalization Index	1*	0.647*	0.935*	0.942*	0.944*
Financial Globalization Index	0.647*	1*	0.709*	0.737*	0.731*
Political Globalization Index	0.935*	0.709*	1*	0.984*	0.939*
Technological Globalization Index	0.942*	0.737*	0.984*	1*	0.938*
Social Globalization Index	0.944*	0.731*	0.939*	0.938*	1*
* Significant at the 0.01 level					

Source: Computation on SPSS

Fig. 4.32: Correlation Between Dimensional Indices of Globalization



Source: Computation on SPSS

Inter-Relationship Between Economic and Financial Globalization:

The index of economic globalization is found to have a relatively strong positive correlation with the index of financial globalization, with a coefficient of 0.65 and is found to be statistically significant at one percent level of significance. The increase in the indicators of economic globalization viz., increase in the imports and exports of goods and services, reduction in import and other custom duties, increase in import penetration, increasing share of India in world trade and the increase in the revealed comparative advantage of India would improve the economic condition of the country. The increase in trade in terms of imports and reduction in import and other custom duties would improve the relation with the trading countries and this would encourage financial capital flows as well. Thus, the country would try to bring more liberal foreign investment capital policies to enhance the investments. The improvement in economic globalization would lead to economic growth and thereby, attract greater foreign investment. Also, India offers itself as a promising market due to its increasing middle-income class, which also induces foreign investments.

Inter-Relationship Between Economic and Political Globalization:

A high degree of positive association is found between economic and political globalization as indicated by the correlation coefficient 0.93 which is also statistically highly significant. This is as expected, as improvement in political relations in terms of bilateral and regional trade agreements, tends to result in a greater flow of goods and services between countries. Such trade agreements give further push to trade between partner countries as a result of mutual easing of trade restrictions and a move towards a freer trading environment.

Also, membership to various multilateral organizations viz., WTO, IMF, IBRD, ADB, etc. creates a more enabling environment for trading. The WTO, for instance, by promoting a rule-based trading system, provides an impetus for trade expansion. The promotion of capital flows between countries under the provisions of Trade Related Investment Measures (TRIMs) further leads to trade expansion between countries. The IMF, through its role of ensuring exchange rate stability and assisting countries during balance of payments crisis, also enables expansion of trade between countries. Likewise, loan

facilitation from IBRD, ADB, and other international and regional banks help countries to trade more. India, being a member of such multilateral organizations and a party to bilateral and regional trade agreements, and having access to finance from international organizations and regional banks, is bound to experience deeper and wider economic globalization with the increase in the level and scale of political globalization. The economic crisis of 1991 compelled India to introduce structural adjustment programme in the economy as a condition imposed by the IMF. This led to an opportunity to improve India's economic globalization on account of various measures adopted by India to liberalize and globalize the economy.

The effect also runs from economic globalization to political globalization. With increase in the imports of goods and services with reduction in import duties to imports over time and increase in exports of goods and services creates an opportunity for India to increase the bilateral and multi-lateral ties with countries. The share of India's trade to World trade and India's revealed comparative advantage also improved in the study period which attracts the political ties with countries.

Inter-Relationship Between Economic and Technological Globalization:

In the present study, technological globalization index has been constructed based on variables such as the spread of mobile cellular subscriptions, access to global commodities, research and development expenditure, and patent applications by non-residents. With increase in trade as a component of economic globalization, there is bound to be a push to the indicators of technological globalization also. Access to global commodities increases with an increase in imports of such goods. Also, over the years, the proportion of non-POL (other than, petroleum, oil and lubricants) goods in the Indian import basket has grown, which are essential for the industrial sector to run. Along with the increase in trade in the study period, all indicators of technological globalization have also exhibited an increasing trend. India has experienced increased trade of principal commodities along with the import of technology from developed countries through joint ventures, mergers and acquisitions, and licensing, etc. These factors reinforce each other to create a positive correlation between themselves.

Inter-Relationship Between Economic and Social Globalization:

The association between economic and social globalization is strongly related with 0.944 correlation coefficient. The core element of globalization is expansion of economic trade with reduction in the barriers. This provides a greater set of variety of goods and services to consumers along with low-cost production. The increase in the trade creates opportunities for young talents to migrate and helps in increasing the remittances. The remittances have improved over time and have increased in proportion to the GDP of India.

Social globalization encompasses measures of people to people connect, and as discussed in section 4.1.5., it is captured in variables such as remittances, extent of foreign exchange earnings coming from tourists, number of inbound and outbound tourists, permits to work abroad, and students going abroad as also those coming from abroad. With more human interaction leading to exchange of ideas and culture it is bound to increase the exchange of material things as well, and thereby lead to an increase in trade in goods and services. This is reflected in the strong association between economic and social globalization over time. The two indices have a positive correlation of 0.94 (Table 4.26), which is statistically significant at 0.01 level.

Inter-Relationship Between Financial and Political Globalization:

Financial globalization which captures the flow of capital from and to various countries is strongly associated with political globalization which involves countries coming together to improve trade and investment relations between themselves. Political globalization, which also entails membership to international and multilateral organization related to trade and investment, and peace and cooperation, reinforce trade and capital flows between countries.

A strong association between financial and political globalization is observed in the case of India over the study period. The correlation coefficient of 0.71(Table 4.26) is found to be highly significant at one percent level. The major trade agreements of India with other countries increased from merely two to 25 during the study period. This is bound to have increased the flow of capital between agreement member countries across a broader spectrum of sectors, with FDI increasing at a robust rate of nearly 29 percent on compound

annual basis. As a member of WTO, India gradually increased the inward FDI limit to 100 percent for practically all sectors, barring those for national security and strategic reasons. Likewise, India's trade with trade agreement partners has also grown at the CAGR of nearly 25 percent over the study period. India's membership in foreign organizations doubled to 62 by the year 2020-21 from exactly half the number, at 31 in 1990-91. These include membership to international financial institutions, sector-specific and region-specific organizations, and organizations related to culture, health, and knowledge domain. Increased foreign investment is found to have accelerated the rate of growth of the Indian economy. These factors substantiate the high positive correlation between the two dimensions of globalization. The increase in FDI, FII, GFCF creates opportunities for Indian government to liberalize the policy to attract more financial growth. The increase in the geo-political tensions would bring about the reversal of the capital flows. The deeper integration of economies in terms of political globalization would also increase the exposure to external shocks such as financial crises, oil shocks, recession, inflation, etc.

Inter-Relationship Between Financial and Technological Globalization:

Financial globalization and technological globalization are expected to be positively and strongly correlated. This is because the former involves flow of foreign investment in the host country in the form of mergers, acquisitions, joint ventures and green investments which typically brings along technology transfer. India being a developing country with prospects of higher returns on investments, induces foreign investors to bring in capital which embodies technology. Diffusion of technology also percolates down to the population in terms of increased adoption of mobile phones and internets in routine life. Rapid increase in the network of mobile phone users and mobile phone technology opens up new avenues of opportunities to integrate economic activities ranging from consumption and exchange, savings and investments, production and distribution enabled by the connectivity through the mobile phone-internet ecosystem. These factors reinforce the association between financial and technological globalization.

In the case of India, the indices of financial and technological globalization are found to be strongly correlated with a coefficient of 0.74, which is statistically significant at one percent level (Table 4.26) Improved level of technology further improves the prospects of

returns on investment as the market for goods and services expands not only in the conventional mode of business but also through IT-enabled mechanism of exchange and the '*uberization*' of services. Technological globalization makes possible the adoption of innovative business models such as circular supply chain, sharing platform, 'product as a service' (PAAS). The technology embodied in these business models and the financial investment that goes into it are thus closely associated with each other. This explains the strong positive correlation between the two dimensions of globalization.

Inter-Relationship Between Financial and Social Globalization:

Increase in trade, investments, technology, cross-border production systems, information and communication, and capital market liberalization grows the interconnectedness of peoples and their cultures, and would bring the societies and citizens closer to each other. Thus, social integration increases along with economic, financial, and political integration. Among other measures, remittances, foreign exchange earnings from tourists and from students coming to the host country are important components of social globalization, that are also tangential to financial globalization as they also imply foreign financial flows into the country. Financial flows outside the country also positively affect work permits abroad through placements in foreign subsidiaries. Further, with greater inter-personal exchanges, there are spillover effects that result into greater financial flows as well. This is evident in the positive correlation between financial and social globalization borne by the coefficient value of 0.73 which was also found to be statistically significant at one percent level.

Inter-Relationship Between Political and Technological Globalization:

Trade and investment related agreements between countries, whether bilateral, regional or multilateral, result into transfer of technology, among other things. Good political relations with other countries pave the way for greater financial flows which in the process brings along technological globalization. Improvement in political ties evident over the study period has created opportunities for technological expansion through opening up of the channels for access to global commodities, increase in mobile subscriptions, and patent flows from non-residents to India. The improvement is also expected from factors such as low labour costs, better business environment and liberal policies toward registration,

licensing, and franchising attract the technological inflow to India and which further encourages beneficial political arrangements with countries.

Membership to international or multilateral organizations helps countries to raise issues of concern to them on a wider platform. Such institutions also play an important role by providing funding and technical support, further adding to the technological advancement of the receiving country. Countries with trade agreements between themselves are least likely to be involve in conflict with each other. Likewise, peace treaties between countries tend to increase their interdependence and reduce inter-state political conflicts. By all these means, there is a creation of a progressive environment for the sharing of technological advancements between countries. The strong association between political and technological globalization in the case of India is evident in the very high positive correlation coefficient of 0.98 which is also highly significant, statistically (Table 4.26).

Inter-Relationship Between Political and Social Globalization:

While economic differentials are prime factors inducing emigration and immigration, government policies in this regard play an important role. Political instability, wars and war-like situations, restrictive legislations in countries of destination, etc., are important forces that dictate the movement of people between countries. These factors have an important bearing on the components of social globalization which among other indicators, include the number of inbound and outbound tourists, permits to work abroad, and students going abroad and coming from abroad. Conducive and friendly political relations encourage emigration to better destinations and thereby, also contribute to increased remittances and to foreign exchange earned from inbound tourists. Strong political ties are, therefore, associated with greater social exchange as well. Increased social exchanges also make for a melting pot of diverse cultures with greater exposure to and acceptance of diversity. These factors reduce the ethnocentric approach to diplomatic dialogues and lead to the creation of a geocentric attitude with all its positive externalities. In the case of India, this is reflected in the high value of the correlation of 0.94 (Table 4.26) between political and social globalization with high statistical significance.

Inter-Relationship Between Technological and Social Globalization:

Technological globalization, as elaborated in section 4.1.4, is measured by variables such as mobile cellular subscription, availability of global commodities in the domestic market, and increased research and development activities, as also, patent applications by non-residents. While it is difficult to capture the impact, the effects of exposure to global commodities and contemporary standards of living of the advanced countries via the access to media, tend to penetrate among the people, particularly, of the developing countries, through demonstration effect and social aspirations. With increased social globalization involving movement of people between countries for work and leisure, these factors become reinforcing in nature.

Technological globalization has an educative value as it encourages home producers to pursue quality production with greater productivity and efficiency. It stimulates the invention of new techniques, process innovations, and polycentric and geocentric organizational practices, as businesses attempt to match up with international standards. With social globalization such changes would tend to become more pronounced. Highly-skilled emigrants contribute substantially to technology innovation, and research and development in destination countries. These reinforcing factors are manifested in a high correlation between technological and social globalization. In the case of India, as shown in Table 4. 26), there is a high positive correlation found between the indices of technological and social globalization.

4.5 CONCLUSION

An in-depth analysis of globalization has been carried out to gauge the nature of globalization of the Indian economy. The nature and extent of globalization have been captured by analyzing trends in the indicators of five dimensions of globalization, construction of dimensional indices of globalization, and overall globalization. The majority of the indicators have attained momentum in the second half of the study period. Table 4.27 summarizes the growth in the dimensional indices of globalization. It may be noted that for the first three-dimensional indices, the CAGR has been calculated after excluding the first year for which the index value was zero. The growth rates for economic, political and social globalization are relatively lower than those of financial and

technological globalization. It needs to be noted that this does not imply that the former three dimensions of globalization have shown lower growth compared to the latter two. Rather, it is either because the levels of economic, political and social globalization were already different from zero in the first year of the study period, or that the figure in the last year of the study period was lower than 100.

Table 4.27 Growth in Dimensional Indices of Globalization

Index	CAGR (%)
Economic Globalization Index	10.68
Financial Globalization Index	35.55
Political Globalization Index	15.62
Technological Globalization Index	37.14
Social Globalization Index	11.20
Composite Index of Globalization	9.20

Source: Researcher's Calculation

It may further be noted that the composite index of globalization is not the simple average of the five-dimensional indices. Also, it has a lower CAGR as it captures the combined impact of all indicators across the five dimensions, and accordingly, has a much higher index value in the very first year of the study period. By the same logic, its index value in the last year of the study period is much lower compared to the values of the dimensional indices in the same year, because it includes all indicators of globalization. This makes the value in the last year lower in a more pronounced manner than in the case of individual dimensions. However, it may be concluded that the composite globalization index of the Indian economy has increased at a reasonably good rate.

The interlinkages between the dimensions of globalization have also been statistically examined. A strong positive association is found between all dimensions of globalization which implies high interdependence between them. Improvement in one dimension would have a reinforcing impact on other dimensions and vice-versa. Considering the heightened efforts made by the government in the current period to enter into more bilateral and regional trade arrangements and given the promising future of the Indian economy globally, the depth and breadth of globalization of India is expected to increase much more.