НАУЧНО-ТЕХНОЛОГИЧЕСКАЯ СФЕРА СОВРЕМЕННОЙ ИНДИИ

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Intersectoral Dynamics and Policy Perspective on Emerging Structure of Indian Economy

Abstract

Studies indicates that the global economy is on the brink of a recession due to slowdown in economic activities in rich economies and slow growth in the Chinese economy. The recession in global economy may have effect on developing economies like Indian economy. However, in the past it was observed that Indian economy was least affected due to global recession because economy of India is substantially based on agriculture sector. The overall economic growth is linked to the performance and dynamics of different sectors of economy. Over the years India has achieved a significant growth in all sectors; particularly service sectors by contributing the largest share in the Gross Domestic Product (GDP). Before, liberalization the economic growth was mainly dependent on Agriculture sector supported by other sectors like manufacturing and service sector. Earlier, agriculture sector was the chief constituent of the GDP followed by manufacturing and service sectors. But after the new economic policies, the inter-sectoral dynamics has reversed and growth in agriculture sector was tumbled despite major source of employment. Therefore, objective of this paper is to analyse inter-sectoral analysis and assessment of Indian economy since 1951. To understand structural shift a comparative growth pattern of agriculture, industry and service sectors are analysed along with GDP growth with policy feedback.

Introduction

The evolution of Indian economy can be traced back from Indus valley civilization which thrived during 3500 BC to 1800 BC. Economy of the Indus Valley was dependent on agriculture, domesticated animals and trade with other regions which were spread up to Mesopotamia. Over the time, the trade relations extended up to Middle East and Greek which enhanced trade and agricultural productivity in Indian subcontinent by 185 BC. During 1st century to 17th century AD, India was the largest economy of the ancient and medieval world comprising more than one third economy of the world (*Harish*, 2012). According to an estimation the Gross Domestic Product (GDP) of India was about 25 % of the world economy during the Mughal period. Maddison (2007) analysed global economy and found that the GDP of India was more than the GDP of China by 1700 AD which was nearly 24 % of the world GDP. The main source of economy during the period was domesticated animals, agriculture and trade. The GDP of India was started declining in the latter half of the 18th century (*Madison*, 2007). The Mughal were replaced by Marathas and other rulers. Subsequently, the British India Company expanded its political influence and established colonial government which affected Indian economy adversely due to emergence of British imperialism in India due to economic drain, though the infrastructure such as railways network, telecommunication and postal network was largely developed by British rulers in India. A large network of irrigation was also developed by them. The emergence of capitalism and economic growth of France, United States, and Germany was other factors in the decline of Indian economy. This phase was concentrated power with capital, technology, science and manufactures which lasted from 1800 to 1945 (*Alam*, 2003). One of the major factors for decline of economy during British rule was diverting revenue towards wars within India and with Europe, this led shattered economy of India.

After independence in 1947, the process of rebuilding India started by focusing on growth of agriculture in the first five year plan (1951–1956) along with other sectors. Hence, investments were made to promote agriculture, creation of irrigation facilities, construction of dams and expansion of infrastructure. The first five year plan was based on the Harrod–Domar model that describes India's economy growth in terms of the level of saving and productivity of capital which suggests that there is no natural reason for an economy to have balanced growth. The second five year plan (1956–1961) was centered on rapid industrialization to boost industrial infrastructure to accelerate GDP growth. In the beginning policy was to make India self-sufficient. Subsequently, economy of India passed from self-sufficient economic phase to the phase of open economy in the end of 1980s. When the process of globalisation stated the new economic policies emphasis shifted from agriculture to industry to service sector that yielded annual GDP growth 9.48 % in 2005–2006. During the regime of open economy services sector became the major contributor to the economy, while agriculture and allied sector became the least contributor. Economy of India, thus, transformed from agrarian economy to service sector economy. The sectoral transformation in the economy of India, therefore, requires an analysis to assess the potential of different sectors of Indian economy; agriculture, industry and service sector. It is imperative to estimate the constituents of economy for strategic point of view because at the time of implementation of first five year plan (1951–1952) the share of agriculture and allied service was 51.88 %, industry 16.19 % and service sector 29.54 % in GDP while during 2013–2014 the share of agriculture and allied service was 13.94 %, industry 26.13 % and service sector 60.05 %. The analysis could be helpful to provide status of future potential of different sectors and trends of economy.

Methodology

Objective of the paper is to anayse the growth pattern of different sectors of Indian economy and GDP growth. Attempt is also made to analyse the relationship between growth of GDP and Agriculture, Industry and Service sectors. The analysis is based on annual rates of growth of GDP and sectors of economy. The analysis is defined in two ways Kumar, Naresh, 2016):

(i) to examine growth pattern of economy, linear growth model is applied as defined below;

(i)

where Y is a dependent variable and X is an independent variable; a, b are constants

(ii) to analyse relationship between GDP growth and sectoral growth Pearson correlation techniques is applied along with descriptive statistics i. e. Mean Deviation is calculated to evaluate deviation of growth of GDP and different sectors of economy.

(ii)

where notations have usual meaning

For analysis time series data for the period 1952−2014 (Economic Survey, 2015) is used for GDP as well as sectoral growth. For parameter estimations SYSTAT package was used (SYSTAT, 1988).

$$MD = \frac{1}{N}\sum_{i=1}^{N} |x_i - \bar{x}|$$

It was kept in mind that total GDP is a sum of different sectors (e. g. Agriculture, Industry and Services). Therefore, a policy that affects one sector will affect overall GDP growth through this sector. Some polices may affect more than one sector, with the relative effect on these sectors varying over time. A given policy may also affect one sector positively and another negatively. In this case the effect on overall GDP growth may be either positive or negative. A set of policies in general have positive and negative effects on different sectors, with the net effect on overall GDP being an aggregation of these sectoral impacts (*Virmani*, 2006). Hence, it was assumed that the affect may be captured and scaled by using the linear model and correlation techniques.

Economic growth and sectoral composition in India

India adopted socialistic strategy of economic growth focusing on self-reliance and alleviation of poverty. It was based on the philosophy of mixed economy with a co-existence of public and private sectors adopted from USSR model of five year plan. The First Five Year Plan (1951−1956) was designed to raise domestic savings and expand agriculture to raise GDP; while the Second Five Year Plan was articulated to develop heavy industries in the public sector. Subsequently, policies focus were on expansion of infrastructure with integrative approach and human development. The policy emphasis included as a high growth rate, national self-reliance, reduction of foreign dominance, indigenous capacity building, encouraging small scale industry, bringing about balanced regional development. However, this could not accelerate the economy, so a shift in economic policy was occurred during late 1980s by adopting policy of economic liberalization. Policy of deregulation was started consequently, (i) some industries were delicensed without any investment limit and (ii) all industries were

exempted from licensing except for a specified list of industries during 1988[1]. This was the beginning of the process of liberalization in late 1980s and was resulted into the regime of liberalization process initiated by Manmohan Singh, the finance minister in the Government of Shri P. V. Narasimha Rao in 1991. As a result, economy of India was on the path of reforms which accelerated growth in industrial sector and service as well. This led growth in GDP and service sector became a main sector in the process of economic development.

To understand Indian economy the economic growth can be divided into three phases (i) socialist phase of economy (1950−1951 to 1979−1980) (ii) Pre-liberalisation phase (1980−1981 to 1993−1994) and (iii) post liberalization or market reforms phase (1991 onwards). The early phase or the socialist phase of economic growth was very slow with average GDP growth rate of 3.5 % per annum (Figure 1). This phase remains until 1980 and the growth in this period was volatile (*Virmani*, 2006). Then economic policies were guided by the process of globalization and reforms in economic policy began as a result boost in Indian economy was registered and trends were sustained.
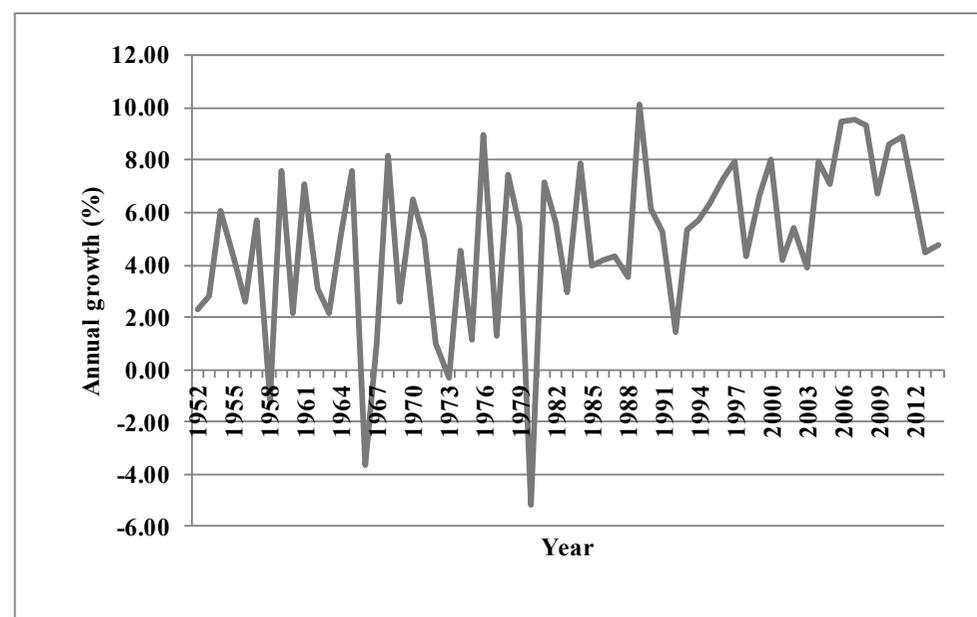

Figure 1: Percentage Growth of GDP at factor cost (1952−2014)

It could be observed that growth of Indian economy was not stable and had been fluctuating. The growth of Indian economy is ascribed to different sectors of economy mainly; primary, secondary and tertiary sectors and therefore, the GDP growth may not be mere dependent on a single sector. However, in India before the process of liberal policies the economy was more dependent on primary sector particularly on agriculture and allied services and was termed as agrarian economy. But in the new economic regime the economy of

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[1] Three important committees were set up in the early 1980s. Narsimhan Committee on the shift from physical controls to fiscal controls, Sengupta Committee on the public sector and the Hussain Committee on trade policy.

any country or region is a product of dynamical interaction between primary, secondary and tertiary sector. The share of Agriculture in GDP during 50s was over 50 % which gradually declined to about 15 % while service sector was the least contributors. The growth of different sectors and their contribution to total GDP is given in Figure-2 &3.
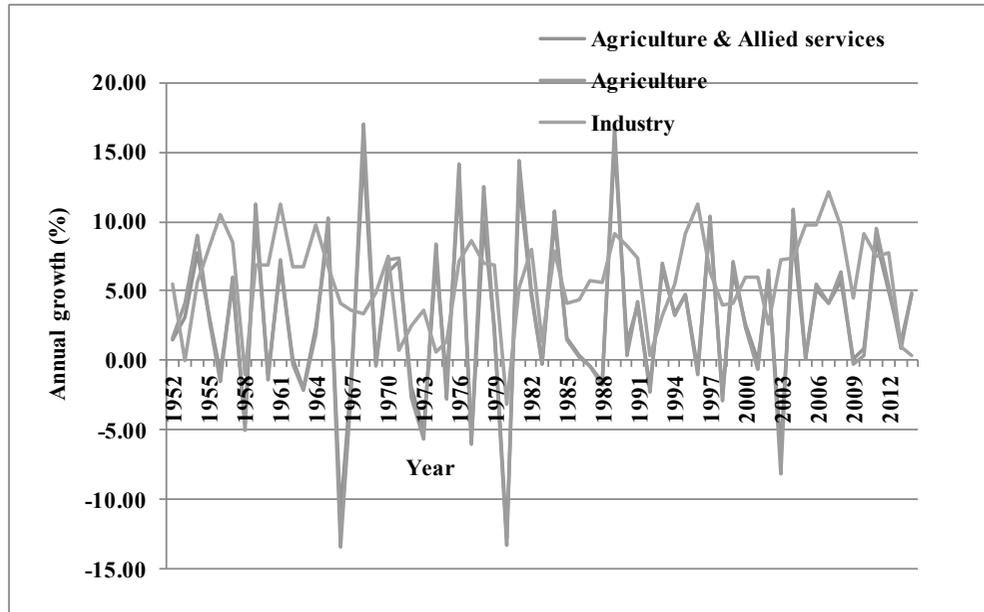

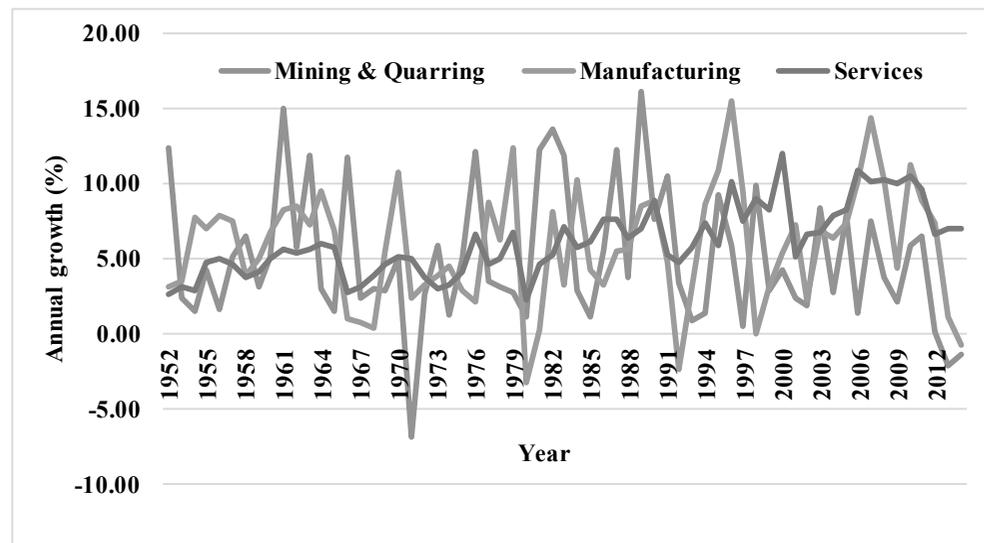Figure 2a: Annual growth of different sectors (1952−2014)

Figure 2b: Annual growth of different sectors (1952−2014)
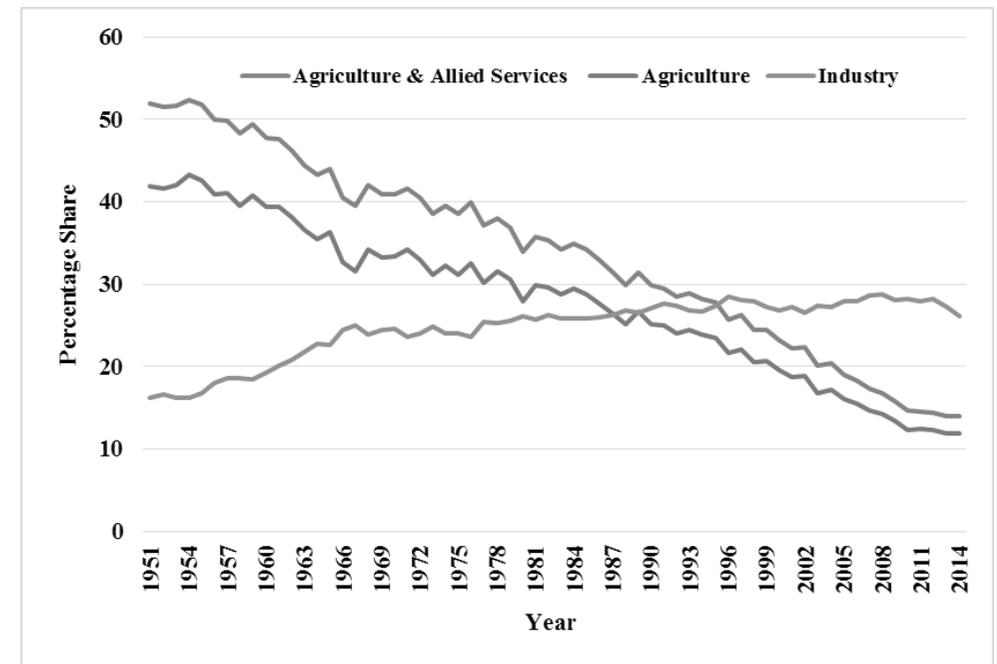

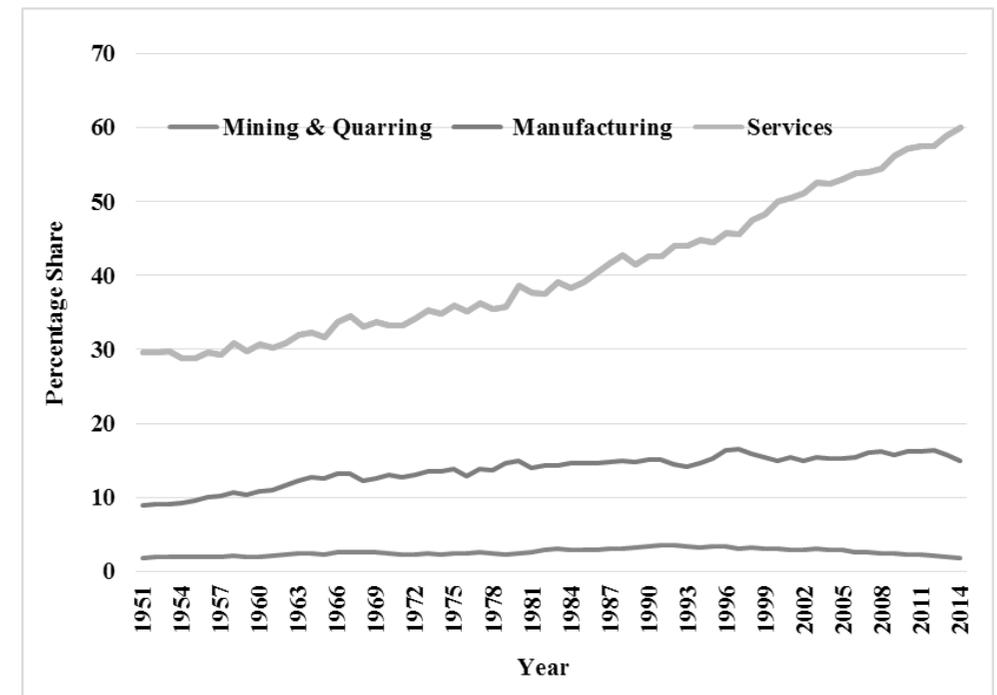Figure 3a: Share of different sectors to GDP (1952−2014)

Figure 3b: Share of different sectors to GDP (1952−2014)

The available data indicates that over the year share of Agriculture, Mining and Manufacturing has declined while Industry and Service sector shown a steady growth. Consequently, a big shift was observed in Indian economy by replacing Agriculture to Service sector. It is significant to note that Industrial sector, despite heavy investment, could not contribute as expected in the GDP and legging behind. The share of Industrial sector in GDP was declined in 2013—2014 as compared to 2012—2013.

Results

Data pertaining to GDP and different sectors for the period 1950—1951 to 2013—2014 was considered for analysis. Analysis was made to examine linkages between different sectors and GDP. Also, analysis was done to make projection of GDP and different sectors to assess future trends of growth of Indian economy. For analysis and parameter estimations SYSTAT was used and using the values of parameters future projections were made up to 2025.

Correlation coefficients are listed in Table 1, while parameter estimates for GDP and different sectors are given in Table 2 and Table 3 respectively. Projections for sectoral growth and GDP are presented in Figure 4 and Figure 5 respectively. In Table 3, projected share of contribution of different sub-sectors in GDP are listed.

Table 1

Correlation coefficient between different components of GDP

Variables	GDP	Agri & Allied Services	Agriculture	Industry	Mining	Manu-facturing	Service
GDP	1000						
Agri & Allied Services	**0.813**	1.000					
Agriculture	**0.802**	0.998	1.000				
Industry	0.592	0.269	0.251	1.000			
Mining	0.034	0.025	0.028	0.342	1.000		
Manufacturing	0.512	0.184	0.168	0.814	0.109	1.000	
Service	0.638	0.156	0.139	0.440	0.037	0.433	1.000

Table 2

Mean deviation for different components of GDP

	GDP	Agri & Allied Services	Agriculture	Industry	Mining	Manufacturing	Service
Mean Dev	4.960	**2.903**	**3.035**	5.765	5.029	5.835	6.127

Table 3

Parameters for GDP and different sectors

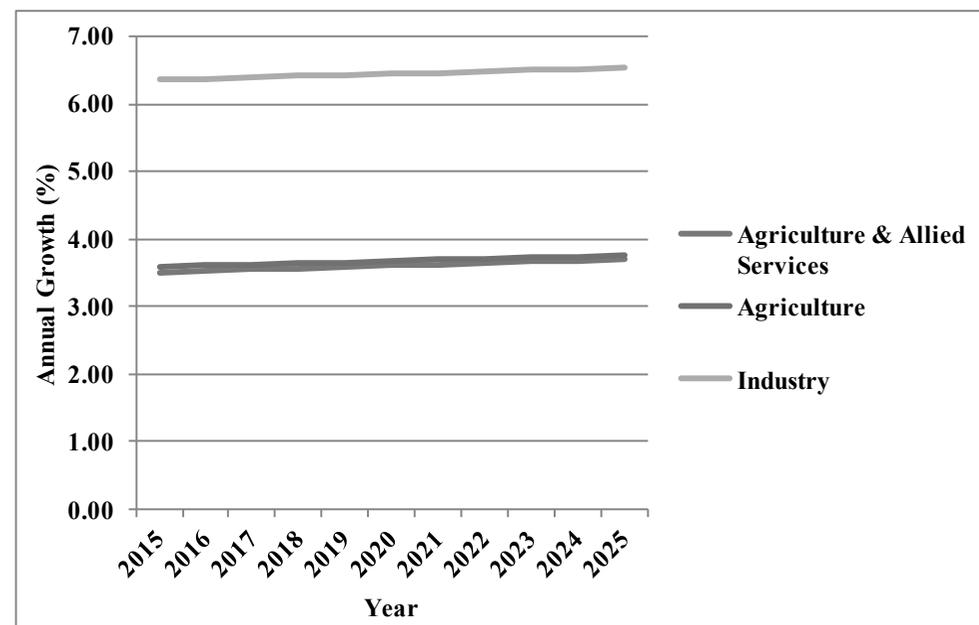| GDP Components	a	b	MSE	CRS
GDP	2.657	0.072	9828.911	0.128
Agri & Allied Services	2.992	0.019	269.355	0.004
Agriculture	2.481	0.017	293.255	0.002
Industry	5.175	0.010	1050.363	0.010
Mining	5.989	-0.030	805.911	0.015
Manufacturing	5.075	0.024	1078.514	0.013
Services	3.141	0.093	1273.267	0.552

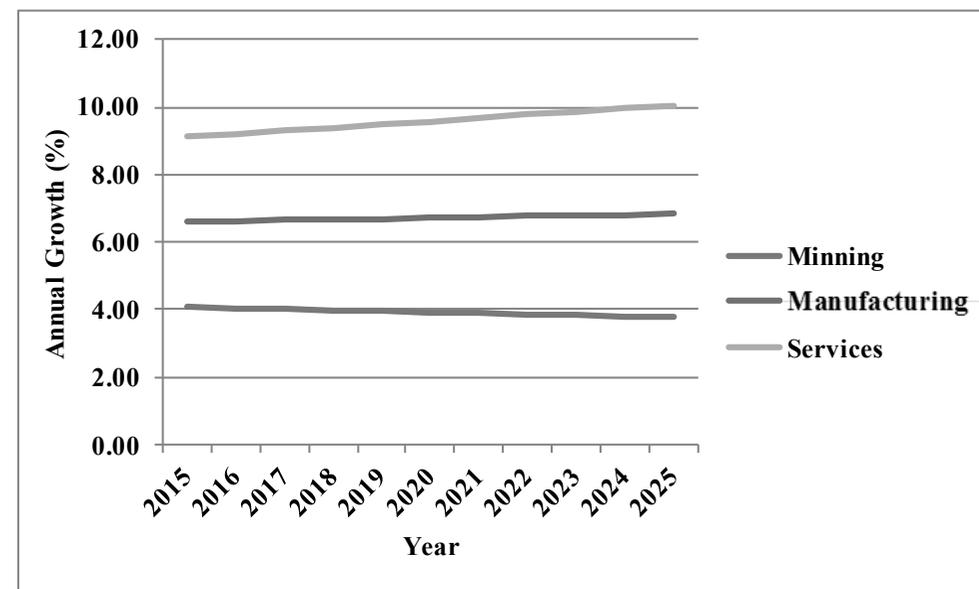Figure 4a: Growth projections of different sectors (2015—2025)

Figure 4b: Growth projections of different sectors (2015—2025)

Table 3: Projected share of different subsectors in GDP

Year	Agriculture	Industry	Mining	Service	Manufacturing
2015	13.67	30.26	2.99	56.54	17.07
2016	13.05	30.43	3.01	57.03	17.17
2017	12.44	30.61	3.02	57.52	17.28
2018	11.82	30.78	3.03	58.01	17.38
2019	11.20	30.95	3.04	58.50	17.48
2020	10.59	31.13	3.06	58.99	17.59
2021	9.97	31.30	3.07	59.48	17.69
2022	9.35	31.47	3.08	59.97	17.79
2023	8.73	31.65	3.09	60.46	17.90
2024	8.12	31.82	3.11	60.95	18.00
2025	7.50	31.99	3.12	61.43	18.11

In this paper an attempt was made to examine the linkages of different sectors of economy with GDP growth. It also tries to analyse future growth trends of GDP and different sectors of Indian economy. The results show that there is a statistically significant correlation between Agriculture and allied services/Agriculture (correlation coefficient(s) 0.813/0.802)
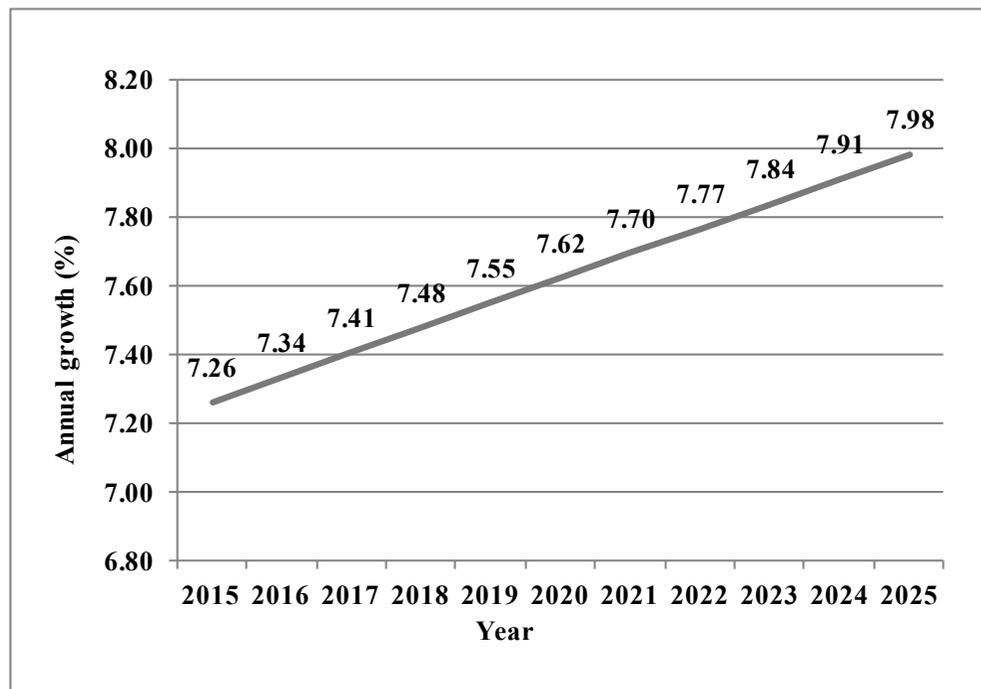

Figure 5: Annual projections of GDP (2015–2025)

and GDP followed by Service sector (correlation coefficient 0.638) and Industrial sector (correlation coefficient (0.512). This is supported by the mean deviation values for Agriculture & allied service (2.903) and Agriculture (3.035) which are least. The Mean deviation values for Industry and Service sectors are 5.765 and 6.127 respectively. Statistically it could be inferred that consistency in GDP growth is likely more dependent on Agriculture sector than Industrial and Service sector. The value of Mean deviation for GDP is 4.960 which is statistically significant which signifies that the GDP growth in future is likely to be stable. However, the rate of growth of GDP may remain slow in future.

Projection results indicate that Mining sector may face decline trends and annual growth of in the Manufacturing sector is expected scanty. Similarly, the growth rate of Industrial sector is likely to increase marginally, while Agriculture sector may perform little better in terms of annual growth. On the other, the rate of growth in Service sector expected little moderate in coming years. The major constituent components of Indian economy exhibit positive growth hence GDP is like to increase in future. Annual growth rate of Agriculture sector is expected about 4 %. Similarly, Industrial sector is expected to grow annually with 5 %, Mining sector 4 %, Manufacturing 7 % and Service sector 10 % by the year 2020. Accordingly, annual growth rate of GDP is expected about 8 % per annum by 2020.

Discussions and conclusions

Analysis shows a positive growth potential in the economy of India, however, slow growth in the primary and secondary sectors could be a critical policy issue, particularly slow growth in the agriculture and mining sub-sector. It can adversely affect the overall growth of economy. Thus the slow growth in primary; agriculture, mining and manufacturing sectors is a matter of worry that needs to revisit the policies to increase productivity in both sectors. Agriculture sector needs compressive and integrated approach to empower farmers in terms of use of modern technology, institutional reform to improve the efficiency of delivery systems for rural development; transfer of necessary resources and effective implementation of agricultural policies like price support system, subsidized institutional credit for stimulating growth in agriculture. For increasing industrial productivity product market reforms are necessitated to improve industrial sectors. The domestic fiscal policy could play a major role in reducing the impact of recessions in manufacturing and industrial sectors. This requires demand management policies focusing on those specific sectors which are venerable in times of economic disturbance. The policy design should be in the least distortionary manner that suits the profile of a specific sector. Such policies may have a stronger and economically more efficient impact on the economy. Reforms in primary sector are more critical because estimates shows that contribution of agriculture in GDP is expected continuous declining. However, mining reflects a little bit positive growth to GDP in coming years, likewise Industry and manufacturing. The Government policy initiatives particularly on *"Make in India"* and *"Skill Development"* may boost GDP growth in coming years. Both the flagship projects focuses on manufacturing and industrial sector which will boost GDP by contributing a big volume to the economy.

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НАУЧНАЯ ЖИЗНЬ

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Социология науки и технологий
на V Всероссийском социологическом конгрессе[1]

Очередной, пятый по счету, Всероссийский социологический конгресс прошел в период с 19 по 21 октября в столице Урала, г. Екатеринбурге, на базе Уральского федерального университета. Оправдывая свое место и роль в жизни социологического сообщества страны, Конгресс собрал более 1000 участников, в том числе представителей Европейской и Международной социологических ассоциаций. Научная программа Конгресса, главной темой которого стали социальное неравенство и социальная справедливость, включала проведение 15 сессий; их название и состав отражали наиболее сложные и актуальные проблемы комплексного характера, стоящие сегодня перед отечественными социологами (социальная политика, неравенство, человеческий потенциал, инновации и др.). Кроме того, по заведенной традиции в рамках научного мероприятия прошли заседания секций (всего их было 37), организованных исследовательскими комитетами Российского общества социологов. Важное место в работе Конгресса заняли круглые столы (их было 35), а также вечерние лекции, встречи с редакторами ведущих профессиональных изданий, презентация изданных монографий, встречи авторов с читателями.

Во время работы V Всероссийского социологического конгресса традиционно была организована и успешно работала секция социологии науки и технологий. Попытаемся тезисно изложить основные пункты прозвучавших докладов.