

EXPLORING THE PRODUCTIVITY TREND OF DIFFERENT SECTORS IN INDIA AND ITS ROLE ON GROSS DOMESTIC PRODUCT (GDP) - AN ANALYTICAL STUDY IN EXISTING ONGOING CHANGING ECONOMY

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ABSTRACT

Growth of a country involves growth in all relevant aspects that the country is desired to undergo – growth in literacy, social system, cultural aspect, economy etc. Out of different constructs of growth which country need to undergo, economic growth is the growth that directly or indirectly works as the cog of the wheel of total growth of the country. Gross Domestic Product (GDP) of a country is the indicator of economic growth of that country. Different sectors of production like agricultural production, industrial production, production of service generating sector etc. are the main contributors to economic growth or more specifically GDP growth. It requires identifying trend of such growth in each relevant sector and also GDP of a country. Also to go for optimization in long term economy and development of a country it requires the study and analysis on long term basis.

On the basis of in-depth study and analysis and also use of updated statistical measures, effort may be made to find out trend of long term economic growth of a country and necessary related mathematical models may be established. This work is an effort in this respect.

Key words: Gross Domestic Product, Economic Growth, Economy, Optimization

INTRODUCTION

India has a developing economy. India ranks as the sixth largest economy of the world. And on the basis of purchasing power parity (PPP), India stands third largest in the world economy. During the period of 2015 to 2017, Indian economy had a record growth (source: revolvvy.com).

The long term growth prospective of Indian economy is positive because of its vast percentage of young population, corresponding low dependency ratio and growing integration of global economy. India ranked highest for the first time in fiscal year 2015 - 16 when economy had gone to the level of 7.6% growth.

India possesses one of the fastest growing service sectors in the world with annual growth rate being higher than 9% since 2001 and this contributed in GDP to the extent of 57% in 2012 - 13. Agricultural sector is also fast growing with large number of people being involved in it. Agriculture sector contributes largest involvement of manpower in Indian economy. However, service-sector and Industry-sector are surpassing with respect to their contribution to economy than Agricultural sector. The Industry sector is occupying a steady share of its economic contribution, being 26% of GDP IN 2013-14.

Concept of 'Gross Domestic Product

Gross Domestic Product accounts for the total values of output produced within a country taking into consideration of the output of all sectors of production like Agricultural, Industrial, Service etc.

GDP is defined popularly as “final value of the goods and services produced within the geographic boundaries of a country during a specified period of time, normally a year”. GDP growth rate is an important indicator of the economic performance of a country.

GDP is measured by using several methods. Mostly the following methods are in practice for measurement of GDP.

LITERATURE REVIEW & RESEARCH GAP

In India there is regular change in pattern of production. Initially India had been an agricultural based country giving primary preference to agricultural production with preference to small industries being basically agro based industries located mostly in rural India.

Gradually there had been changes in pattern of production being evident from different from the fact that different sectors getting dominance in production process being undertaken like i) Agricultural sector, II) Agro-industries sector iii) Industrial sector iv) Service sector etc.

Consequently it requires establishing the role of these changing sectors of production upon Gross Domestic Production (GDP) how the country economy is involved because of this changing pattern in nature of production sectors.

The review of different work involving such analysis undertaken by different researchers and authors in this work taken into consideration in this work as literature review may be done for such analysis.

Chopra Kanchan (1995) noted that Government of India had undertaken in 1952 National Policy with respect to utilization of available different national resources and stressed that there must be optimal utilization of resources with creating any trend which may lead the national resources towards total gradual depletion and also it should be such done that it creates the best feasible effect upon economy without endangering neither economy nor the process of availability of national resources.. Hence it requires an extensive study with respect to utilization of resources and the impact thereof upon economy or GDP.

Chandra Pankaj (1998) noted that sector level firms develop strategies to compete and with their initiatives grab bigger market share in the business world. He cautioned that one has to be careful about nontariff hurdles in the later period of MFA world. The new market would revolve on the basis of acumen and specialty in supply chain management. Policy would be required to boost competence at the levels of firm.

The strength of the firm lies on developing its competitive abilities which subsequently encourages the contribution of firm to Economic growth.

Sen, Abhijit and M.S. Bhatia, (2004) in this work emphasize that in process of production productivity is not the one and only criterion, the author, a noted analytical and developmental economist emphasizes the needs to take care the impact of the product process, system and end product upon the entrepreneur or producer,. In process of analyzing impact of agricultural product, it has been mentioned that even in case of green revolution agriculture in several cases had failed to bring best satisfaction to producers- cases of farmers distress had been in several cases very frequent. Accordingly it requires to identify the impact of the production process upon the economy - how far it satisfies the economic development or GDP towards optimization. Unless it turns to be fairly competitive with other sectors in respect of its contribution upon GDP, it is not to be encouraged. Chanda R, (2004,) highlighted that more broad based growth within the service sector is required. Services such as trade and distribution,, which has high employment intensities and large backward and forward linkages with other sectors need to grow more rapidly. In this regard, further infrastructural and regulatory reforms and FDI liberalization in services can help diversify the sources of growth within India's service sector and provide required momentum towards its fare-share of contribution to overall national economy.

Nachane, Dilip M., Partha Roy and Saibal Ghosh (2005) observed, the banking structure that India had adopted during 1947 endured two major shortcomings: (i) intertwining of directorships of corporate-houses and banks and (ii) lack of credit to significantly important social and economic sectors of the nation. These demerits brought in umpteen problems and eventually many banks were nationalized.

Economy at that period had been under constraints of growth rate being less than targeted. The reason behind this poor growth rate of economy had been poor growth rate in production in different areas of production like agriculture, industry, services, import and export balance of the country leading to undesired BOP. In a developing economy it is desired that there should be capital investment and consistent availability of capital in all areas of production so that all sections contribute to economy or GDP fairly and thus results a trend of reasonable growth in GDP.

The Government during that period had taken such a policy on the basis of consideration as noted in second drawback as above in order to boost up social system and economy as desired.

Sarkar Abhirup, (2007), said that the problem is one of adopting a long run feasible policy for India. The so-called East Asian model of economic development, which has produced miracles in terms of growth, though not always in terms of human development, can hardly work in India even towards increasing the rate of growth. The East Asian model puts the entire policy emphasis on the investor, giving him all the incentives possible. In the process the human considerations are largely ignored. It contributes upon economic development very poorly.

Hence, it is observed that professor Sarkar discourages the acceptance of the model since contributes very poorly to economic growth of country.

Hence from the work of different research workers undertaken at different times at different areas of production and consequently economy related with production, it is emphasized that unless there is significant contribution, the production and growth in that area is to be discouraged.

Also other than these, several other significant research works are available which explored and critically analysed and justified need of growth of different production activities in different sectors like agricultural sectors, industrial sectors, service sectors etc in order to find out how these contribute or share of contribution of each upon total economy or growth rate in of GDP. The work of Montek Singh Ahluwalia (1999), Nirvakar Singh (2005), Ashima Goyal (2004), Jeffrey D Sachs(1981), Tirole Jean (2002) etc. may be mentioned in this respect. .

However, though an intensive study over impact of production growth upon GDP or economic development have been undertaken, no much work in this area has been undertaken to justify specifically the GDP with this respect at different phases of time and also justifying the extent of contribution of each sector and also all the sectors cumulatively with percentage composition of the constituents, upon economy primarily and GDP collectively.

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GDP is measured by using several methods. Mostly the following methods are in practice for measurement of GDP.

Output Method

Using this method the monetary or market value of all the goods and services produced in a country are measured. In order to avoid discrepancies in measure of GDP due to changing price positions, GDP at constant prices is computed. GDP (as per output method) = Real GDP (GDP at constant prices) - Taxes + Subsidies.

Expenditure Method

This measures the total expenditure incurred by all entities on goods and services within the domestic boundaries of a country. GDP (as per expenditure method) = C + I + G + (X-IM) C: Consumption expenditure, I: Investment expenditure, G: Government spending and (X-IM): Exports minus imports, that is, net exports.

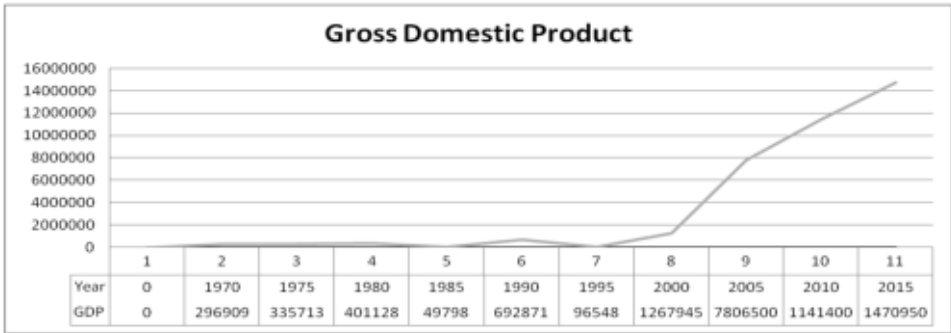
Income Method

It measures the total income earned by the factors of production, that is, labour and capital within the domestic boundaries of a country. GDP (as per income method) = GDP at factor cost + Taxes - Subsidies. In India, contributions to GDP are mainly divided into 3 broad sectors - agriculture and associated activities, Industry and Service sector.

The GDP since the initiation of Five- year plans as initiated by Government of India had started taking a new dimension. And since the decades of eighties along with development of production using updated technology and management had shown appreciable changes. The growth and development in service sectors had given it a notable change in the upward direction of growth in GDP. Changes in trend of GDP are shown as below:

Figure: 1

Rs. In Crore



Source: Central Statistical Organization as reported in RBI Handbook of Statistics of economy (2015-16)

Indian Agriculture Sector and its role in GDP

Agriculture had always been back-bone of Indian economy and despite concerned industrialization in last decades; agriculture still occupies its place of pride. The significance of agriculture in the national economy may be explained by considering the role of agriculture under different heads.

Table -1: Share of Agriculture in Total GDP (At 1999-00 Prices)

In percentage

Year	Agriculture
1950-51	56.5
1970-71	45.9
1990-91	34.0
2000-01	24.7
2005-06	19.55
2010-11	8.6
2011-12	5.02
2013-14	4.71

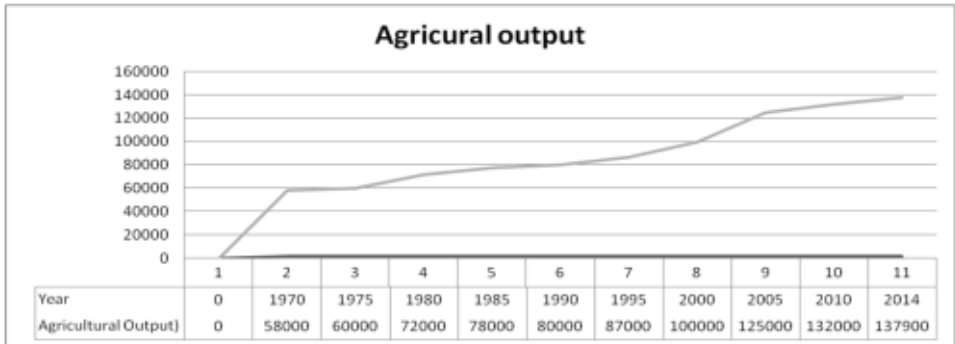
Source: Economic Survey, 2014-15, Statistical Abstracts of India, 2015

Agricultural Output

Though there is appreciable fall in Percentage of contribution of agricultural sector to GDP with respect to other sectors of production, agricultural production continued to be in growing rate in India significantly. This is because of increased infrastructural facilities used in this sector and also use of advanced technology.

Figure: 2

Rs. In Crore



Source: Central Statistical Organisation as reported in RBI Handbook of Statistics of economy (2015-16)

Industrial Output

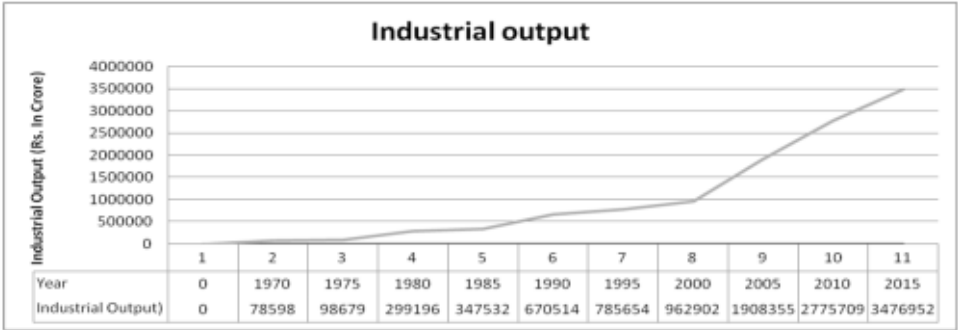
Industrialization has major role to play in economic development of India. The gap in per capita income between underdeveloped and developed economy is largely reflected in the disparity in the structure of their economies.

The Government of India launched the process of industrialization as conscious and deliberate policy of economic growth in early fifties. The Government organized the significant contribution to industrialization so that it could add to development process, "as base for the growth of the primary sector".

The growth in Industrial output has been on steady rise since the decades of seventies after process of large scale nationalization of different large sized heavy industrial sectors and also large investment in private sectors by private entrepreneurs both in light as well as heavy engineering and process sectors. The trend of industrial output is shown in Figure 3 as below.

Figure: 3

Rs. In Crore



Source: Central Statistical Organisation as reported in RBI Handbook of Statistics of economy (2015-16)

Output of Service Sector

However, the output of service sector had been coming out as a significant contributor to Indian economy and also GDP since it had been started being considered as a part of industrial sector with an economical output towards the objective of getting revenue out of this sector and adding that to economy of the country. Since 2005-06 this sector had started coming out as a major revenue generating sector contributing to Indian economy and GDP significantly and also surpassing other sectors.

Combined output of different sectors

The output of different sectors is actually, though growing in Indian scenario, show different growth rate in comparison to each other. The growth rate of agriculture sector is observed to be less in comparison to growth rate of Industrial sector and growth rate of Industrial sector again is surpassed by growth rate of Service sector.

Table: 2

Year	Growth Rate in Production in Percent (%)			
	Gross Domestic production	Agriculture	Industry	Service
2004-05	7.05	0.18	9.81	8.28
2005-06	9.48	5.14	9.72	10.91
2006-07	9.57	4.16	12.17	10.06
2007-08	9.32	5.8	9.67	10.27
2008-09	6.72	0.09	4.44	9.98
2009-10	8.59	0.81	9.16	10.5
2010-11	8.91	8.6	7.55	9.67
2011-12	6.69	5.02	7.81	6.57
2012-13	4.47	1.42	0.96	6.96
2013-14	4.74	4.71	0.35	6.78

Source: Handbook of statistics on the Indian Economy (2014-15)

GDP and production at different sectors and corresponding effect in Indian economy:

India is passing since the beginning of this century through a very shining and coveted scenario of growth in its trend. Production at different sectors are growing up and also rate of contribution of each sector of production is at a fiercely competing and changing state towards their contribution or role upon Indian economy and Gross Domestic Production (GDP).

The pattern or change of trend of production in each sector is in order as happens in country where economy shifts from or become in a transition stage in its process of change from developing to developed one.

Contribution of Different Sectors of Production in GDP

It requires identifying elaborate analytical study and observe the pattern of changing trend in production in each sector, not only whether individually the same is rising or falling in magnitude but also how the contribution of each is changing either in form of revenue generation and corresponding contribution to total GDP or percentage of contribution of each on GDP stating its order either ascending or descending.

The following figures (Figure 5 and Figure 6) show the contribution of all the sectors as stated here:

Figure 4 - actual value of production at constant price showing GDP, Agricultural production, Industrial production and Service production

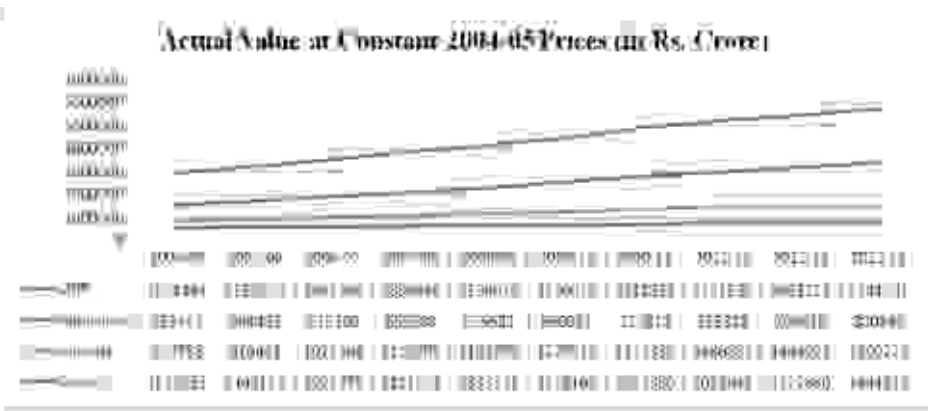
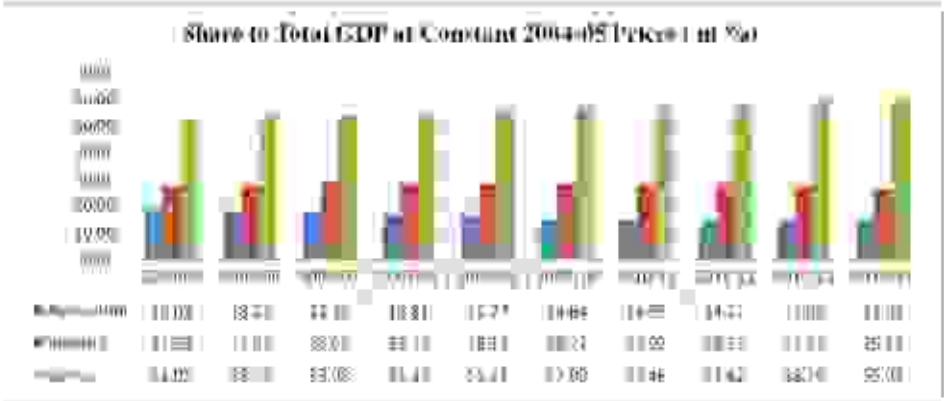


Figure 5: Contribution of each sector of production upon GDP



Source: Central Statistical Organisation (2015-16), Handbook of statistics on the Indian Economy (2014-15)

Justifying the Trend of Growth with Respect to Stability and Sustainability of Trend:

It is observed from the above study of data of production in different sectors for a significant period and analysis of this with respect to change in pattern of trend of production and its effect upon GDP, the growth pattern in GDP and different sectors of production follow a changed track. It needs to justify how this changed track is going to survive over phases of economic shifts being in existence in real life of new economy. For this several statistical measures are taken for consideration. Correlation analysis among these few variables (means of productions) has been done as shown in following table to study the pattern that is expected to follow.

Table :3 Correlations

		GDP	Agriculture	Industry	Service
GDP	Pearson Correlation	1	.387	.889**	.852**
	Sig. (2-tailed)		.269	.001	.002
	N	10	10	10	10
Agriculture	Pearson Correlation	.387	1	.158	.071
	Sig. (2-tailed)	.269		.663	.846
	N	10	10	10	10
Industry	Pearson Correlation	.889**	.158	1	.636*
	Sig. (2-tailed)	.001	.663		.048
	N	10	10	10	10
Service	Pearson Correlation	.852**	.071	.636*	1
	Sig. (2-tailed)	.002	.846	.048	
	N	10	10	10	10
**. Correlation is significant at the 0.01 level (2-tailed).					
*. Correlation is significant at the 0.05 level (2-tailed).					

From the above correlation table Inter- production- item (Gross Domestic Production, Agricultural production, Industrial production and Service production) correlation with respect to their revenue generation is significantly correlated. The correlation analysis is done on the basis of data obtained from yearly feed of production figures maintained by different sources as mentioned in the above tables and figures.

Since the correlation coefficients are significant it is established that the trend of production as is observed since 2004-05, as is taken for study and analysis in the above tables and figures are significant and stable and this trend is to be sustained for longer period.

Regression Analysis and an Approach to Model Summary

Regression analysis of data as obtained in previous figures and tables related with GDP and different types of production has been undertaken towards an attempt to justify suitability of previous correlation test and suitability and consistency of data towards a suitability of model formulation has been done.

Table. 4 Result of Regression Analysis

Model Summary ^b										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.999 ^a	.998	.996	.11545	.998	821.543	3	6	.000	1.758
a. Predictors: (Constant), Service, Agriculture, Industry										
b. Dependent Variable: GDP										

From above Regression analysis it is observed value of 'R' is 0.999 which is very high and very much rational. It supports the significant correlation as obtained in Table 3. The value of R² available in Regression analysis, above table, is 0.998 supports this high value of R. The standard error is .11545 which is less and is also fairly acceptable. Also it is observed from this regression analysis that adjusted R² and R² change are respectively .996 and .998 which are significantly close to present R².

This justifies the stability of exiting pattern of contribution of different sectors of production upon GDP and consequently a proposed model upon the present state of affair of Indian economy with respect to growth of GDP and the roles, as these in present situation, from different sectors of production system upon GDP are significantly stable so that any model built thereof may be usable in Indian economy with durable reliability.

Analysis of Variance (ANOVA)

Analysis of variance (ANOVA) is an extremely useful technique concerning researchers in the field of economics where it is required to compare more than two populations as is done in this study taking into consideration yield from several varieties of production sectors and finding out their role in GDP. Through ANOVA technique it is possible to investigate any number of factors which are said to influence the dependent variable. In this existing study dependent variable is GDP and predictors are products or revenue outputs from different sectors like Service,

Table: 5 Anova Summary

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	32.850	3	10.950	821.543	.000 ^b
	Residual	.080	6	.013		
	Total	32.930	9			
a. Dependent Variable: GDP						
b. Predictors: (Constant), Service, Agriculture, Industry						

It shows that the sum of squares of residual factors are 0.080 out of the total sum of squares and mean square of residual factors are only 0.013. Hence this justifies the absence of factors which may adversely affect the conclusion that is available in this study over role of different factors of production upon GDP.

Model Formulation

As observed in this study GDP is the dependent variable and independent variables are the different sectors existing in national economy which are contributing to GDP. The coefficients of the variables are obtained as below :

Table: 6 Coefficients

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.018	.228		.079	.939
	Agriculture	.181	.014	.268	13.143	.000
	Industry	.256	.013	.532	20.196	.000
	Service	.561	.030	.494	18.954	.000
a. Dependent Variable: GDP						
The relation between dependent variable and independent variables may be established as below using the constant and coefficients as obtained from above Table. indicate any error that may be considered to be taken into consideration in this process.						

$$GDP = 0.18 + 0.181 \text{ Agriculture} + 0.256 \text{ Industry} + 0.561 \text{ Service} +$$

In a country, whether it is developed or developing, capital resources are used for undertaking continuous growth rate in GDP or economy. In this process of growth and development care is taken such that optimum utilization of investment is done. Rate of return upon investment is not same or uniform from all investments. In economy supply of fund is assumed to be kept under restriction assuming fund to be scarce in nature and also for managing mal utilization of fund. Accordingly, it needs to identify the investments which generate high return and also contribute high upon economy or GDP of country in comparison with those where contribution is low. The investments with lower rate of return should be preferred to be discouraged as much as possible.

With this aim in view in this present research work, it has been tried to identify the contributions of different sectors of production and justify and identify the sectors which are higher in respect of rate of return generation.

Regular studies are undertaken by different Government agencies, as in case of India, by Reserve Bank of India, Planning Commission. Economic Survey etc in this respect. Since it involves collection of data, to be done instead of one source from numerous sources in accordance with their area of activity or performance zone, what is done primarily the contribution of each operation area or sector is taken for consideration. This work is an effort to assemble data from different sources as discussed earlier to find out the integrated effect of different segments upon GDP. Other than the different Government agencies as noted, different individual research workers like L. Low, (2000), Pranab Bardhan (1985), P.N.Dhar (1902) etc. had undertaken study and analysis in this respect in order to identify role of different sectors and its changing trend upon GDP. However evidence is rarely observed over a cumulative work as taken in this study in respect of economy in India, Cumulative work as undertaken in this work taking cumulatively contribution of all different sectors over economy or GDP is rarely undertaken.

CONCLUSION

Indian economy since decade of ninety of earlier century has undergone massive changes being subjected to liberalization because of some policy decision of Government of India. Consequently the traditional pattern or trend of growth of the production sectors had undergone significant changes and such was their role upon GDP. The post liberalization pattern of Indian economy had wide differences with pre liberalization pattern. Also along with this there were many changes in technology and infrastructural resources used.

These all caused much change in Indian economic scenario in premises of global economy. Accordingly it requires the study of Indian economy with use of different statistical and other relevant tools to find out the pattern of movement and trend of

economy in the days to be followed. Also it requires to identify the prospects of different sectors and their share of contribution over GDP so that suitable support in form of inputs like capital, technology, infrastructural support etc are provided by relevant authorities to optimize the outcome.

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