The Analysis of Service Sector post 1970

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Abstract: *The service sector has been an important driver of economic growth. Its share in GDP has continued to rise since 1970s. In this paper, we focus on the interlinkages of service sector with manufacturing sector and GDP per capital and within different components of services sector itself. The study employs time series econometric techniques to establish the relationship and we find strong interdependence within the services sector. Further, manufacturing also has had a positive impact on the services sector. These results are in line with existing economic literature which regards the demand for services to be highly elastic.*

Keywords: Service sector, growth, granger causality, VAR

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Introduction

According to Kuznets Rostow Chenery and the traditional economic belief there are different stages of development that a country goes through in its growth path. The structure of economy changes accordingly and the traditional economists argue that first structural changes is from moving from an agricultural dominated economy to an Industrialised economy and then in the developed stage a Service sector dominated economy. This path has been followed by many countries from developed to developing like UK, US, Japan and China in their path towards growth and development. However, India has been an outlier as it bypassed the Industrial stage directly to service dominated economy.

The share of Industrial sector has stagnated to around 30% while the share of Service sector has reached to more than 50 % post liberalisation phase. Hence, the current study focuses on the role of different components of the sector in its growth. Also, the importance of manufacturing sector in being a determinant of its development. This study also explores the demand driven nature of services, to understand the high-income elastic nature of the services being provided from the sector.

Literature Review

Service sector in India holds significant importance for the growth and development of the country and has become a major driver in the past few decades and especially after the liberalisation and privatisation reforms of the 1990s. A number of studies have been carried out to understand its critical role and the factors that are driving the rise.

Park and Shin (2012) emphasised on the importance of service sector growth in the development of Asian economies. They found that the 12 countries experienced significant increase in the share of services in the output and employment with significant gain in labor productivity in the sector between 1980-2010. Additionally, the share of service exports increased substantially as a proportion of total exports and the rise in trade has a significant impact on the growth of productivity in the service sector. The broader conclusion of the study was that with the increase in income the share of services rises among all the countries.

In a study by Salman, et al. (2018) the factors that affect the service sector growth in developed and developing country were focussed upon. GDP per capita FDI net inflow, trade openness and innovation were the variables significantly contributing to growth in service sector value

added (especially for developing countries). They used a pooled data set of indicators from world bank in the during the period of 1990-2014 to establish the relationship. However, the study could not find any significant effect of productivity differential between services and manufacturing on growth of services sector.

Mukherjee (2013) analysed the overall service sector and the major trends that sector is witnessing. The study affirmed the importance of this sector in the economy highlighting on the fast-growing nature, high productivity and the increase in both export and import of services. But it also highlighted on the issues that the sector has been facing like the problem of inclusive growth, lack of coordination among governing bodies, limited employment and outdated regulations. Further there are wide variation within the service sector and also stresses on other problems like weak infrastructure and poor human capital. Hence, in order to sustain growth and more so in an inclusive manner these issues need to be addressed. The study therefore recommends integrating in the global value chain, enhancing investment in human capital and infrastructure.

Service sector has also played a role in addressing the current account balance issue of India. Thomas (2019) showed a significant positive impact of service trade on economic growth and current account balance. In assessing the impact on growth using the input-output approach, robust forward and backward linkages were observed in the construction, business and transport services in 2007-08. Further, the imports of services also contributed to growth in the economy through its contribution in manufacturing sector using the WTO TIVA (trade in value added) database.

Service sector has been critical and a driving force for reduction in poverty and a pull factor for migration to urban areas. Mitra (2020) through a recursive system analysis and correlation matrix argued that services is positively associated with urban consumption expenditure per capita. So, services activities lead to rise in income which supports the rise in consumption. With the diversity of jobs being provided in the services sector in urban areas, it becomes a major pull factor for urban movement. The study counters the belief that the migration to urban areas from rural regions lead to transfer of poverty.

Banga (2005) stressed on the critical issues in service led growth, the study identified both demand and supply side factors which impacted services. The factors which were brought into focus were high income elasticity of demand for services, increase in contractual services within the manufacturing sectors, increased trade, high FDI and overall improved technology.

These factors become even more pronounced in the next few years as shown by different studies later on.

Jain (2015) employed the multiple linear regression analysis to understand the factors that lead to growth of overall GDP and of the progress in Services sector. FDI, Net FII equity, Import and export were identified as the major contributors to the increase in GDP during 2000-01 to 2011-12. Eichengreen and Gupta (2010) also focused on the factors of service sector in which they find that with the increase in income per capita income the value added from services also increases. So, demand was a major contributor to increase in the growth of service sector. This is especially true for the modern services sector which includes financial, communication, computer, technical and business. Nayyar (2009) also recognized demand as a major determinant of service sector output growth. The study stressed on the high-income elastic nature of services and established an Engel curve type relationship for six types (education, health etc.). It utilised Tobit regression estimates from household surveys of the year 2004-05 and 1993-94.

Singh and Kaur (2014) used VAR and Granger Causality to determine the economic variables impacting the growth of services sector between 2000-01 to 2012-13. The study was able to identify factors like GDP per capita, GCF, FDI inflows and trade impacting the service sector development positively. The study also found Telecommunication, construction and hotels and restaurant attracting FDI inflows. Sen (2011) also established a strong relationship between FDI growth in service sector and its positive impact in not only the output of service sector but also the total GDP of the economy. It used data from 1970-2008 and with different regression equations showed that Service sector growth has positive impact on FDI and vice versa. And that service sector has a significant impact on the growth total GDP. The study also touched on the vulnerability of service led growth due the high-tech nature (high skilled requirement), the reliability on external demand (especially the outsourced services) and the jobless growth during the high growth phase.

Das et al. (2015) revisited the concept of service led growth in case of India and emphasised on the high level of productivity growth in services as compared to other sectors, and also how this growth in productivity has been a major contributor to increase in output of the economy. The study has used the KLEMS (capital, labor, energy and material) data provided by RBI from the period between 1980-2009 and the Tornvqvist aggregation to analyse the rapid rise in productivity in the services sector. The disaggregated analysis showed maximum rise in total

factor productivity was in the ICT intensive services followed by market and non-market services. But a decline in non-ICT intensive services. Further, post and telecommunication saw the highest rise in productivity followed by hotels and restaurant within the services sector with major contribution to productivity from the growth of total factor productivity (TFP, residual). Additionally, TFP was the major source of productivity growth in different sectors within the services. Even in the total GVA growth of the economy TFP growth in services was high compared to manufacturing and agriculture. Capital deepening due to trade liberalisation has been the major contributor to growth in productivity of services sector due to adoption of ICT equipments and new technologies, driving the increase in output.

Data and Methodology

Time series data has been used for analysis from 1970-71 to 2020-21, data on services sector and its components has been sourced from the national accounts statistics provided by the ministry of statistics programme and implementation (NAS, MOSPI) and from CMIE Economic outlook. The national accounts data including manufacturing has also been used from the NAS. The data on commercial capital has been obtained from DBIE (Data base on Indian Economy) which is maintained by RBI. The data from NAS is of constant prices of the year 2011. Further, growth rate has been used for the different sectors and total GDP and investment (Gross capital formation) has been taken as a proportion of GDP for normalisation.

Vector Auto Regression (VAR)

As the variables used are endogenous, vector auto regression technique is being used in the study to determine the interrelationship and interlinkages between the economic variables. VAR is a system of regression model where there is more than one dependent variable which is a mix of univariate and timeseries models. So, if time series Z_t is impacted by current and past values of Y_t and its own lagged terms then simultaneously Y_t is also affected by the current and past values of Zt

Stationary variables are used for VAR analysis, therefore Augmented Dickey Fuller test is employed to check for stationarity. All the variables were stationary at levels (table 1).

Table 1 Unit Root results

Variables	At levels

sgrt	-4.236*
fsc	4.8*
trc	-4.78*
padc	-4.09*
mangrt	-4.84*
gdppgrt	-5.6*
gccc	-3.7*
*Indicates 5% significance level	

The optimal Lag length is found using the Akaike Information criteria, which was found to be 4 in our model.

For the current study the following equations has been estimated which is in standard form VAR:

$$\begin{bmatrix} sgrt_t \\ trc_t \\ \vdots \\ gcc_t \end{bmatrix} = \begin{bmatrix} \alpha_1 \\ \alpha_2 \\ \vdots \\ \alpha_6 \end{bmatrix} + \begin{bmatrix} \beta_{11} & \dots & \delta_{16} \\ \beta_{21} & \cdots & \delta_{26} \\ \vdots & \vdots & \vdots \\ \beta_{61} & \dots & \delta_{66} \end{bmatrix} \begin{bmatrix} sgrt_{t-1} \\ trc_{t-1} \\ \vdots \\ gcc_{t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \vdots \\ \varepsilon_6 \end{bmatrix}$$

Or

S_t=A+BX+e

S_t- Represents the dependent variable vector

X - Represents the Independent variable vector

e- represents the error term vector

sgrt- service sector growth rate,

trc-Trade, Transport and communication Services growth rate

fsc- Financial and real estate Services growth rate

padc- public administration and community services growth rate

gdppgrt- GDP per capita growth rate

gccc – Growth of commercial capital

To understand the causality between variables **Granger Causality** is estimated which basically focuses on whether one variable causes change in the other variable. But causality here means

only a correlation between the current value of one variable and the past values of others, it does not mean one causes the other.

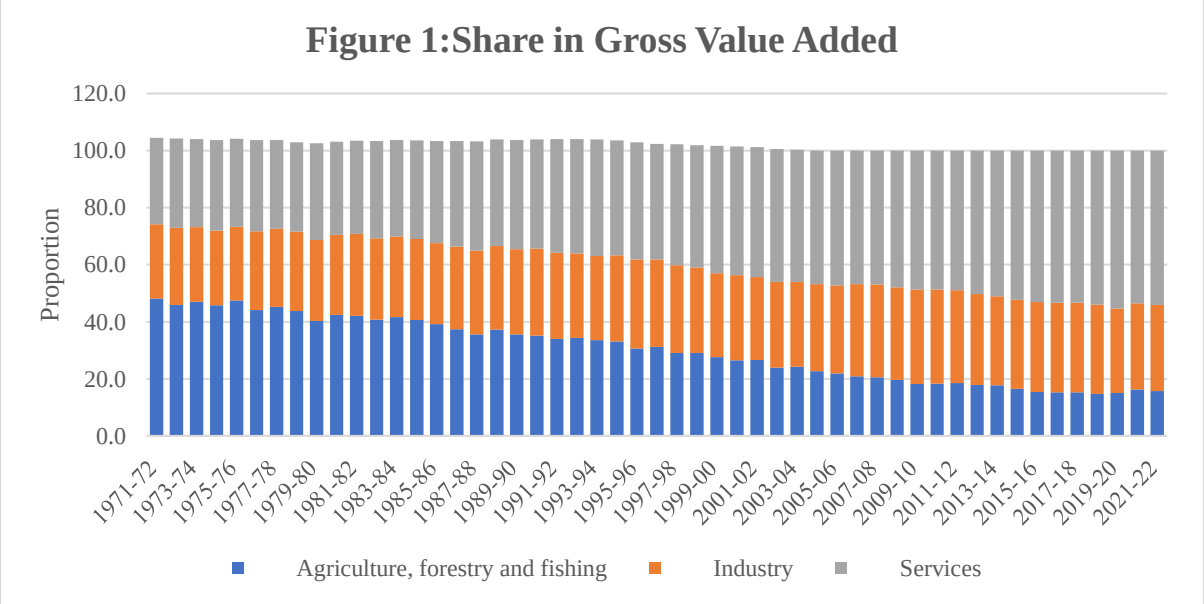
Impulse response function and Variance Decomposition

To understand the impact of one variable on other, the study estimated impulse response function or IRF. IRF measures the responsiveness of dependent variable to the shocks on the independent variable in the VAR model. It delineates the path the dependent variable will take to shock given to the independent variable. To estimate the shock the VAR is expressed as a vector moving average (VMA) and the shock subsides gradually.

Variation Decomposition is a bit different from impulse response function, it estimates the proportionate change in variable due to their own shock versus other variables. It provides for estimates of how much of forecast error variance is explained by exogenous shocks of other variables

Trends and Movements

The time period from 1970 to 2019-20 saw major structural change in the economy of India as is visible in the **Figure 1.** In the 1970s Agriculture had the major share in terms of output, with service sector and industry coming next. But in the 1980s Service sector strated expanding and share increased to 37.3 % in 1989-90 and agriculture declining to 35.6 %.

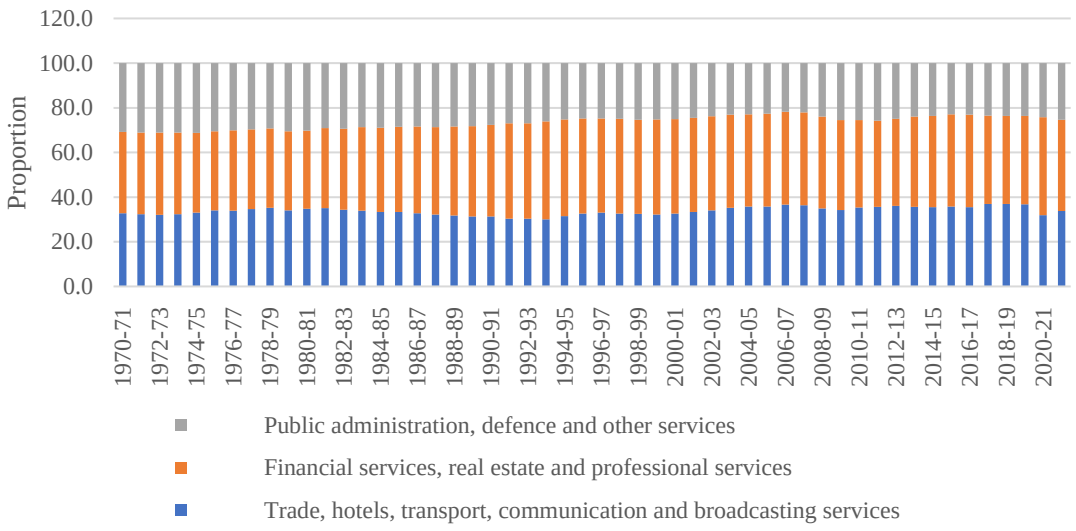


Source: NAS, MOSPI

And Post 1990 the liberalisation and privatisation reforms the structure of economy saw major change and service sector became dominant with contribution of 54.1 % in 2021-21 and the share of agriculture declined to 15.7 %. Industrial sector share in the economy has stagnated to around 30 % in the period.

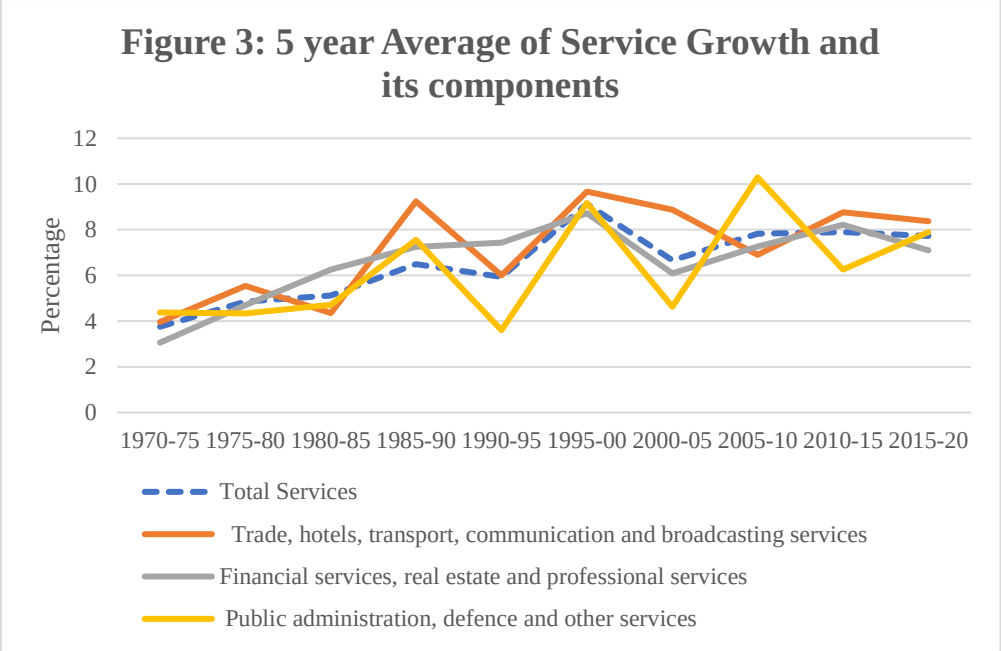
The service sector also has seen considerable change in the share of its components which had remained almost the same till 1990s (**Figure 2)**. But post 1990s and in the 2000s the share of financial, real estate and professional services increased considerably to 40.8 %, although this sector of service had always had the dominant share. The reforms further strengthened the sector and globalisation and privatisation contributed significantly to growth of the financial services sector. Public administration, defence and other services saw a decline in share in the total service output.

Figure 2:Components of Services Sector and its share



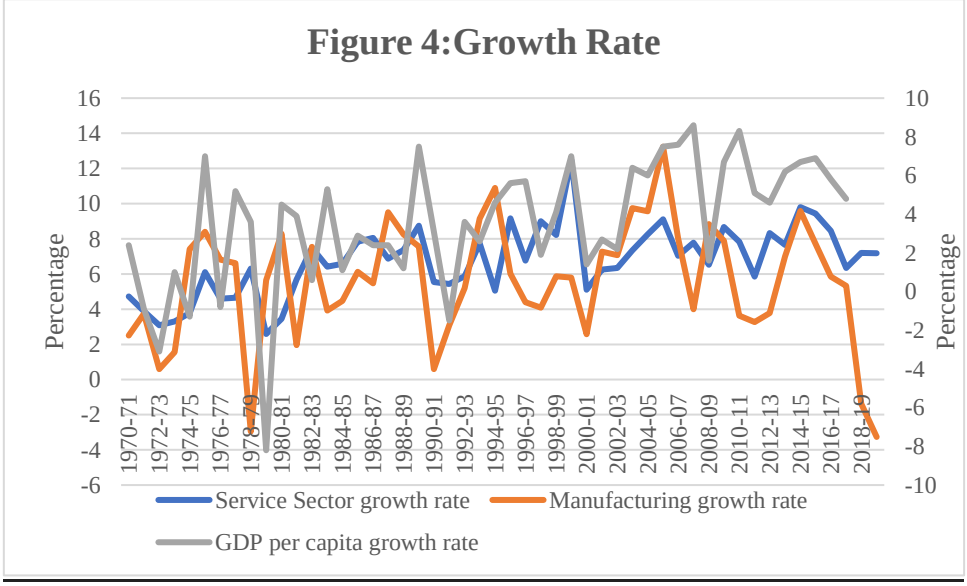
Source: NAS, MOSPI

The components of service sector saw on an average increase in growth rate during the period of the study as shown in the **Figure 3.** In the 1990s and 2000s service sector witnessed significant rise in growth rate and this high growth rate has been a major factor in the rising share of services sector in the total output.



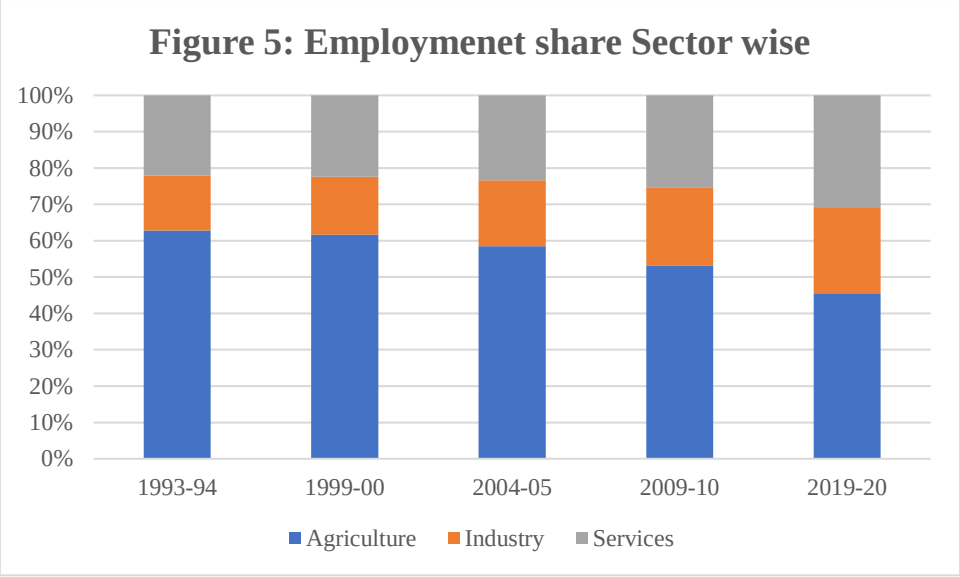
Source: NAS, MOSPI

Figure 4 shows that there is correlation between growth rate of services, manufacturing and GDP per capita in the Indian Economy.



Source: NAS, MOSPI

Employment in the services sector has also increased since the 1990s has reached around 31 per cent in 2019-20 indicating its significant role as an employment provider **Figure 5.** However, in comparison to developed and developing countries like China and Brazil the proportion of employment being provided in relation to its share is Gross Valued Added is quite low.



Source: NSO, PLFS, Mukherjee (2013)

Empirical Results

In this section, we will discuss the empirical results. Table 2 presents descriptive statistics of our main variables of interest. Mean service sector growth rate over the given time period has been 6.74 while the mean of that of growth of commercial capital is 16.57. Mean growth rate of manufacturing sector is 13.082.

Table 2 Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max	Skew.	Kurt.
sgrt	50	6.748	1.964	2.59	12.49	.067	3.288
trc	50	7	2.738	-.6	13.31	-.187	3.28
fsc	50	6.917	2.799	1.03	13.28	-.1	2.397
padc	50	6.259	3.148	1.72	16.12	1.076	4.578
mangrt	50	5.6	5.896	-3.32	13.52	.328	4.009
gdppgrt	48	3.594	3.309	-8.2	8.6	-1.059	4.761
gccc	49	16.577	4.773	7.169	28.133	.248	2.724

The Granger causality Wald test results of the VAR model are as given below with the optimal lag length calculated earlier (table 3).

Table 3 Granger Causality Wald test							
	Dependent variables						
Lagged variables	**sgrt**	**trc**	**fsc**	**padc**	**mangrt**	**gdppgrt**	**gccc**
sgrt		37.16(0.0) *	14.23(0.007) *	66.15(0.00) *	4.3(0.35)	2.9(0.5)	6.83(.512)
trc	14.63(0.006) *		18.86(0.001) *	63.81(0.0) *	3.51(0.475)	.8 (0.92)	2.91(0.57)

fsc	10.09(0.039) *	31.139(0.0) *		59.18(0.0) *	5.96(0.20)	2.5 (0.63)	3.6(0.46)
padc	13.75(0.008) *	37.733(0.0) *	18.86(0.001) *		6.57(0.16)	2.9 (0.56)	2.7(0.59)
mangrt	10.73(0.03) *	146.16(0.0) *	10.02(0.04) *	57.59(0.0) *		99.22(0.00) *	7.02(0.13)
gdppgrt	10.53(0.032) *	41.387(0.0 *	11.26(0.024) *	24.75(0.0) *	11.92(0.01) *		19.5(0.01) *
gccc	22.8(0.00)	76.8(0.00) *	4.42(0.35)	39.8(0.00) *	10.29(0.036) *	21.75(0.00) *	
* Indicates 5% significance level, **indicates 10% significance level							

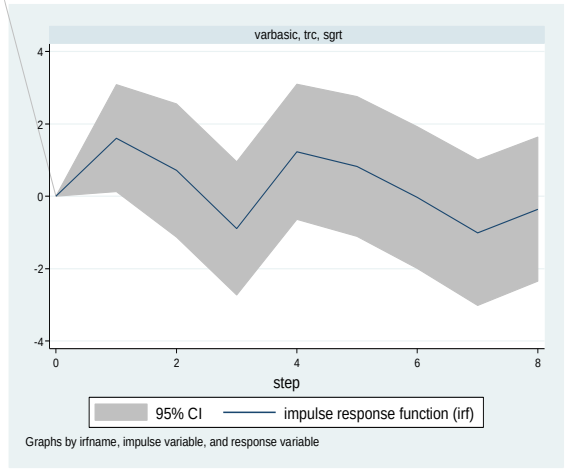
The results indicate trade, transport communication, financial, public administration services, manufacturing growth rate, GDP per capita granger causes service sector growth. Simultaneously, service growth granger causes financial and public administration services so there is a bidirectional causality. Indicating that there are strong interlinkages between service sector and its component and the bi-directional nature between services financial and public administration services. Services and its component do not granger cause GDP per capita but manufacturing growth and growth in commercial capital granger causes GDP per capita. This is results is in conformity with the economic theory and various studies that manufacturing growth has a much more significant impact on the per capita income than services. Further, Manufacturing growth granger causes service sector however the vice versa is not true according to the analysis.

Within the components of services financial services and public administration has bidirectional granger causality indicating strong interlinkages. However, financial and public administration services do not granger cause transportation and communication services and even manufacturing does not impact it. Manufacturing granger causes financial and public administration services, but the vice versa is not the case.

Impulse Response Function (IRF, Cholesky Decomposition)

Now IRFs are estimated to assess the impact of a one-unit shock in one variable on a different variable and focusing on the relations which were significant in the granger causal relation. The graphs below indicate shocks given to different economic variables and its impact on service sector growth rate.

Figure 6



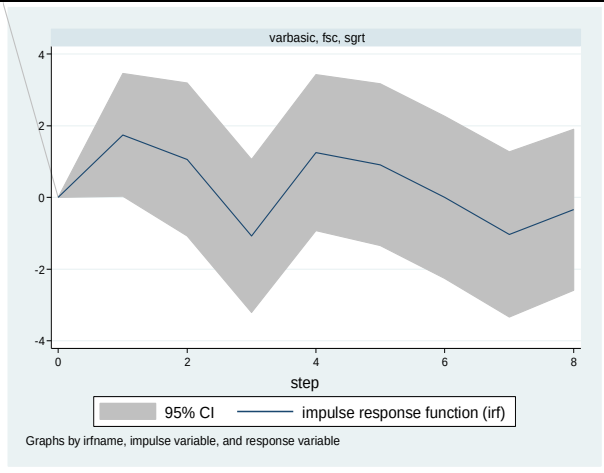
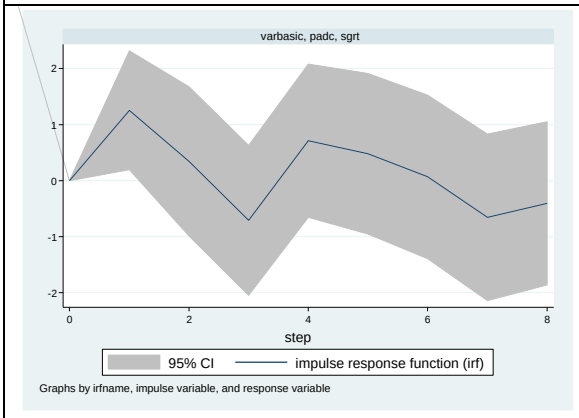


Figure 6 indicates that in the short run there is a positive impact of transport and communication services and financial services growth rate on the growth of service sector, with it going marginally negative in the medium term but overall, the effect is positive. Further **Figure 7** public administration services also has a positive impact indicating that the growth in components of service sector have a strong impact on service sector growth.

As shown in **Figure 7** manufacturing growth rate has a positive impact on the growth of services sector. This conforms with the study done by Banga (2005) in which manufacturing growth has a positive impact in service sector growth due to increase in contractual services as the manufacturing sector develops.

Figure 7



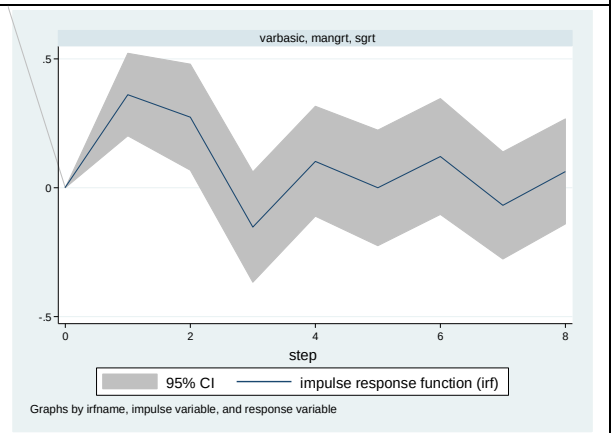
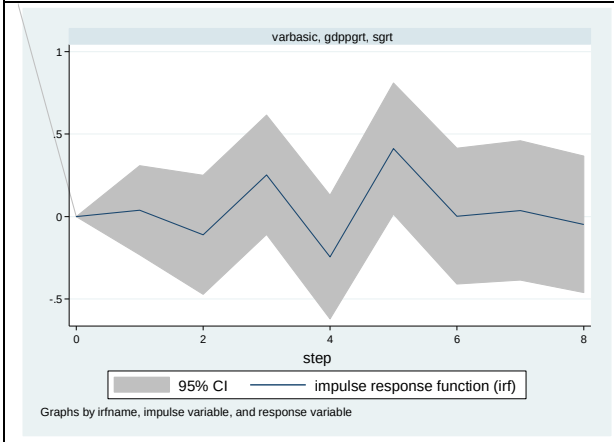


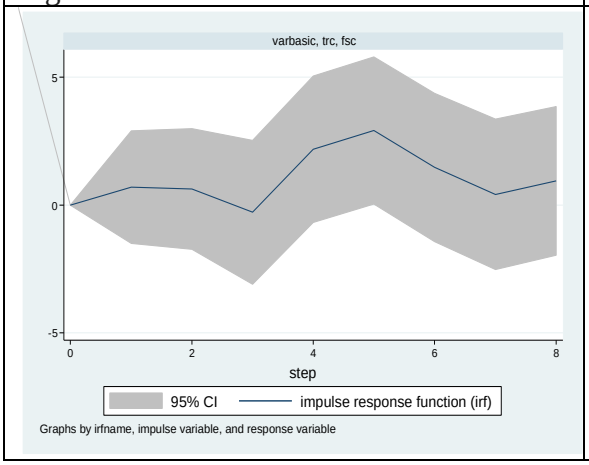
Figure 8 indicates an overall positive impact on service sector growth when a shock is given to GDP per capita growth rate. This shows that with increase in per capita income the demand for services increases. This is in line with various literature which argue for high income elasticity of service sector output like Jain (2015), Eichengreen and Gupta (2010) and Nayyar (2009). Similar relationship between GDP per capita growth rate and its impact on the various constituents of services sector.

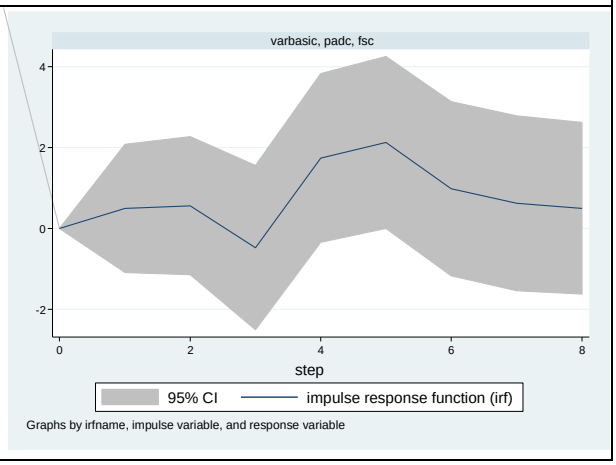
Figure 8



To assess the interrelationships and interlinkages within the services sector IRFs have been estimated. This was calculated to understand the impact of the components of one sector on the other. As shown in **Figure 9**trade transport and public administration services has an overall positive impact on the financial services. This indicates that with growth in trade, transport and public administration the services from the financial sector becomes important for their development.

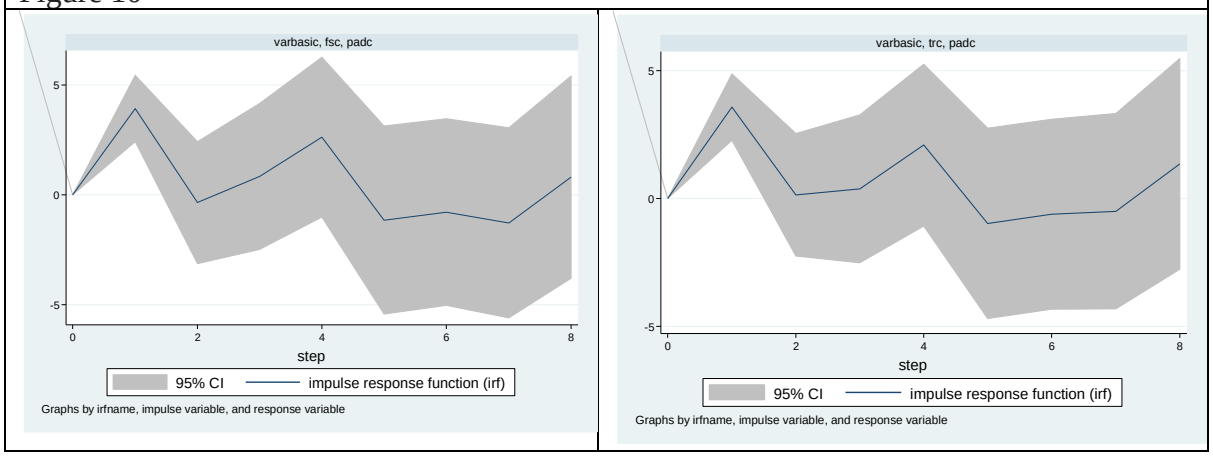
Figure 9





With a shock in financial, trade and transport services there is a positive shock on the public administration services in the short run and an overall positive throughout the whole time period as shown in **Figure 10**. So, with growth in these services the role of government also increases and the public administrative services needs to match with the growth of other components.

Figure 10



As the financial and public administration services did not granger cause trade and transport services the IRFs have not been shown here.

Variance Decomposition

VDA describes how much variation in one variable is due to shocks in the other variables. The VDA estimates are described in the table 4. So, majority of variation in services sector growth is explained by itself which dissipates with time. After that growth public administrative services have a larger impact on the growth of services. The impact of manufacturing remains consistent and significant, confirming with the economic literature of the role of manufacturing in development of service sector. The GDP per capita has limited impact initially but in the long run the impact on the service sector becomes significant due to high income elastic nature of services.

Table 4: Variance Decomposition analysis

Period	D(sgrt)	D(trc)	D(fsc)	D(padc)	D(mangrt)	D(gdppgrt)	D(gccc)
1	1	0	0	0	0	0	0
2	0.55	0.02	0.00	0.35	0.04	0.01	0.03
3	0.52	0.04	0.01	0.31	0.08	0.01	0.03
4	0.48	0.05	0.01	0.28	0.11	0.03	0.03
5	0.44	0.08	0.01	0.28	0.12	0.04	0.03
6	0.40	0.08	0.01	0.28	0.11	0.09	0.03

7	0.39	0.08	0.01	0.28	0.11	0.09	0.03
8	0.38	0.08	0.02	0.27	0.13	0.09	0.04
9	0.38	0.08	0.02	0.26	0.13	0.09	0.05
10	0.37	0.08	0.02	0.26	0.12	0.11	0.05
Average	0.49	0.06	0.01	0.28	0.10	0.05	0.03

Conclusion

From the analysis conducted the role of components of service sector, manufacturing and GDP per capita in the development of the overall service sector becomes more pronounced. The results strengthen the argument that for service sector growth to be high and sustainable there is a necessary requirement of manufacturing sector to grow and the GDP per capita to continually increase. And more importantly, there is significant inter linkages and a strong positive relationship within the service sector. So, each component is linked and the growth and development are tied together.

Hence, the government policy should focus on improving the general business environment and removing regulatory barriers not only for the services sector but for the all the sectors as they are intrinsically connected. Further investment needs to be undertaken to improve our human capital as the economies are becoming more skill intensive with the 4^{th} industrial revolution on the horizon and to effectively utilise the demographic dividend of the country. Therefore, the policy focus should be service sector which will continue to remain significant for the economy.

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