RESEARCH PROJECT REPORT

Services-led Growth in India: Sustainable?

SUBMITTED BY

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DECLARATION

I Kanupriya Parashar hereby declare that this Project Report titled **"** Service-led Growth in India: Sustainable? **"** submitted by me in partial fulfilment of the requirements for the degree of Post Graduate Diploma in International Marketing from Sri Guru Gobind Singh College of Commerce, University of Delhi is based on my original work and has not been submitted in part or full for any other assessment of any University. My indebtedness to various other works/publications as referred to in this thesis has been duly acknowledged at relevant places.

Date: 20th April 2022

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CERTIFICATE

This is to certify that Kanupriya Parashar, student of PGDIM (2020-21) of Sri Guru Gobind Singh College of Commerce, University of Delhi, has worked under my guidance on the topic title " Service-led Growth in India: Sustainable? ". To the best of my knowledge, this piece of work is original and the student has submitted no part of this project to any other college or university.

[Signature of Mentor]

Dr Gurleen Kaur

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I feel thankful to the college staff for giving me such a big opportunity. I believe I will enroll in more such events in the coming future. I ensure that this project was done by me and is not copied.

[Signature of the student]

Kanupriya Parashar

ABSTRACT

This study aims to understand the long drawn debate on the sustainability of the services sector growth in the economy. To ascertain this we have taken Services, Value-Added as the indicator for the services sector growth which we will model against six other factors, Employment in Services, LFPR, Services Exports, Services Imports, Industry, Value-Added and Agriculture, Value-Added. We have three models, Multiple Linear Regression, Granger Causality and Cointegrating and VECM. We have found the Employment in Services to be positively impacting ther Service, Value-Added. Other than this, Industry, Value-Added showed a significant relationship but failed to show a long term relationship. LFPR showed a positive relationship, which was taken as a variable for curiosity only. Agriculture, Value-Added to our surprise showed a long term equilibrium relationship with the Services, Value-Added giving us a hopeful picture of the intersectoral linkage in the long run. In the short run, we see all independent factors having a causal relationship with the Services, Value Added. This study aims to provide an eye view analysis on the factors which could determine the sustainability of the services sector in the way ahead.

Key words: *services sector, economic growth, India*

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Chapter 1: INTRODUCTION

The service sector also known as the tertiary sector has been important for the economic development of every nation. In India, the growth in the services sector was however unconventional. It is common knowledge that when a country embarks on the journey of economic development there is a structural shift. Not only did not India follow the pattern followed by other developing countries by moving from agriculture to industrialization, with the direct jump to growth in the services sector, India also became a puzzle for growth studies further. In 60 years beginning from 1950, the growth of the agricultural sector fell from 56% to 22% and that of the services sector grew from 28% to 54% (Singh, 2021). This paper will not ascertain whether the growth has been services-led or not, this has been proven several times in previous studies. However, what could be more important to ascertain would be to analyse whether this pattern of growth is sustainable and beneficial. We aim to do this by picking up several indicators which could affect the growth of the services sector in the country.

When this paper aims to quantify the growth of the services sector, we will take into account the Services Value Added at the constant price, 2015. The services centric growth in India has been attributed to the 1991 LPG reforms which have created better domestic and foreign competition in the sector. Over the years services sector has grown in leaps and bounds. In the year 2020-21 when the pandemic had hit the economy, the contact intensive services were badly hit, as result, there was a steep fall in the growth of the services sector, but with the subsequent opening of the economy post-COVID-19 induced lockdown, the services sector fall narrowed and we saw a V-shaped recovery for the sector.

The weightage of the services sector to contribute to the GDP of the country has been rising with every passing decade currently holding more than 50% weightage of the GDP. While conventionally, as the popularity of the agricultural sector fell, workers moved to the manufacturing sector in other developing countries. In India, the work of the manufacturing sector was performed by the services sector which absorbed a portion of the agricultural sector employees. However, still, the rate of employment in the services sector is not large enough to employ those still sitting ideally in the other sector. It is imperative that as the largest growing sector, the services sector has the potential to absorb a large amount of labour, however, this is

not the case here. It is seen that with the rise of the services sector, growing exponentially against all odds, the contribution to the employment by the services sector has been limited. Despite this, the services sector remains one of the largest employers in the country, especially for trade, hotels&restaurants, community and social & personal services (D. Amutha & M.Juliet, 2017). This particular problem will be addressed in this paper.

Another important aspect that this study meant to address along with the service's sector contribution to the employment generation over the past 60 years, was to see the relation between the number of active workers, 15 years and older, and the services sector. We are including this not only to understand the employment but also what is the cohort of the population being employed. Most importantly it has been argued that service employment reduces LFPR but services employment also leads to underemployment, which by economic theory, should increase LFPR. However, in the current situation where the ICT services are being extensively demanded both domestically and internationally in India, these services belonging to high-skilled, high-qualification requiring jobs have plummeted the labour productivity growth for the services sector, therefore, its imperative to see the significance of the LFPR to the services sector over the years.

Another variable which we chose to create a relationship here is the impact of services trade on the growth in the services sector. The variable we chose were, Services Exports at constant prices (2015) and Services Imports at constant prices (2015). Post-1991 trade liberalization helped pull up the growth of the services extensively. India currently is among the top 10 services traders under the WTO but its exports are limited to only a few markets. Many believe that the services trade could be a big reason for the growth of the services in the country, but the growth is mainly attributed to the non-traded services and not much credit can be given to the traded services. However, over the past few years, the services exports saw a fall mainly due to the pandemic, wherein in the year 2020-21, services exports fell to $14.3 billion, earlier in 2010 it had grown to $430 billion from $6 billion in 1980. It was also important to see whether the services imports still hold importance despite the services sector holding 53.89% of our GDP currently. We will, therefore, aim to see the relationship of the services exports and services imports individually on the services, value-added.

Intersectoral linkages had been in many talks about the growth of the services sector. For this purpose, we will see the relationship between the services, value-added and industry, value-added as well as agriculture, value-added both taken at constant from 2015. Many feel that the growth of the manufacturing sector post-1991 reforms was not only sole efforts of the manufacturing sector alone but rather an effect of the services sector which grew post-liberalization of trade. Liberalization of trade undoubtedly led to well-paid jobs, and reallocation of labour to high-productivity jobs. The majority of activities and more so of the industrial activities turn out to be relatively services-intensive in the Indian economy (Hansda, 2001). The intersectoral linkage between services and agriculture is however very low. Many economists believed that while the manufacturing sector growth in India was being studied many neglected the contribution of the services sector. On the contrary, even a simple causal examination proves that many manufacturing activities are largely dependent on services such as finance, transport and telecommunication. To dwell on this further, we will study the relationship between agriculture and industry with respect to the services sector.

The paper is divided into 5 chapters, namely, Chapter 1 is the Introduction, Chapter 2 is the Select Survey of Literature, Chapter 3 is the Data and Methodology description, Chapter 4 includes the Findings and Discussion and lastly, Chapter 5 will be the Conclusion.

Chapter 2: SELECT SURVEY OF LITERATURE

This chapter includes a very distinctive sort of literature review aiming to do preliminary research on past studies based on the sustainability of the growth of the service in India and how it will unfold in the future. All the researchers confirmed the long-drawn conjecture of India going through a services-led growth. Other than this, researchers began to analyse the nature of this growth, the initial days of the growth economy, contributing sub-sectors, policies framework, intersectoral linkages, way forward, etc. A commonality of all the studies includes the confirmation of services-led growth, the ICT sector contributing the most to the growth, the strong linkage between industrial activities and the services sector, the ability of the services sector to create both forward and backward linkages and a lack of a coherent policy framework to address the services sector. Interestingly, all of these results came from different papers, what our paper aims to do is, to do an empirical analysis altogether on all these parameters. We figured that while these studies were doing an in-depth analysis on a fragmented level, we took all parameters under our study to see their overall effect on growth. This study aims to provide an eye-view analysis of the services sector due to several factors which we have opted for. The growth ins the services sector saw two downturns in past 30 years, during the financial crisis of 2007-08 and the recent pandemic situation from 2019-20 onwards. However, many researchers claim that the financial crisis of 2007-08 did not affect services growth in India much and it remained isolated for several sub-sectors. They believe this could be attributed to the growth of the services sector mainly due to the non-traded services. While traded services were being affected in 2007-08, non-traded remained isolated to keep the growth better than what other countries seemed to have suffered during the same period. The pandemic however bought down the growth in services by nearly 16 per cent in the first half of 2020-21 (Economic Survey 2020-21 Volume 2, 2020).

Here is a tabulated summary of the literature review, key findings, methodology adopted by different authors and the objective (s) of their studies.

S. NO.	AUTHORS AND YEARS	TOPIC OF THE STUDY	OBJECTIVE OF THE STUDY	METHODOLOGY	TOOLS USED	RELEVANT FINDINGS
1	Fan et al. (2021)	Service-Led or Service-Biased Growth? Equilibrium Development Accounting across Indian Districts	To determine whether growth in India is services-led or services-biased.	Spatial Equilibrium analysis with nonhomothetic preferences	Development accounting, Income elasticity analysis, Robustness Analysis	1. India's growth is services-led. 2. Welfare impact of this sevice-led growth is unequal and only benefitting the rich individuals in the urbanized areas of the country.
2	Banga (2005)	Critical issues in India's Service-led growth	Identifying some of the critical issues in India's service-led growth and provides policy insights with respect to them.	Assessing the performance of services at the aggregated as well as the disaggregated level in terms of their shares in GDP, employment, trade and FDI. To identify external and domestic constraints to trade, services have been categorised according to their extent of liberalisation, growth and share in trade.	Assessing shares in GDP, FDI and employment.	The critical issues identified are: what explains the growth of service sector in India; what are the reasons for the lack of corresponding growth in employment in the service sector; can service sector sustain its growth; and what are the external and domestic constraints to trade in different services.

3	Hansda (2001)	Sustainability of Services-Led Growth: An Input-Output Analysis of the Indian Economy	To analyse the sustainability of the service-led growth in India with forward and backward linkages of the services sector.	Input-Output Analysis, Backward, Forward and total linkages indices	Input-Output Transactions Table 1993-94, CSO (2000), Matrices	Sectoral Intensity (to measure inter-sectoral linkages): 1. Services activities hardly draw their inputs from agriculture while such linkage is relatively strong between industry and agriculture. 2. With 63 out of 115 activities (55 % activities) having the above - average services intensity, the predominances of services intensive activities is clear. 3. The majority of activities and more so of the industrial activities turn out to be relatively services-intensive in the Indian economy. Backward and Forward Linkages: 1. The services activities have the largest inducing effect in terms of backward linkage, with 8 out 13 activities having the largest value. 2. The services activities are endowed with relatively large forward linkage. 3. In terms of the total

						of backward and forward linkage indices, a larger proportion of activities in services (69 per cent) stand out as the key sector for the economy. Vertical Integration (a dimension-free measure of the multiplier on the value-added of the rest of the economy): 1. 14 out of 115 activities have a higher index value. Out of the 14 activities, 7 belong to the services sector. 2. 3 activities stand out prominent, trade, banking and transport. 3. Out of the 13 service activites, 7 have a large multiplier effect on the economy.

4	Das et. al. (2013)	Revisiting the Service-led Growth in India Understanding India's service sector productivity growth	1. Examining the productivity dynamics in service sector at a detailed industry level using carefully developed INDIA KLEMS panel data. 2. Examining the dynamics of total factor productivity in the service sector, measured using the KLEMS growth accounting framework.	A growth accounting exercise based on the KLEMS production function by Jorgenson, Gollop and Fraumeni (1987) was undertaken.	KLEMS production function incorporating Capital (K), Labor (L), Energy (E), Material (M) and Services (S) as inputs allows us to evaluate the relative significance of multi-factor productivity growth. Analyzing sources of labour productivity in 9 sub-sectors of the service economy – trade, hotels and restaurants, transport and storage, post and telecommunication, financial services, public administration, education, health and other services. These 9 sectors are	1. Labour productivity in Indian service sector has been growing substantially over decades, and much of this productivity gain is accruing through an acceleration in market services based sectors particularly, ICT intense services. 2. The labour reallocation effect is positive in all the periods, suggesting a structural transformation that is growth-enhancing. 3. Observed TFP estimates based on KLEMS production function for the services sector indicate impressive growth in TFP for market-based services. The non-market based services on the other hand indicate a progressive decline in resource use efficiency in the recent decades. 4. Import liberalization has been a principal component of the economic reforms undertaken in India and along with complementary policies like technology import

					further divided into market services and non-market services, within which we also examine ICT intensive and non-ICT service segments separately.	policy has to a large extent contributed to the import and adaptation of ICT equipment and technology in the observed capital deepening within services. 5. It is imperative to undertake an international comparison of services in emerging economies like India. We need to create internationally comparative datasets for engaging in meaningful comparisons.

5	Dehejia, Panagariya (2010)	Services Growth in India: A Look Inside the Black Box	To observe and analyse the services growth across the post and pre economics reform period which coincides with the post and pre-growth acceleration period. Further analysis on how the LPG policies had a lesser effect on growth in services since a lot of non-traded services boomed in spite of having no relation to the external and internal de-regulation.	Analysing growth in services in India using firm-level data collected by the NSSO during 2001-02 and 2006-07 employing broadly comparable sample design.		1. The smaller enterprises exhibit much lower output per worker, output per enterprise and growth in output over time than larger enterprises. This means that the transformation to a modern economy would require not just the movement of workers from agriculture to industry but also a movement of workers from the smaller to larger services enterprises or, alternatively and minimally, modernization of on account enterprises. 2. Services output and growth are highly concentrated in a handful of the states, namely, Maharashtra and Karnataka. 3. Calculations suggest a very substantial contribution of productivity growth to overall growth in services, yielding annual compound productivity growth rates of 3 per cent or more in a number of states, with Kerala and Andhra Pradesh

						exhibiting rates as high as 5.2 per cent per annum. This productivity growth has resulted at least in part from more effective use of previously underutilized labour. 4. Growth in manufacturing, which depended on the liberalization, increased the demand for many services directly as well as through increased expenditures and the capital-intensive services, which depend on tradable inputs, have grown more rapidly than other services that do not depend on these inputs.
6	D. Amutha, M. Juliet (2017)	The Role of the Service Sector in the Indian Economy	Making an analysis of the Indian services sector through examining its growth and contributions to the economy. The paper also highlights reform measures that will enable the services sector to not	Analyse growth data to understand the contribution of the services sector to the GDP of India, Employment in the services sector, and services sub-sectoral contribution to both employment and GDP.	Data were taken from CSO, Nirvikar Singh, ―Understanding Service Led Economic Growth‖ India 2010, Business Standard	1. The study confirms that the services sector has grown at a significant rate in comparison to other sectors. Its growth rate is found to be higher than the growth of overall GDP covering the poor performance of the agricultural sector. 2. As a service sub-sector, trade is dominant all in terms of its contribution to Indian GDP. 3. Largest employer in

			only to grow at a fast pace but also to create quality employment and attract investment.			service sector was trade, hotels & restaurants and community, social & personal services are the significant generator of employment. 4. The foregoing analysis brings out the fact that in comparison to different countries of the world, the share of service sector in India is not so high.
7	Das et al. (2011)	Global Economic Crisis: Impact and Restructuring of the Services Sector in India	To ascertain the impact on services growth in India during the Global Economic Crisis of 2007-08.	Qualitative Analysis and Data Envelopment Analysis at the firm level, Standard Export Demand Function	Data from CSO, RBI Handbook of Statistics 2008-09, Economic Survey 2009-10, Standard Export Demand Function	1. Most of the sectors that have high shares in the GDP are not dependent on external demand. The fall in external demand has, therefore, not led to a severe decline in their growth rates. However, domestic demand has also decreased in the wake of the current crisis. 2. Three specific sectors, retail/wholesale trade, software services, and banking services have high shares in the GDP and contribute substantially to its growth. These services have a strong growing domestic demand and are on a rising productivity trajectory. 3. TFPG was estimated at the firm level for

						software firms and banks and shows that both sectors experienced productivity growth above 10% post-2000.
8	Singh (2012)	Is the Service-Led Growth of India Sustainable?	To understand whether the services induced growth in India is feasible and sustainable.	Qualitative analysis	Data from CSO, Economic Survey 2010-11. RBI (Handbook of Statistics)	1. To gainfully employ the growing "human capital" and improve "human productivity" there is a need to foster entrepreneurship through the development of entrepreneurial skills, financing of entrepreneurial efforts and promotion of networking. 2. Emphasis should be laid on technology-driven ventures in modern services. 3. India should deregulate key service sub-sectors, like retail, financial services and real estate further to attract FDI and promote services that are tradable. 4. For economic and social sustainability there is a need to increase investment in education, entrepreneurship, technology, modern means of

						communication and transportation and human development coupled with desirable policy reforms.
9	Economic Survey of India (2020)	Services	To understand the impact of the COVID-19 pandemic on the services sector for 2019-20	Qualitative analysis	Data from RBI, NASSCOM, MOSPI	1. COVID-19 induced lockdown led to a fall in the contact intensive services by 16 per cent in the first half of 2020-21. 2. Air passenger traffic, rail freight traffic, port traffic, foreign tourist arrivals, and foreign exchange all contracted sharply in March 2020 and now are showing signs of recovery, with a V-shape recovery curve. 3. FDI inflows into India's services sector grew by 34 per cent YoY during April-September 2020 to reach US$ 23.6 billion. 4. Telecom related regulations were removed from the IT-BPO sector, and consumer protection regulations were introduced for e-commerce. 5. The Indian start-up ecosystem has been progressing well amidst the Covid-19 pandemic. 6. The Indian Space

						ecosystem is undergoing several policy reforms to engage private players and attract innovation and investment.
10	Arnold et al. (2010)	Services Reform and Manufacturing Performance: Evidence from India	To understand the growth of the manufacturing sector post-1991 reforms in India and how they lie beyond manufacturing sector performance, but rather to the other contributing sector.	Ordinary Least Square Model (Regression analysis)	Services reform index, firm-level data from the Capitaline database, Multivariate Regression analysis, Cobb-Douglas production function	1. There is a strong role for services liberalization in explaining manufacturing firm productivity in India. 2. The productivity effect of services liberalization is stronger for foreign-owned firms. 3. Services reforms in India remain incomplete and barriers to domestic and foreign competition exist in many other countries, these barriers also penalize the manufacturing sector.
11	Mukherjee (2013)	The Service Sector in India	To understand the services growth pattern, the barriers and restrictions to FDI in the services sector and International trade and policies required to create an	Trend Analysis, Summary Statistics, Revealed Comparative Advantage,	National Income Accounts data, UNCTAD database, NSSO data on employment and unemployment	1. India does not have a policy that can lead to inclusive growth, and numerous governing bodies and a lack of coordination among them adversely affect the growth of the sector. 2. The regulations are outdated, and there are FDI restrictions and regulatory barriers. 3. Growth and export of services that are still

			inclusive services growth in the country.			lower than other competing countries like PRC. 4. There are wide variations in the growth of different types of services and great disparities in access to services.
12	Kesavan et al. (2013)	Outsourcing Services to India: A Review and New Evidences	To understand the nature of growth and the reason behind off-shoring of services to India.	Qualitative analysis	-	1. The U.S firms consider offshoring more of their services to stay globally competitive with their offerings. They must keep visiting India and communicate with their partners here. 2. Preparing the U.S public for the upcoming surge in offshoring of services to developing nations such as India should be a high priority.
13	Chanda (2012)	Services led growth	To understand the employment, growth, trade and capital flows in India's services sector. Also see the close link between services sector growth and	Qualitative Analysis	Data from UN National Accounts Statistical Database, UNCTAD Handbook of Statistics,	1. The services sector has not outperformed other sectors but integrated them with the world economy. 2. Those services sub-sectors with FDI and liberalization have shown positive spillovers for the economy. 3. Skill-based services sector must be based on

			the economic prospects in India.			internal demand too.
14	Chanda (2017)	Services for Indian Manufacturing	To understand the intersectoral linkage between the services sector and the manufacturing sector.	Qualitative Analysis	Summary Statistics, Data from OECD.stat	1. There is a potential to create value in India's exports through the integration of the services sector. 2. There are policy-induced constraints to hamper the strong linkage between the manufacturing and services sectors. 3. There is a need for servicification of the manufacturing sector.
15	Sen (2011)	FDI in the Service Sector – Propagator of Growth for India?	To see whether the growth in FDI will lead to growth in the services sector and to the GDP as a whole.	Regression analysis	Data from RBI, UNCTAD and Business Beacon database	1. There is a significant positive impact of the FDI on the services sector and this service sector growth has in turn a significant effect on the GDP. 2. The trade, hotels and restaurants, transport, storage and communications sub-sector contribute the most to the growth of the Indian service sector. 3. FDI can be used as a propagator for economic growth.

16	Singh (2006)	Services-Led Industrialization in India: Assessment and Lessons	To understand the role of the services in the Industrilizatio n of the economy.	Regression analysis, Input-Output analysis	Data from RBI	1. India's manufacturing sector development may have been constrained in part by weaknesses in key service sectors such as transportation and electricity. 2. Tackling the education bottleneck, and adding some labour market reform will allow Indian industry and its services sector to draw on the large numbers of underemployed. 3. In India's case, there may be positive spillovers from services growth to manufacturing, through income and demand, or through organizational learning.
17	Ramaswam y & Agrawal (2012)	Services-led Growth, Employment and Job Quality: A Study of Manufacturing and Service-sector in Urban India	To study employment growth, structure, and job quality outcomes in manufacturing and service-sector in urban India spanning the period 1999-2000 to 2009-10.	Causal relationship	Data from NSSO survey.	1. There is no acceleration in service-sector employment growth relative to manufacturing in the urban areas of India. 2. Young males have increased their share of regular employment both in manufacturing and services. 3. Both young and middle-age female workers increased their share of regular jobs.

						4. The skilled in service-sector have gained proportionately more in terms of real wage growth.The services sector might not provide employment to low skilled, therefore, manufacturing sector needs to be pulled up.
18	Prasad & Sathish (2010)	Policy for India's Services Sector	To understand the major policy issues with the services sector.	Trend analysis, Summary Statistics	-	Policy initiatives recommended for different sub-sectors.
19	Aggarwal (2012)	India's Services Sector: Gateway to Development?	Whether Services sector is truly the medium to inclusive development.	Qualitative Analysis	-	1. The GDP shift in favour of the services sector has not been met with the concomitant changes in the employment in the services sector. 2. The services sector have shown dualism where the fastest growing services are high-productivity, low employment generating ones. 3. Growth in services has led to the transfer of resources to the corporate house, eradicating the livelihoods of those who depend on these resources.

20	Joshi (2004)	Tertiary Sector-Driven Growth in India: Impact on Employment and Poverty	To analyse the sectoral composition of the GDP growth and employment for the period 1950-2000	Qualitative Analysis	-	1. There is a tertiarization of the GDP. 2. Services sector has the potential to create employment in the medium run. 3. In the long run, contribution to growth from all three sectors is necessary.

Chapter 3: METHODOLOGY AND DATA

This paper will be doing an empirical analysis of how the services sector growth is related to Employment, Labour Force Participation Rate (LFPR), Services Export, Service Import, Industry, Value Added and Agriculture, Value Added. Each of these parameters has its rationale for being in this study.

Services sector growth in India is often seen as lopsided as it did not merely lead to a proportionate increase in employment. Here our Employment in Services will be taken as a percentage of the total employment based on the International Labour Organisation (ILO) estimate. LFPR in percentage form is taken as a variable of interest rather, to see whether there exists a relationship between the services, value-added and LFPR in the past years. since India is a country with a potential demographic dividend, it is imperative that even out of curiosity we can see the relation between the largest growing sector and the working-age population between 15 years above who are economically active. It is believed that the services sector employment leads to a reduction in LFPR, however, to check this assertion, we will run tests to ascertain their relation. Services exports and imports were individually taken as variables to ensure that the growth of exports, which is being seen for so many years can be related to the value-added by the services sector. This we, believe will also help us understand the nature of the services export growth and the contribution of the other sub-sectors. To understand the intersectoral linkages between agriculture and industry and the services sector, we took two more variables for our study, Industry, value-added and Agriculture, value-added.

For our entire study, we have chosen to run our models and tests on the Gretl Software which is used wholly for econometric analysis purposes. To understand the relationship of each of the above independent variables namely, Employment in services, LFPR, Services Exports, Services Imports, Industry, value-added and Agriculture, value-added will be put in a multivariate regression equation on the right-hand side. The left-hand side indicating the dependent variable will be representing the services sector growth variable as the services, value-added. Our annual data for 30 years from 1991to 2020 were extracted from the World Bank DataBank and converted to a time series for the analysis. We initially took the values at their levels on our regression model and ran the test to ascertain the OLS estimates. We received impressive results

with 5 variables showing the statistical significance and relating to the services sector growth. However, it is important to note that under multivariate regression, the assumptions need to be fulfilled for valid results. To our findings, the errors were not normally distributed and there existed multicollinearity between the independent variables which would make our analysis difficult to prove. To solve this, we did a log transformation of all the variables on the left and right-hand sides. On regressing the variables, we had a clear cut statistical significance for three variables, namely, Employment in Services % (% of the total employment), LFPR% and Industry, value-added. However, most of the assumptions of the Multiple Linear Regression were held except the multicollinearity, however low, still existed between the independent variables. But on further research, it was felt that the problem of multicollinearity did not pose many problems in our analysis, as we only aimed to understand the effect, whether significant or not, and not the magnitude of the same. Since we were not concerned with the forecasts, rather we aimed to see how the past values have been affecting, simply, the services sector growth, the low multicollinearity was not a cause of concern.

However, it was imperative that even though our regression model did not hold the assumption of "no multicollinearity", which did not create much damage to our results, these results still need to be further asserted. Therefore, we did produce results from two more models, Granger Causality and Co-integration. When analysing the short term relationship between variables, Granger Causality is best suited and a stronger relationship over the long run can be ascertained through the Co-integration model. We took the same data set for 30 years, from 1991to 2020, for the dependent variable, services, value-added and the independent variables, namely, Employment in Services %, LFPR %, Services exports, Services imports, Industry, value-added and the agriculture, value-added. Even though there is a strong correlation between the dependent and independent variables as per the correlation matrix shown below in Table 1. It is to be noted that v1 here represents Services, Value-Added, v2 represents Employment in Services%, v3 represents LFPR%, v4 represents Services Exports, v5 represents Services Imports, v6 represents Industry, Value-Added and v7 represents Agriculture, Value-Added.

Corr. Matrix	v1	v2	v3	v4	v5	v6	v7
v1	1.0000	0.9938	-0.9701	0.9810	0.9778	0.9930	0.9893

Table 1: Correlation Matrix between services, value-added and the independent variables

Source: Author's Calculations from World Bank data

The mere presence of correlation does not signify causation, hence, our study also calculates the Granger Causality between the independent variables and dependent variable. To ascertain this, we have checked the stationarity of the variables. On running the KPSS test for stationarity, we found all the first differences of all variables to be stationary for 2 lag lengths. After getting the results from our Vector Autoregression model for 2 lag lengths, which was the optimal lag length from our VAR lag selection test. We found the following results for Granger Causality for services, value-added (dependent variable) and with each of the independent variables.

P-value	Employment in Services	Services, value-added
Services, value-added (Equation 1)	8.82e-24	-
Employment in services (Equation 2)	-	8.28e-29

Table 2: p-value for VAR taking services, value-added and employment in services% as endogenous variables.

Source: Author's calculations

In both our cases, our result signifies that services, value-added granger causes employment in services and employment in services granger causes services, value-added. P-vale being lower than 0.001 shows that we reject our null hypothesis for the test that there is "no Granger Causality" at a 5% level of significance. A similar test was run for all independent variables to

see the bi-causal relationship, as we saw above between the dependent variable and the independent variable. The following tables will give us an idea:

P-value	LFPR%	Services, value-added
Services, value-added (Equation 1)	4.72e-21	-
LFPR% (Equation 2)	-	1.04e-17

Table 3: p-value for VAR taking services, value-added and LFPR% as endogenous variables.

Source: Author's calculations

Here, services, value-added granger causes LFPR% and vice versa at 3 lag lengths.

P-value	Services Exports	Services, value-added
Services, value-added (Equation 1)	6.00e-27	-
Services Exports (Equation 2)	-	5.96e-24

Table 4: p-value for VAR taking services, value-added and Services Exports as endogenous variables.

Source: Author's calculations

Here, services, value-added granger causes services exports and vice versa at 1 lag length.

P-value	Services Imports	Services, value-added
Services, value-added (Equation 1)	1.65e-26	-
Services Imports (Equation 2)	-	2.80e-19

Table 5: p-value for VAR taking services, value-added and Services Imports as endogenous variables.

Source: Author's calculations

Here, services, value-added granger causes services imports and vice versa at 1 lag length.

P-value	Industry, value-added	Services, value-added
Services, value-added (Equation 1)	1.63e-26	-
Industry, value-added (Equation 2)	-	3.53e-27

Table 6: p-value for VAR taking services, value-added and Industry, value-added as endogenous variables.

Source: Author's calculations

Here, services, value-added granger causes Industry, value-added and vice versa at 2 lag length.

P-value	Agriculture, value-added	Services, value-added
Services, value-added (Equation 1)	1.03e-26	-
Agriculture, value-added (Equation 2)	-	1.71e-26

Table 7: p-value for VAR taking services, value-added and Agriculture, value-added as endogenous variables.

Source: Author's calculations

Here, services, value-added granger causes Agriculture, value-added and vice versa at 1 lag length.

On seeing the short-run relationship between the dependent variable and independent variables, we felt the need to check the long-run relationship between the same which would be a stronger relationship than the previous one we had calculated. For this purpose, we will calculate the results from the co-integration model with the same variables for a sample size of 30 years from 1991 to 2020 (time series). We will run it through the Engle-Granger Co-integration model after taking into account that the variables at their own level are non-stationary, and the residuals are co-integrated and stationary. If and only if, the residuals are stationary as per the Augmented Dickey-Fuller test, we will confirm the cointegrating relationship between the variables

For Services, value-added and Employment in services, the residuals were cointegrated and stationary, proving that there exists a cointegrating relationship between the two variables. Our co-integration equation would be:

$$\boldsymbol{y\ (services,\ value\text{-}added)} = \alpha_1 + \beta_1\ \boldsymbol{(Employment\ in\ services)} + \boldsymbol{u_1}$$

The results for the equation were as follows:

v1	coefficients	S.E.	p-value	t-ratio
const.	−2.19982e+12	5.95787e+10	2.70e-25	−36.92
v2	1.06494e+11	2.25822e+09	3.17e-28	47.16

Table 8: Co-integration equation results for services, value-added as the dependent variable and employment in services as the independent variable for 1 lag.

Source: Author's calculations on Gretl software

For, LFPR% as the independent variable the unit root test for the residuals failed to prove that the residuals are non-stationary and hence, we cannot conclude that there is a cointegrating relationship between the services, value-added and LFPR% in the long run.

In the case of services exports as the independent variable, again the unit root test for the residuals proved that the residuals are non-stationary and therefore, one cannot conclude that there is a co-integrating relationship between services, value-added and services exports.

Again, when taking the services imports as the independent variable, we saw that the ADF test to check for the stationary residuals failed, proving that there exists no co-integrating relationship between the services, value-added and services imports in the long run.

For industry, value-added as the independent variable, we again find that the residuals are not co-integrated and stationary, hence, there exists no co-integrating relationship between industry, value-added and services, value-added in the long run.

However, in the case of agriculture, value-added as the independent variable, the ADF test showed staionarity in the residuals, thus proving that there exists a long term relationship between the services, value-added and agriculture, value added. Our co-integration equation would be:

$$\textbf{\textit{y (services, value-added)}} = \alpha_1 + \beta_1 \textbf{\textit{ (Agriculture, Value-Added)}} + \textbf{\textit{e}}_1$$

The results for the equation were as follows:

v1	coefficients	S.E.	p-value	t-ratio
const.	−7.29583e+11	3.80827e+10	1.25e-17	−19.16
v7	4.80089	0.134100	6.29e-25	35.80

Table 9: Co-integration equation results for services, value-added as the dependent variable and agriculture, value-added as the independent variable for 1 lag.

Source: Author's calculations on Gretl software

Since two of our independent variables showed co-integrating relationship with the services, value added, we will run the VECM (Vector Error Correction Model) with the two independent variables individually with respect to the services, value-added. This will help us understand that, provided there is a long term equilibrium relationship between the variables, the VECM coefficient (ECT) also called as the "Speed of Adjustment" will specify by how much the variables are able to correct the disequlibirum in the lon run.

The VECM results were as follows:

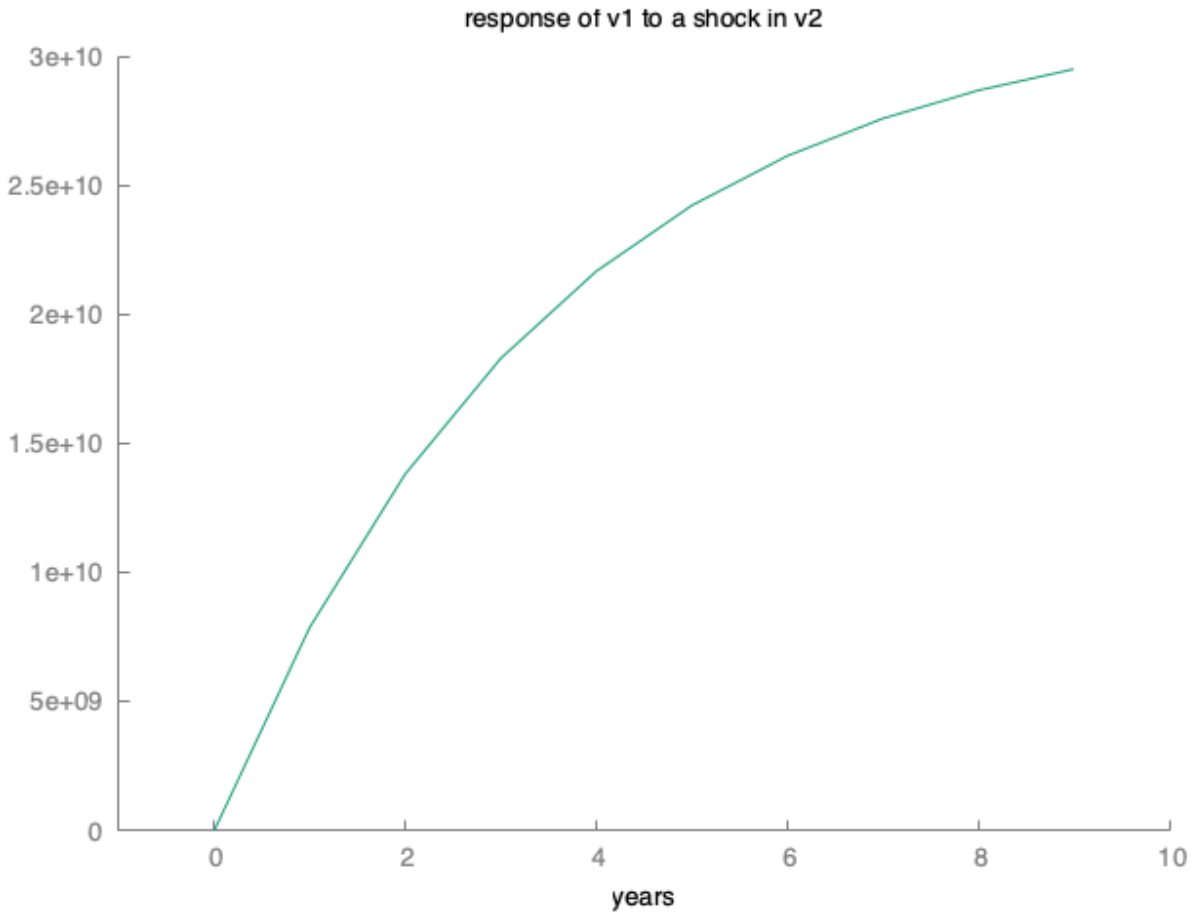
ECT	Employment in Services	Agriculture, Value-Added
Services, Value-Added	−0.406759	−0.0237708

Table 10: VECM results for services, value-added as the dependent variable and Employment in services, agriculture, value-added as the independent variable for 1 lag.

Source: Author's calculations on Gretl software

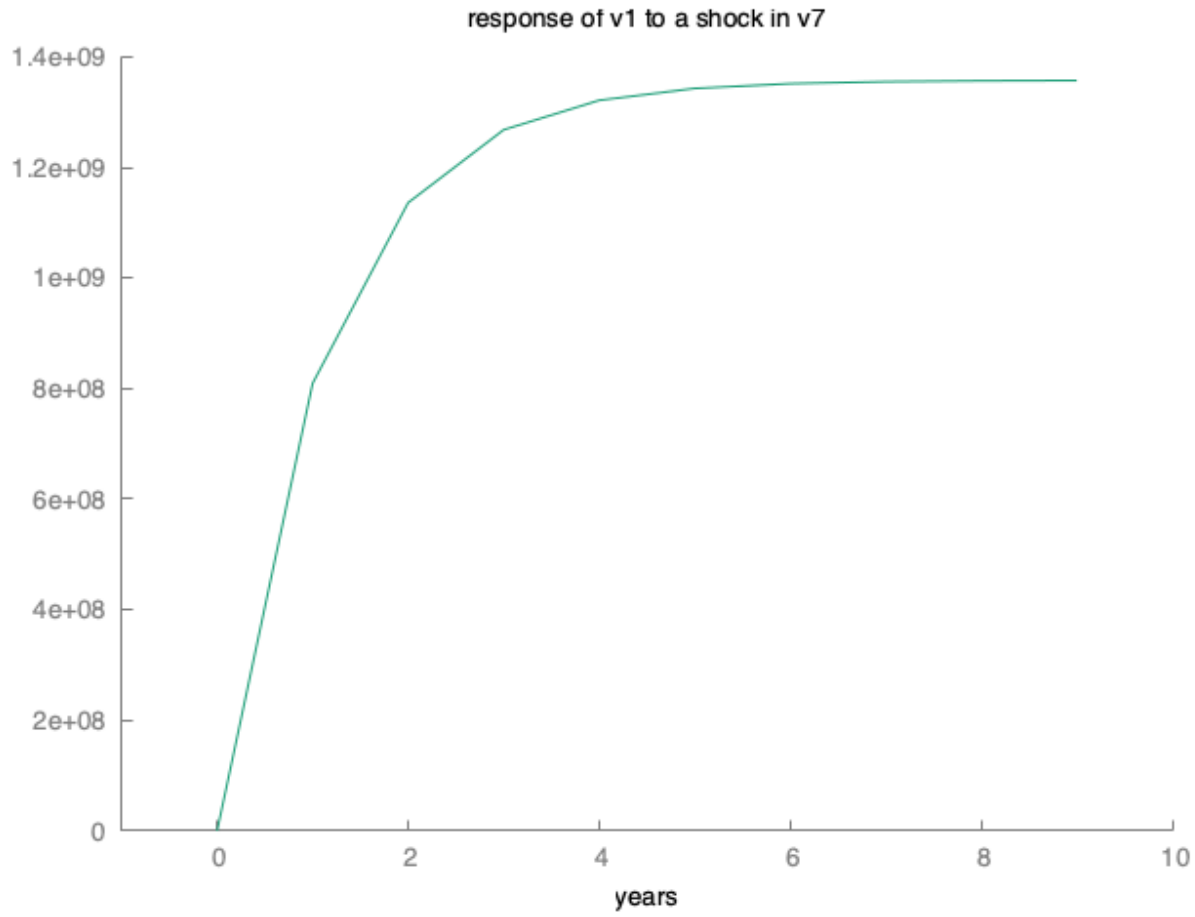
Since we found two variables having a long term co-integrating relationship with the services, value-added, individually, we also drew up a graph analysing the response of services, value-added (v1) to a shock in employment in services (v2) and agriculture, value-added (v7).

These are as follows:



Graph 1: Response of Services, Value-Added to a shock in Employment in Services for a period of 10 years.

Source: Author's calculations on Gretl Software



Graph 2: Response of Services, Value-Added to a shock in Agriculture, Value-Added for a period of 10 years.

Source: Author's calculations on Gretl Software

We have discussed our methodology and data structure, we will now discuss the results in the next chapter titled "CHAPTER 4: FINDINGS AND DISCUSSION".

Chapter 4: FINDINGS AND DISCUSSION

In our previous chapter, we have elaborately described our methodology, wherein we used the Multiple Regression Analysis with log transformation on our variables, followed by Granger Causality for the short-run relationship between the variables and Co-Integration and VECM to understand the long term relationship.

For the Multiple Regression Model we had taken the log transformation for our dependent variable, Services, value-added, and for our independent variables, Employment in services, LFPR%, Services exports, Services imports, Industry, value-added and Agriculture, value-added. This was done in order to meet the assumption of regression analysis, however, the multicollinearity still existed, which still doesn't hold a problem in our analysis, as we are concerned only with statistical significance and not with the forecasting of the measures. Our Multiple Linear regression equation was:

$$y\ (v1) = \alpha_1 + \beta_1 v2 + \beta_2 v3 + \beta_3 v4 + \beta_4 v5 + \beta_5 v6 + \beta_6 v7 + e_1$$

On running the regression analysis our findings for the log transformation of above variables were as follows:

	Coefficient	S.E.	t-ratio	p-value
Const.	−5.10474	6.16614	−0.8279	0.4163
l_v2	2.96142	0.488057	6.068	3.45e-06 ***
l_v3	1.23379	0.369297	3.341	0.0028 ***
l_v4	0.0558748	0.0418699	1.334	0.1951
l_v5	−0.0113124	0.0718838	−0.1574	0.8763
l_v6	0.448857	0.129928	3.455	0.0022 ***
l_v7	0.170062	0.229665	0.7405	0.4665

Table 11: Multiple Regression Analysis Results for the log transformation of variables.

Source: Author's calculation from Gretl Software

Here, we have seen three independent variables, namely, Employment in Services%, LFPR% and Industry, value-added are statistically significant in relation to the Services, value-added. This is, however, in coherence with our understanding that all these three variables do have a positive impact on the services sector's growth. If employment in services increases by 1 per cent then services, value-added will increase by approximately $3. Therefore, this proves our economic theory that the growth in services hasn't been leading to a proportionate increase in employment, as only with a 1% increase in employment we are seeing a $3 addition, which will always keep the services, value-added empirics above the employment generation. A major reason for this trend in India could be due to the high productivity of workers in the services sector. With professional services booming, the employment is limited there due to high skills and qualification requirements, but this is also the sub-sector with a significant contribution of 22.05% of the total 53.89% in the GDP. This difference can be remedied with appropriate policies over the long run, working to enhance the productivity of labour.

LFPR% was taken as a variable of curiosity to see whether exists a relationship between the LFPR and the services sector growth. But to our surprise, there exists a significant relationship between the two as a 1 per cent increase in LFPR will lead to a $1.23 addition to the services, value-added. However, this is a very proportionate change and one can note here a nuance of relationship that, that 15 years or above working population are adding positively to the growth of the tertiary sector. Efforts made in favour to increase the LFPR could retain the growth in services even during the harsh period of instability such as the current pandemic.

The third variable which proved a statistically significant relationship in confirmation with the economic theory is the Industry, value-added, which as per our previous understanding from the literature review, had stated that the industrial activities are closely knit with the services sector. Even post-1991 LPG reforms, researchers believed that the unsung hero of that time was the services sector which bolstered the growth in the manufacturing sector. A $1 increase in the Industry, value-added leads to a $0.5 increase in the services, value-added. This result is based on the data from the past 30 years itself from the post-reform period, however, one cannot be sure whether the secondary sector will continue to support the tertiary sector in this way in the future. With the advent of technology, particularly, inventions such as machine learning have the

potential to replace many human-induced services in the future. These services are critical for the growth of the manufacturing sector as the demand increases, not only would the capital formation bring in new technology but the desire to speed up the commercial operations will drive out certain services in the future. Therefore, the sustainability of the services sector with respect to the positive impact of the growth of the industries is a question that needs to be answered.

To understand the causal relationship between the variables, our Granger Causality relationship with all stationary variables shows that all independent variables individually cause the growth in the services sector. However, the positive or negative may not be seen here, but as per our economic theory, employment in services, LFPR%, Services Exports, Industry, valued-added and Agriculture, value-added have a positive impact while Services Imports have a negative impact. The Granger Causal relationship is infact bi-causal as per our analysis. This relationship is only for the short term. But to get a more clear picture, we need to do a long-term analysis of this relationship which would be a stronger image. For this, we did an Engle-Granger Co-integration Model over these variables. It was seen that only for Employment in services% and Agriculture, value-added, there existed a long-term co-integrating relationship. It showed us that employment in services and agriculture, value-added individually with respect to services, value-added, co-integrated, tend to stay in equilibrium in the long run and cannot deviate. Their behaviour also justifies the economic theory that employment in services will lead to an increase in the services sector growth. However, the second result with respect to agriculture, value-added is questioning. Our literature review confirmed that the services sector was closely knit with the manufacturing sector, which cannot be seen here as per our result, and have a very weak relationship with the agricultural and allied activities. But this could give us an idea about the way forward. As we explained above that the sustainability of the services sector growth arising from the manufacturing sector is questionable in the long run, but for an agrarian economy such as India, this could be a boon in disguise. The shift of services contribution to agriculture could help absorb the excess labour in the agriculture sector and add to the GDP. The long term equilibrium relationship gives us a promising picture of both the primary and tertiary sectors. It also gives the previous studies another angle to view their results.

The VECM of the employment in services and agriculture, value-added with respect to services, value-added showed that estimated error correction in case of disequilibrium will be done 41% when employment ins services and services, value-added are taken into consideration and the same would be done 24% when agriculture, value-added and services, value-added are taken. However, these are not significant percentages but they could be remedied provided a conducive environment in the economy with appropriate policies is created so that the speed of adjustment can be increased for both cases.

We also saw two response curves for 10 years for services, value-added with respect to employment in services and agriculture, value-added when there is a shock in the latter two. In the case of shock to employment in services, the services, value-added move-in coordination and continue to rise post-shock period, showing a promising picture. On the other hand in the case of agriculture, value-added, when there is a shock, the services, value-added will rise but then would become stagnant over the long run. This could be an area of further examination, considering there is a long term co-integrated relationship between the services, value-added and agriculture, value-added. With these results, stagnation in growth could be a cause of concern.

Our results in this paper present an eye view of the relationship between the services sector growth and the independent variables. There have been several studies done individually on each of these cases to prove the economic theory, but here, we see how these results tell us about the sustainability of the services sector growth in the future.

Chapter 5: CONCLUSION

The "tertiarization" of the Indian economy began with the Manufacturing sector embarking on its growth. However, not much was seen about the growth of the manufacturing sector, but the services sector today accounts for 53.89% of the total GDP of the country. Back in the 1990s, the sustainability of the services sector brought much doubt, but now it is being asserted that the resilience of the Indian economy is in consonance with the resilience of the services sector growth.

Our study looked at a very important aspect, to understand how several indicators influenced the growth of the services sector. We created an eye-view analysis of the influence while also taking into account certain out-of-curiosity factors such as LFPR%. Our study showed that employment in services, in all our three analyses, was one factor that always showed a positive impact on the growth of the services sector. Moreover, LFPR which was taken as an experimental variable resulted in a positive effect on the services, value-added, our empirical indicator of the growth of the services sector. Industry, value-added, did show a positive impact but the sustainability of this intersectoral linkage between the secondary and the tertiary sector is questionable. Agriculture, value-added which also showed a long-term co-integrated relationship with the services, value-added showed a promising picture. The shadowed primary sector with this foothold can serve employment, add to GDP, create income and create the inclusive development which we wait for. We saw that no result was obtained between the services exports and services, value-added in any of the three models, only proving that the growth in the services sector is not thriving on trade but rather on non-traded, domestically demanded services. Our models, however, had certain limitations, which have not hampered our results or its analysis in any way but they are important to be noted for the sake of ethicality. In our Multiple Regression Model, we face the problem of multicollinearity between the independent variable, but this will not impact our analysis of the statistically significant relations which we aimed to see. Our time-series data was also unstable as per the Chow test, showing structural breaks over the years. However, this is a very common limitation, very rarely declared in studies. The presence of any of these two limitations did not hamper our analysis.

Policy Implication for the way forward:

Seeing a strong co-integrated long-run relationship between services sector's growth and employment in services, there is a need to bolster the employment in the sub-sectors. IT-BPO sector which is high skills and productivity sector requires advanced learning and training. This sector being a professional services sector holds a majority portion of our growth in the GDP. Appropriate policies, to promote higher education, skill-intensive training and research work will help India compete with the rest of the developing countries such as China.

Actions helping to promote more people from 15 years and above in the cohort of working population will ensure sustainability of our services sector, as per our result. This too, like in the above case can be made sure with high enrollment rate in schools, colleges and universities, advanced training, skills development, vocational training and ensuring work incentives, rebates, allowances, will only help create the right sort of workers for the economy. There are non-traded services which could help absorb low-skilled workers, provided we have the supply of those in the working-age population.

Industrial activities have always shown a connection with the services sector. However, the sustainability of services sector with respect to the manufacturing sector growth is ambiguous, considering the proliferation of technology which have the potential to replace many skill-intensive services in the long run. Therefore, for a country like India which not only provides such services for the home country but also for several foreign firms, this could threaten the employment rate. Policies to create limitations on the usage of technology need attention at least for the medium term, such that the country doesn't get overwhelmed with large groups of unemployed people in the future. Technology, however, will eventually take the forefront in manufacturing industries in future to cater to fast-growing economies and growing demands, but the application of appropriate policies to be the winner in this situation would not hurt either side.

All of our six independent variables showed a causal relationship in the short run with the services sector's growth. However, services exports which have been in much talks for their exponential rise did not see a long-run equilibrium relationship with the services sector's growth, only proving that our growth is more internally based. Even though we are amongst the top 10

traders for services worldwide, our non-traded services which work to cater to internal demand hold importance. This is also the reason why during the Financial crisis of 2007-08, our services-induced economy did not bear the brunt of the crashing markets. Therefore, in spite of the growing popularity of Globalization, to sustain our services sector growth, steps towards uplifting the non-traded services and increasing the internal demand for the same need to be put into action.

Surprisingly, Agriculture, value-added showed a long-term equilibrium relationship with the services, value-added. Even the forecasts for the services sector when taking into account the growth of the agriculture sector for the next 5 years show sustained growth of around $1,400 billion. Since the secondary sector's help to sustain the growth seems questionable, the vulnerable Agriculture sector with the right reforms could capitalize on the services in the country. This will help absorb the informal sector unemployment which has long plagued our economy.

Other than all the above suggestions, it is imperative for the services sector to retain its position as the driver of economic growth, it needs a coherent policy framework. The uncoordinated, fragmented and disproportionate policies governing the sector today will not lead to returns in the future. The sector would require a portal to manage its operations through government regulations, and make sure there are no bottlenecks in providing good quality services in a competitive and organised market. It needs to be understood that our country took a leap in terms of the development process by directly jumping to the tertiary sector to uphold growth. Under such circumstances, the services sector requires the attention of the policy framers.

REFERENCES

1. AGGARWAL, A. (2012). India's Services Sector: Gateway to Development? *Economic and Political Weekly*, *47*(26/27), 119–123. http://www.jstor.org/stable/23251685
2. Seema Joshi. (2004). Tertiary Sector-Driven Growth in India: Impact on Employment and Poverty. *Economic and Political Weekly*, *39*(37), 4175–4178. http://www.jstor.org/stable/4415534
3. Amutha, D. and Juliet, M., The Role of the Service Sector in the Indian Economy (July 11, 2017). Available at SSRN: https://ssrn.com/abstract=3000398 or http://dx.doi.org/10.2139/ssrn.3000398
4. Das, Abhijit and Banga, Rashmi and Kumar, Dinesh, Global Economic Crisis: Impact and Restructuring of the Services Sector in India (October 4, 2011). ADBI Working Paper No. 311, Available at SSRN: https://ssrn.com/abstract=1938153 or http://dx.doi.org/10.2139/ssrn.1938153
5. Arnold, Jens Matthias; Javorcik, Beata; Lipscomb, Molly; Mattoo, Aaditya. 2012. Services Reform and Manufacturing Performance: Evidence from India. Policy Research working paper; no. WPS 5948. World Bank. © World Bank. https://openknowledge.worldbank.org/handle/10986/3233 License: CC BY 3.0 IGO.
6. Mukherjee, Arpita. 2013. *The Service Sector in India*. © Asian Development Bank. http://hdl.handle.net/11540/2314. License: CC BY 3.0 IGO.
7. Sen, C. (2019, September 26). *FDI in the Service Sector – Propagator of Growth for India?* Munich Personal RePEc Archive. Retrieved April 21, 2022, from https://mpra.ub.uni-muenchen.de/30574/
8. Singh, Nirvikar, Services-Led Industrialization in India: Assessment and Lessons (November 2006). Available at SSRN: https://ssrn.com/abstract=951735 or http://dx.doi.org/10.2139/ssrn.951735
9. Chanda, R. (2012). *Services Led Growth in India*. New Oxford Companion to Economics in India.
10. Chanda, R. (2017). *Services for Indian Manufacturing*. India Development Report 2017.

11. Banga, R. (2005). CRITICAL ISSUES IN INDIA'S SERVICE-LED GROWTH. *INDIAN COUNCIL FOR RESEARCH ON INTERNATIONAL ECONOMIC RELATIONS*, (WORKING PAPER NO. 171).
12. Fan, T., Peters, M., & Zilibotti, F. (2021). *Service-Led or Service-Biased Growth? Equilibrium Development Accounting across Indian Districts*. Yale University.
13. Dehejia, R., & Panagariya, A. (2011, August 3). *Services Growth in India: A Look Inside the Black Box*. Columbia Academic Commons. Retrieved April 21, 2022, from https://academiccommons.columbia.edu/doi/10.7916/D8P84KW6
14. Kesavan, R., Mascarenhas, O. A. J., & Bernacchi, M. D. (2013). *Outsourcing Services to India: A Review and New Evidences* (2nd ed., Vol. 9). International Management Review.
15. Ministry of Finance. (2020). *Economic Survey 2020-21* (Vol. 2). Ministry of Finance.
16. Hansda, S. K. (2001). *Sustainability of Services-Led Growth: An Input-Output Analysis of the Indian Economy Sanjay K. Hansda* The sustainability of se*. Reserve Bank of India. Retrieved April 21, 2022, from Sustainability of Services-Led Growth: An Input Output Analysis of the Indian Economy
17. Prasad, D. H. A. C. (2010). *Policy Paper on Services Sector I*. Department of Economic Affairs. Retrieved April 21, 2022, from https://dea.gov.in/sites/default/files/policy%20Paper%20on%20Services%20Sector.pdf
18. Das, Deb & Erumban, Abdul Azeez & Sengupta, Sreerupa & Erumban, Abdul & Aggarwal, Suresh. (2013). Revisiting the Service-led Growth in India Understanding India's service sector productivity growth Revisiting the Service-led Growth in India Understanding India's service sector productivity growth.
19. Singh, B. (2012). *Is the Service-Led Growth of India Sustainable?* IJTEF. Retrieved April 21, 2022, from http://www.ijtef.org/papers/219-D10037.pd
20. *India GDP sector-wise 2021*. (2021). StatisticsTimes.com. Retrieved April 21, 2022, from https://statisticstimes.com/economy/country/india-gdp-sectorwise.php