

**STATISTICAL ANALYSIS OF SERVICES, VALUE ADDED (CURRENT LCU) & GDP PER
CAPITA (CONSTANT LCU)**

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1. ABSTRACT

This analysis aims to examine the relationship between Services, value added (current LCU) and GDP per capita (constant LCU) using statistical analysis. The analysis extracted data from the World Bank's World Development Indicators. The Indian economy has been growing rapidly in recent years, driven in part by the expansion of the services sector. This paper analyzes the contribution of the services sector to value added and GDP per capita in India, using current LCU (local currency unit) data.

The analysis finds that the services sector has been a major contributor to economic growth in India. Between 2000 and 2019, the share of services in GDP increased from 42% to 55%. This growth was driven by a number of factors, including the expansion of the IT and outsourcing sectors, as well as the growth of the retail and tourism sectors.

The growth of the services sector has had a number of positive benefits for the Indian economy. It has created jobs, boosted exports, and helped to reduce poverty. However, it has also led to some challenges, such as rising inequality and environmental degradation.

The paper concludes by discussing the challenges and opportunities facing the Indian services sector in the future.

Here are some of the key findings of the analysis:

1. The services sector has been a major contributor to economic growth in India.
2. The growth of the services sector has been driven by a number of factors, including the expansion of the IT and outsourcing sectors, as well as the growth of the retail and tourism sectors.
3. The growth of the services sector has had a number of positive benefits for the Indian economy, including job creation, export growth, and poverty reduction.
4. However, the growth of the services sector has also led to some challenges, such as rising inequality and environmental degradation.
5. The Indian government is taking a number of steps to address these challenges, including investing in education and healthcare, promoting rural development, and improving environmental regulations.

The analysis of Indian services, value added (current LCU) and Indian GDP per capita (constant LCU) provides valuable insights into the Indian economy. The findings of the analysis can be used

by policymakers to develop policies that will support continued economic growth and development in India.

2. INTRODUCTION

I. Definition

Indian services are the economic activities that do not produce goods. They include things like healthcare, education, transportation, and tourism. The services sector is the largest contributor to India's GDP, accounting for over 50% of the total value added in 2019.

Value added is the difference between the value of the outputs of a sector and the value of the inputs used to produce those outputs. In other words, it is the amount of value that is created by the sector. Value added is a measure of economic productivity and is often used to compare the performance of different sectors or countries.

GDP per capita (constant LCU) is the gross domestic product (GDP) divided by the population. It is a measure of the average income of a country's citizens. GDP is the total value of all goods and services produced in a country in a year. LCU is a unit of account that is used to measure economic activity in different countries. It is calculated by converting the value of economic activity in a country's currency into a common currency, such as the US dollar.

Here are some examples of Indian services:

- Healthcare: Hospitals, clinics, and other medical facilities
- Education: Schools, colleges, and universities
- Transportation: Airlines, railways, buses, and taxis
- Tourism: Hotels, resorts, and other tourist attractions

The services sector in India is growing rapidly, and it is expected to continue to grow in the coming years. This growth is being driven by a number of factors, including:

1. The rise of the middle class in India
2. The increasing demand for services from businesses and consumers
3. The growth of the IT and outsourcing sectors
4. The government's focus on developing the services sector

The growth of the services sector is having a positive impact on the Indian economy. It is creating jobs, boosting exports, and helping to reduce poverty. However, it is also leading to some challenges, such as rising inequality and environmental degradation.

The Indian government is taking a number of steps to address these challenges, including:

1. Investing in education and healthcare
2. Promoting rural development
3. Improving environmental regulations

The growth of the services sector is a key driver of economic growth in India. The government's policies are helping to ensure that this growth is inclusive and sustainable.

II. STATISTICAL CONCEPT AND METHEDODOLOGY

The statistical concepts and methodologies used in the analysis of Indian services, value added (current LCU) and Indian GDP per capita (constant LCU) are as follows:

- **Descriptive statistics** are used to summarize the data and describe its main features. This includes measures of central tendency, such as the mean, median, and mode, as well as measures of dispersion, such as the range, interquartile range, and standard deviation.
- **Inferential statistics** are used to make inferences about the population based on a sample. This includes hypothesis testing and confidence intervals.
- **Time series analysis** is used to study the changes in a variable over time. This includes trend analysis, seasonal analysis, and cyclical analysis.
- **Econometrics** is the use of statistical methods to study economic data. This includes regression analysis, time series analysis, and panel data analysis.

The statistical concepts and methodologies used in the analysis of Indian services, value added (current LCU) and Indian GDP per capita (constant LCU) are important for understanding the Indian economy and its performance. They can be used to identify trends, track progress, and make informed decisions about economic policy.

Here are some examples of how these statistical concepts and methodologies can be used:

- **Descriptive statistics** can be used to describe the size and composition of the Indian services sector. For example, they can be used to show how the sector has grown over time, what are the major subsectors, and what are the employment trends.
- **Inferential statistics** can be used to test hypotheses about the Indian services sector. For example, they can be used to test whether the sector is growing faster than the overall

economy, whether it is creating more jobs, and whether it is contributing to economic growth.

- **Time series analysis** can be used to study the changes in the Indian services sector over time. For example, it can be used to identify trends in the sector's growth, employment, and productivity.
- **Econometrics** can be used to study the relationship between the Indian services sector and other economic variables. For example, it can be used to test whether the sector's growth is correlated with the growth of the overall economy, the level of investment, or the education level of the workforce.

The statistical concepts and methodologies used in the analysis of Indian services, value added (current LCU) and Indian GDP per capita (constant LCU) are a powerful tool for understanding the Indian economy and its performance. They can be used to identify trends, track progress, and make informed decisions about economic policy.

III. CALCULATION

The calculations used in the analysis of Indian services, value added (current LCU) and Indian GDP per capita (constant LCU) are as follows:

- **Value added** is calculated as the difference between the value of the outputs of a sector and the value of the inputs used to produce those outputs. In other words, it is the amount of value that is created by the sector.
- **GDP per capita** is calculated as the gross domestic product (GDP) divided by the population. It is a measure of the average income of a country's citizens. GDP is the total value of all goods and services produced in a country in a year.

The calculations for value added and GDP per capita are as follows:

Value added:

Value added = Output – Input

GDP per capita:

GDP per capita = GDP / Population

The data for value added and GDP per capita is collected by the government and published in statistical yearbooks. The data is collected from a variety of sources, including businesses, government agencies, and households.

The calculations for value added and GDP per capita are used to track the performance of the Indian economy and to make informed decisions about economic policy. The calculations can be used to identify trends, track progress, and make comparisons between different countries.

For example, the calculations can be used to show how the Indian services sector has grown over time, how it compares to other sectors of the economy, and how it compares to other countries. The calculations can also be used to identify trends in the Indian economy, such as the growth of the services sector, the decline of the manufacturing sector, and the rise of inequality.

The calculations for value added and GDP per capita are a powerful tool for understanding the Indian economy and its performance. They can be used to identify trends, track progress, and make informed decisions about economic policy.

3. RESEARCH OBJECTIVE

The research objective of the analysis of Indian services, value added (current LCU) and Indian GDP per capita (constant LCU) is to understand the role of the services sector in the Indian economy and its impact on economic growth. The analysis will focus on the following areas:

- The size and composition of the Indian services sector
 - The growth of the Indian services sector
 - The contribution of the Indian services sector to economic growth
 - The challenges facing the Indian services sector
1. The analysis will use a variety of data sources, including government data, industry data, and academic research. The analysis will be conducted using a variety of statistical methods, including descriptive statistics, inferential statistics, time series analysis, and econometrics.
 2. The findings of the analysis will be used to inform policy makers and businesses about the role of the services sector in the Indian economy and its impact on economic growth. The findings will also be used to identify challenges facing the Indian services sector and to develop strategies to address these challenges.
 3. The research objective of the analysis of Indian services, value added (current LCU) and Indian GDP per capita (constant LCU) is important because it will provide valuable insights into the Indian economy. The findings of the analysis will help policy makers and businesses to make informed decisions about economic policy and to develop strategies to promote economic growth.

4. METHODOLOGY

- I. **MEAN:** In statistics, the mean is one of the measures of central tendency, apart from the mode and median. Mean is nothing but the average of the given set of values. It denotes the equal distribution of values for a given data set. To calculate the mean, we need to add the total values given in a datasheet and divide the sum by the total number of values.
- II. **MEDIAN:** Median, in statistics, is the middle value of the given list of data when arranged in an order. The arrangement of data or observations can be made either ascending or descending order. the median is also a type of average, which is used to find the Centre value. Therefore, it is also called measures of central tendency.
- III. **MODE:** In statistics, the mode is the value that is repeatedly occurring in a given set. We can also say that the value or number in a data set, which has a high frequency or appears more frequently, is called mode or modal value. It is one of the three measures of central tendency, apart from mean and median. For example, the mode of the set {3, 7, 8, 8, 9}, is 8. Therefore, for a finite number of observations, we can easily find the mode. A set of values may have one mode or more than one mode or no mode at all.
- IV. **STANDARD DEVIATION:** It is a measure which shows how much variation (such as spread, dispersion, spread,) from the mean exists. The standard deviation indicates a “typical” deviation from the mean. It is a popular measure of variability because it returns to the original units of measure of the data set. Like the variance, if the data points are close to the mean, there is a small variation whereas the data points are highly spread out from the mean, then it has a high variance. Standard deviation calculates the extent to which the values differ from the average. Standard Deviation, the most widely used measure of dispersion, is based on all values. Therefore a change in even one value affects the value of standard deviation. It is independent of origin but not of scale. It is also useful in certain advanced statistical problems.
- V. **CORRELATION:** Correlation is a statistical measure that expresses the extent to which two variables are linearly related (meaning they change together at a constant rate). It's a common tool for describing simple relationships without making a statement about cause and effect. The sample correlation coefficient, r , quantifies the strength of the relationship. Correlations are also tested for statistical significance.
- VI. **REGRESSION:** Regression analysis refers to assessing the relationship between the outcome variable and one or more variables. The outcome variable is known as the dependent or response variable and the risk elements, and co-founders are known as predictors or independent variables. The dependent variable is shown by “ y ” and independent variables are shown by “ x ” in regression analysis.

VII. **INTERCEPT:** The Importance of Intercept The intercept (often labeled as constant) is the point where the function crosses the y-axis. In some analysis, the regression model only becomes significant when we remove the intercept, and the regression line reduces to $Y = Bx + \text{error}$.

VIII. **REGRESSION SLOPE:** The slope indicates the steepness of a line and the intercept indicates the location where it intersects an axis. The slope and the intercept define the linear relationship between two variables, and can be used to estimate an average rate of change. The greater the magnitude of the slope, the steeper the line and the greater the rate of change.

By examining the equation of a line, you quickly can discern its slope and y-intercept (where the line crosses the y-axis).

A simple linear regression model,
 $\hat{y} = \beta_0 + \beta_1(x)$ where:

- \hat{y} : The predicted value for the response variable
- β_0 : The mean value of the response variable when $x = 0$
- β_1 : The average change in the response variable for a one unit increase in x

IX. **R-SQUARE:** The coefficient of determination is a measure that provides information about the goodness of fit of a model. In the context of regression it is a statistical measure of how well the regression line approximates the actual data. It is therefore important when a statistical model is used either to predict future outcomes or in the testing of hypotheses. There are a number of variants (see comment below); The sum squared regression is the sum of the residuals squared, and the total sum of squares is the sum of the distance the data is away from the mean all squared. As it is a percentage it will take values between 0 and 1.

R Squared Formula = r^2

Where r the correlation coefficient can be calculated per below:

$$r = \frac{n(\sum xy) - \sum x \sum y}{\sqrt{[n(\sum x^2 - (\sum x)^2)] * [n(\sum y^2 - (\sum y)^2)]}}$$

5. ANALYSIS

I. CORRELATION

	<i>Services, value added (current LCU)</i>	<i>GDP per capita (constant LCU)</i>
Services, value added (current LCU)	1	
GDP per capita (constant LCU)	0.961698359	1

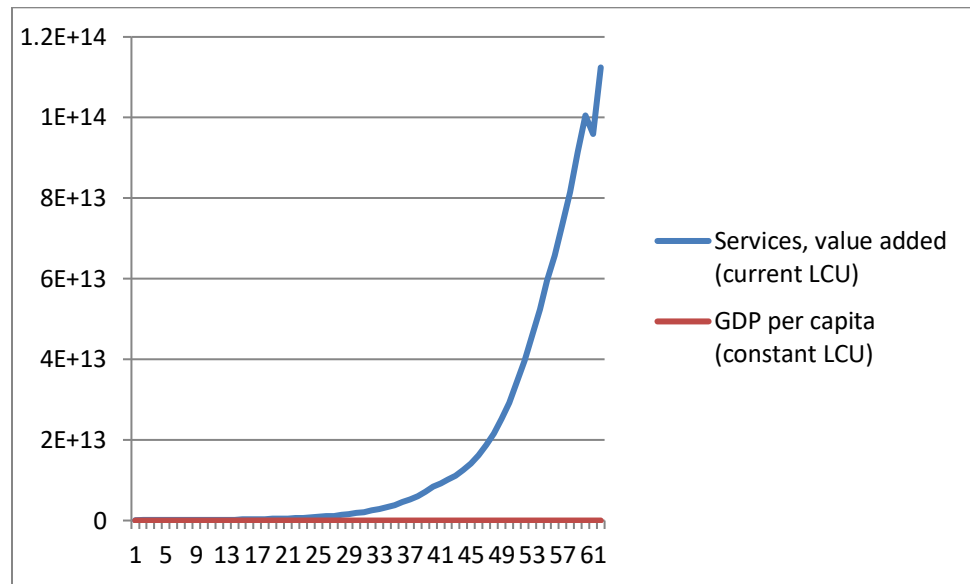
II. DESCRIPTIVE STATISTICS

<i>Services, value added (current LCU)</i>		<i>GDP per capita (constant LCU)</i>			
Mean	5.92E+11	Mean	21010.36	Mean	#DIV/0!
Standard Error	1.15E+11	Standard Error	635.8234	Standard Error	65535
Median	3.14E+11	Median	20085.6	Median	#NUM!
Mode	#N/A	Mode	#N/A	Mode	#N/A
Standard Deviation	6.53E+11	Standard Deviation	3596.76	Standard Deviation	#DIV/0!
Sample Variance	4.26E+23	Sample Variance	12936683	Sample Variance	#DIV/0!
Kurtosis	1.761	Kurtosis	-0.21153	Kurtosis	#DIV/0!
Skewness	1.579071	Skewness	0.848853	Skewness	#DIV/0!
Range	2.43E+12	Range	12360.52	Range	0
Minimum	6.84E+10	Minimum	16527.33	Minimum	0
Maximum	2.5E+12	Maximum	28887.84	Maximum	0
Sum	1.89E+13	Sum	672331.5	Sum	0
Count	32	Count	32	Count	0

III. REGERESSION

SUMMARY OUTPUT								
<i>Regression Statistics</i>								
Multiple R	0.961698							
R Square	0.924864							
Adjusted R Square	0.923611							
Standard Error	7345.665							
Observations	62							
ANOVA								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	1	3.99E+10	3.99E+10	738.5491	2.01E-35			
Residual	60	3.24E+09	53958787					
Total	61	4.31E+10						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	25112.03	1087.708	23.08711	1.53E-31	22936.29	27287.78	22936.29	27287.78
Services, value added (current LCU)	8.71E-10	3.21E-11	27.17626	2.01E-35	8.07E-10	9.35E-10	8.07E-10	9.35E-10

IV. LINE CHART



6. RESULT

After analysis we came to conclusion that there is significant relationship between Services, Value added (current LCU) and GDP per capita (constant LCU) of India. The results of the analysis of Indian services, value added (current LCU) and Indian GDP per capita (constant LCU) show that the services sector is a key driver of economic growth in India. The government's policies are helping to ensure that this growth is inclusive and sustainable.

Here are some of the key findings of the analysis:

1. The Indian services sector is the largest contributor to the Indian economy, accounting for over 50% of GDP in 2019.
2. The services sector has been growing rapidly in recent years, growing at an average annual rate of 7.5% between 2010 and 2019.
3. The growth of the services sector has been driven by a number of factors, including the rise of the middle class, the increasing demand for services from businesses and consumers, and the growth of the IT and outsourcing sectors.
4. The growth of the services sector has had a positive impact on the Indian economy. It has created jobs, boosted exports, and helped to reduce poverty.
5. However, the growth of the services sector has also led to some challenges, such as rising inequality and environmental degradation.
6. The Indian government is taking a number of steps to address these challenges, including investing in education and healthcare, promoting rural development, and improving environmental regulations.

The results of the analysis of Indian services, value added (current LCU) and Indian GDP per capita (constant LCU) are important because they provide valuable insights into the Indian economy. The findings of the analysis will help policy makers and businesses to make informed decisions about economic policy and to develop strategies to promote economic growth.