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Message from the Chief Editor

Higher education in India is encountering reforms in terms of Curriculum design, delivery and administration of Institutional Framework and the implications of such reforms are far more than what perhaps we could conceive. Implementation of NEP 2020 and more specifically the four year Under Graduate Programme with focus on flexibility, mobility and liberal leering with multiple entry exit options, have opened opportunities with associated challenges. Choice of Programs and portfolio of courses under a program are all key leads in the HEI learning process. Direct option for PhD without Masters is a path way with implications which are far reaching. These reforms call for the transformative approach to learning where we need to know practices, applications and appropriate functions. This is happening in accounting and finance also.

All this will make research to be viewed more seriously and with a clear focus on translation and application. Research Institutions are therefore struggling in terms of creating THE RIGHT RESEARCH ECO-SYSTEM.

The advent of Fin-Tech and the all-new automated ACCOUNTING Software along with AI based applications has made Accounting a challenging body of knowledge where the focus is more on control, integrated compilations, advisory functions and effective use of resources.

Sustainable models of development and best use of resources have now emerged as key transformational thoughts. Accounting needs to be aligned with this function.

With the prime objective of showcasing pertinent research outcomes in the domains of finance and Accounting, Indian Accounting Association brings out a Biannual Journal. I take this opportunity to thank all the contributors of research papers to this issue and sincerely request all my friends to come up with more research work and research publications, which we would gladly welcome. I also thank all our subscribers and the

editorial team. I acknowledge with sincere gratitude the timely intellectual support from our reviewers and do appreciate the wonderful support from the office bearers and EC Members of IAA. I request all our readers and well-wishers to kindly give us suggestions and valuable inputs on improving the journal.

Wishing you all the very best and sharing my anticipation for robust research and learning system, I conclude

Thank you.

Gabriel Simon Thattil
Professor & Head
Department of Commerce
Dean, Faculty of Commerce
University of Kerala
Chief Editor – Indian Journal of Accounting

Message from the President

It is a matter of pride to pen down my message as President of Indian Accounting Association (IAA) for the bi-Annual Research Journal -The IndianJournal of Accounting. My heart fills with immense pleasure as I perceive the progress being made by IAA. I wish to tell that I am eternally grateful for getting the privilege to serve you. The IAA, in its illustrious journey, was founded by academicians and professionals in accounting on March 15, 1969, and was inaugurated on February 14, 1970 by the Accountant General of Uttar Pradesh at Banaras Hindu University, Varanasi.

It is a member organisation of International Association of Accounting Education and Research (IAAER). It is also held in high esteem by American Accounting Association (AAA). This year I am going to attend AAA conference in USA representing all IAA fraternity. At present, IAA has a network of 59 branches in India with more than 7700 life members, and a Research Foundation as an affiliate at Kolkata. It also brings out a biannual research journal 'Indian Journal of Accounting' in the months of June & December to give wider publicity to research findings. The Association also gives IAA Young Research Award and IAA fellowship.

IAA Annual conference is a flagship program to disseminate knowledge and create a platform for discussion on Accounting education and research in allied areas. Past conference have attracted a large number of delegates from across the country and abroad. This year IAA is going to organise its 45th annual conference at Thiruvananthapuram, Kerala on 9-10th December 2023 I invite each one of you to participate in this mega academic event.

I am sure we all meet in this conference in big number, I appreciate the efforts made by Prof. Gabriel Simon Thattil, Head,& Dean,Faculty of Commerce, University of Kerala for putting all possible efforts to make this conference a grand success and memorable one and bringing the issue of this journal in time.

As I drive off and set my GPS for Vision 2025 of IAA becoming the world's leading accounting body, All the best to everyone! Best wishes,

Prof. Jas raj Bohra
President, Indian Accounting Association (IAA)
Former Dean & Head, Faculty of Commerce & Management Studies,
Jai Narain Vyas University, Jodhpur

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A COMPARATIVE STUDY ON STOCK MARKET MOVEMENTS BETWEEN MARICO LTD. AND DABUR LTD.

Dr. Om Shankar Gupta*

Abstract

The analysis that we had done is basically about the various observations of BSE: opening, closing, maximum, minimum and 2 FMCG companies with the same necessary data. We had collected the data for a time span of 60 days form 05 July 2021 to 29 September 2021 to study the change in the various parameters and the change in market trends. We have made analysis by using Descriptive Analysis, probability Distribution, ANOVA, and regression analysis the findings are attached in the annexure.

In the report presented we aim to use several techniques of Descriptive and Inferential Statistics on a given data for a period of 60 days.

Furthermore, we then have used probability measures under controlled environment to understand how the sample data reacts and how the movement of the prices have been. Estimations were made on 30-day and 60-day period, post which hypothesis were created and tested for their efficacy. Finally, the project ends with Regression Analysis of the data, to study the time impact and trend of the data. The Analysis was done on excel and the future estimation has been made for the same.

Introduction

(In regard to the data that shall be analyzed, following information has been gathered)

BSE

Bombay Stock Exchange (BSE) is the first ever stock exchange in Asia established in the year 1875. It is the fastest stock exchange of the world, the leading stock exchange of India, and 1st listed stock exchange of India (2017). BSE provides a transparent and efficient market for trading in equity, derivatives, currencies, debt instruments, mutual funds. It is situated at the Dalal Street of Mumbai.

BSE SENSEX is the popular equity index of BSE. It is the most widely tracked stock market index of India. It is traded internationally on the EUREX as well as leading exchanges of the BRCS nations (Brazil, Russia, China and South Africa).

Other popular Indices of BSE are BSE 100, BSE 200, BSE MIDCAP, BSE SMALLCAP, BSE BANKEX, BSE IT, BSE AUTO, BSE FMCG, etc.

In our assignment we have used the data of BSE SENSEX for the analysis purpose.

*Associate Professor, G. D. Binani P. G. College, Mirzapur

Two FMCG Stock

I. MARICO LIMITED

Marico Ltd. is an Indian Multinational FMCG company established in the year 1990, headquartered at Mumbai. It is present over in over 25 countries of Asia and Africa. Popular brands of the company are Parachute, Saffola, Nihar, Medikar which present different product of edible oils, skin care, health care, etc. Marico Ltd. has the market share of ₹ 72,523.23 Cr. with promoters holding 59.52 % of total market share of the company.

II. DABUR LIMITED

Dabur Ltd. is also an Indian Multinational FMCG company, and fourth largest company of the sector based on the market share. It was founded in year 1884 headquartered in Ghaziabad. It is popularly known for its Ayurvedic medicine and Natural consumer product. Popular brands of the company are Hajmola, Chyawanprash, Pudin Hara and the most famous product of the company is Dabur Honey. Dabur Ltd. has the market share of ₹ 1,05,152.10 Cr. with promoters holding 67.36 % of total market share of the company.

Objective of Study

- We can use these statistical methods for providing basic information about variables in a dataset and highlighting potential correlations between variables.

- It helps in better decision-making looking upon every aspect whether its average value, consistency, variability or making hypothesis for the population etc.

- We use samples for estimating and can know the probability options for specific situation.

- We are here observing three companies' datasets and getting values with descriptive statistics, probability, regression and hypothesis etc. for evaluating the consistency, variation, average, standard deviation, estimation and evaluating which one is the best one among the three as comparing their inputs and outputs.

- These statistical methods help a manager of the company or anyone who uses these, in arranging, deciding and discriminating the values, sets or samples for being on a conclusion.

Methodology

We have collected the value of SENSEX and price of 2 FMCG stock MARICO and DABUR from 5th July 2021 to 29th Sept 2021. We collected this data from the website www.investing.com. For all those three index/stocks we have taken the opening, closing, lowest and highest value of index/share of a day. On the raw data we had applied descriptive statistics, probability, hypothesis and regression data analysis and ANOVA test on the excel. For all the four data we have taken the sample as the data of 60 days.

Now we took the raw data and the processed data from excel sheet and did our interpretation and analysis. We have tried to use maximum statistical concepts possible in our interpretation.

Concept/Formula Used

A. MEASURES OF CENTRAL TENDENCY-

Central tendency is the middle point of a data set. It is also called measures of location. There are three measures of central tendency: -

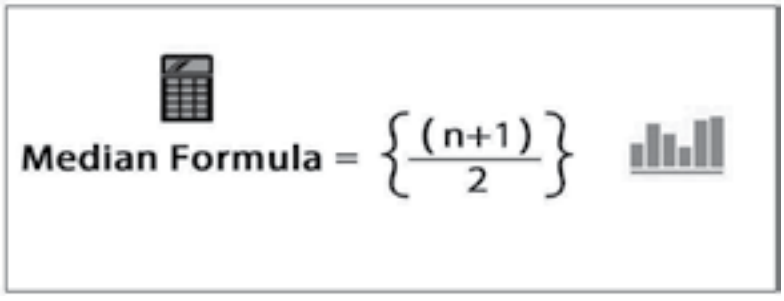
a. The Arithmetic Mean-

Mean calculates the average of a data set. Mean is used when the data is metric. It is an extremely sensitive measure of central tendency and hence can be affected easily by the presence of outliers in the data set. Since mean takes every single value from a data set and therefore outliers could hamper the average of the data set directly.

b. The Median-

Median calculates the middle most value or the most central item of the data set. Median is used when the data is metric. Half of the data lies above median, and half of the data lies below the median.

Median is the best measure of central tendency when the data contains outliers, as the median takes the center value and ignore the outlying values.



c. The Mode-

Mode is used as measure of central tendency when the data is non-metric. Mode calculates the most frequent value of the data set.

B. DISPERSION

Dispersion helps us to judge the reliability of the measures of central tendency. Dispersion also sees that the data is widely dispersed or not.

Dispersion can be measured by following measures: -

a. Range-

Range is the difference between the highest and the lowest value in the data set. It is easy to understand but range fails to take into consideration any other value except the highest and the lowest value in the data set.

Range cannot be calculated in an open-ended data as there will be no "highest" or "lowest" value in the open-ended set.

b. Standard Deviation-

Standard deviation calculates the dispersion of the data from its mean. Standard Deviation is simply the square root of Variance. When the data set has outliers, standard deviation should be avoided because the mean of the data set would be affected by the outliers present.

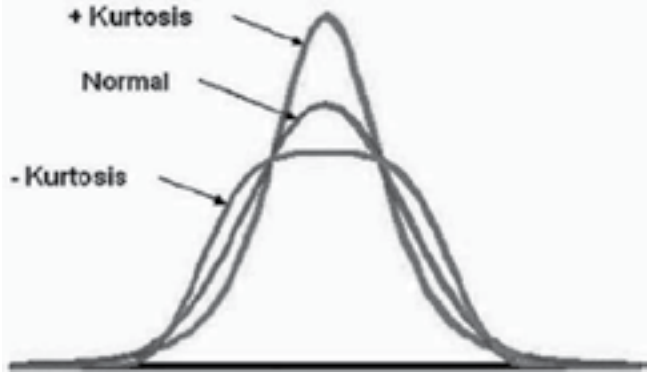
c. Coefficient of Variation-

Coefficient of variation is a relative measure of dispersion which compares the variability or consistency between two or more data sets. It is the ratio of standard deviation and mean. The only difference between standard deviation and coefficient of variation is that standard deviation is used for only one data set and coefficient if variation can be used for two different data sets.

C. KURTOSIS

Kurtosis measures the peakness or flatness of the data set. Kurtosis could be of three types:

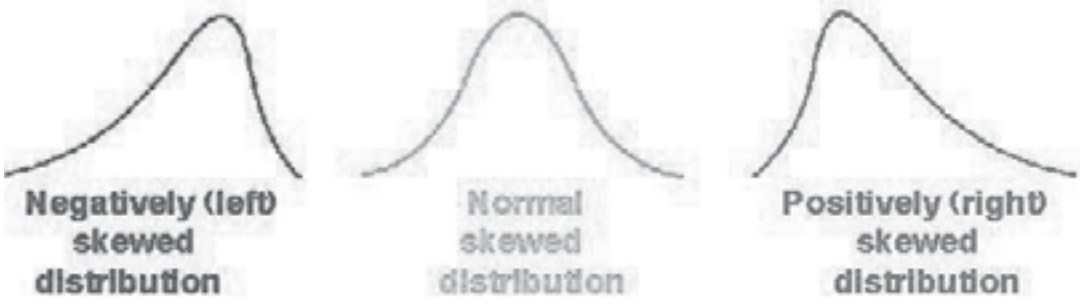
1. LEPTOKURTIC- Highly peaked kurtosis or positive kurtosis, where kurtosis is greater than zero.
2. MESOKURTIC- Normal kurtosis, where kurtosis is equal to zero.
3. PLATYKURTIC- Highly flat kurtosis or negative kurtosis, where kurtosis is less than zero.



D. SKEWNESS

Skewness is a measure to determine the asymmetry of the data set. Skewness can be of three types:

1. POSITIVELY SKEWED- In the positively skewed, the right tail is longer and the skewness is positive.
2. NEGATIVELY SKEWED- In the negatively skewed, the left tail is longer and the skewness is negative.
3. ZERO SKEWED- In the zero skewed, both the tails are equal and the skewness is approximately zero.



E. PROBABILITY DISTRIBUTION-

A probability distribution is a function the probabilities of occurrence of different outcomes of an experiment. It is a mathematical description of a chance of phenomenon with in its sample space and the probabilities of events.

F. HYPOTHESIS TESTING

Hypothesis testing is analyst tests that assume regarding a population parameter. Its methodology highly depends on the nature of given data used and cause for the analysis that is to be needed. Hypothesis testing is also used to assess the plausibility of a hypothesis by using sample of the data. Here the data might be provided in from of larger population or may be from a data-generating processes.

ONE SAMPLE TEST

In one sample test, after assuming the hypothesis we take only one sample data and produce a single sample statistic for testing.

TWO SAMPLE TEST

In two sample test, we compare the two population means whether they are similar or different.

G. ANOVA TEST

ANOVA means Analysis of Variance.

It enables us to test for significance of the difference among more than two means of a data. The steps followed for ANOVA Test are same as that of the T-test.

ANALYSIS OF VARIANCE (ANOVA)
(A.1)

(A.2)

(A.3)

SUMMARY OUTPUT of Sensex and Marico

Regression Statistics	
Multiple R	0.696007
R Square	0.484426
Adjusted R Square	0.47538
Standard Error	1871.27
Observations	59

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1.88E+08	1.88E+08	53.55628	9.38E-10
Residual	57	2E+08	3501653		
Total	58	3.87E+08			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-982.186	7744.226	-0.12683	0.899523	-16489.7	14525.36	-16489.7	14525.36
530.55	105.0404	14.35328	7.318216	9.38E-10	76.29843	133.7823	76.29843	133.7823

SENSEX AND MARICO

1. Significance of the Regression Model-

H_0: Regression Model is significant ($R^2 = 0$, $\beta 1 = 0$, $\beta 2 = 0$)

In this, considering the ANOVA table A.1, the key element is the p-value taken out as 0.899. This value is however greater than $\alpha = 0.05$, which means the results are statistically insignificant because in this model when the outcome/value is greater than α (0.05), we reject H_0. While, when compared with the significance(F) i.e., given as 9.38E-10 << 0.05.

Therefore, we reject H_0 at 5% level of significance which means the regression model is significant and is safe to conclude that the predictors (close, open, high, low) have a significant impact on market share of Sensex and Marico.

2. Degree of predictive accuracy-

Considering the table A.1, the adjusted R^2 is 0.4844 which means in the proposed model which consists of four predictors has an accuracy of 48%. Here, the Multiple R is 0.69 which is close to 0.70. Since, the value of multiple R is close to 1 and is quite high therefore, it is indicating that there is a strong relationship.

SENSEX AND DABUR

1. Significance of the Regression Model-

H_0: Regression Model is significant ($R^2 = 0$, $\beta 1 = 0$, $\beta 2 = 0$)

In this, considering the ANOVA table A.2, the key element is the p-value taken out as 0.842. This value is however greater than $\alpha = 0.05$, which means the results are statistically insignificant because in this model when the outcome/value is greater than α (0.05), we reject H_0. While, when compared with the significance(F) i.e., given as 1.9E-19 << 0.05.

Therefore, we reject H_0 at 5% level of significance which means the regression model is significant and is safe to conclude that the predictors (close, open, high, low) have a significant impact.

2. Degree of predictive accuracy-

Considering the table A.2, the adjusted R^2 is 0.7625 which means in the proposed model which consists of four predictors has an accuracy of 76%. Here, the Multiple R is 0.87 which is close to 0.9. Since, the value of multiple R very close to 1 and is very high therefore, it is indicating that there is a strong relationship between.

MARICO AND DABUR

1. Significance of the Regression Model-

H_0: Regression Model is significant ($R^2 = 0$, $\beta 1 = 0$, $\beta 2 = 0$)

In this, considering the ANOVA table A.3, the key element is the p-value taken out as 1.05E-07. This value is however extremely less than $\alpha = 0.05$, which means the results are statistically significant

because in this model when the outcome/value is lesser than α (0.05), we accept H*0*. While, when compared with the significance(F) i.e., given as 4.76E-21<< 0.05.

Therefore, we accept H_0 at 5% level of significance which means the regression model is insignificant and is safe to conclude that the predictors (close, open, high, low) have an insignificant impact.

2. Degree of predictive accuracy-

Considering the table A.3, the adjusted R^2 0.7876 which means in the proposed model which consists of four predictors has an accuracy of 78%. Here, the Multiple R is 0.88 which is close to 0.90. Since, the value of multiple R is close to 1 and is quite high therefore, it is indicating that there is a strong relationship.

Conclusion

Several data analysis techniques were employed during the investigation to better understand the data that had been submitted. All the information gathered was evaluated and interpreted. On the data, we first used the Descriptive Statistics tool. From there, we learned about the Central Tendency Measure, Dispersion Measure, and Shape Measures. We were able to get a fairly accurate representation of the data because of this. After that, we ran a Probability Analysis on the data to get the predicted value we may deduce from it. We moved on to using other tools on the data after preparing the probability distribution (Data Sheet attached).

All the parameters were analyzed with the help of following tools:

- Descriptive Analysis.
- Probability Analysis (Normal Distribution) ANOVA Analysis.
- Regression Analysis.

Both Marico and Dabur are less volatile than Sensex, and Marico is the least volatile (risky) in comparison to Dabur. Further there is significant difference between high-low prices of both the stocks but not in the index but there is no significant difference between open-close prices of any of the three. Which shows there is high volatility in intraday trade of the stocks but for long-term investment they are good.

References

BSE (formerly Bombay Stock Exchange) | Live Stock Market updates for S&P BSE SENSEX, Stock Price, Company News & Results (bseindia.com)

Marico – make a difference (marico.com)

One of the Best Ayurvedic Companies in India | Dabur (dabur.com)

Investing.com India - Financial News, Shares & Quotes

LEVIN, RUBIN, RASTOGI, SIDDIQUI. “STATISTICS FOR MANAGEMENT” - seventh edition by PEARSON

BLOCKCHAIN TECHNOLOGY: ADOPTION, IMPACT AND CHALLENGES INBANKING SECTOR

Kapil Shobhwani*

Dr Shilpa Lodha**

Abstract

The primary focus of this paper is on blockchain technology, including its adoption,impact, and challenges in the banking industry. This paper discusses the purpose of the study'sapplicability of blockchain technology in banking, the difficulties the banking industry is facingas a result of that implementation, and the significance of that adoption. The background and operational procedures of blockchain technology are first addressed. Secondary sources used by the researcher to compile study data include bank websites, academic journals, publications, research papers, and a variety of other websites. By utilizing blockchain technology, banks will be able to streamline their current operations, improve security, and cut expenses. As a conclusion, customers will receive better services at lower prices. With updated laws, cutting-edge security, accurate identity verification, and the potential to conduct speedier payments, it can be stated that blockchain technology represents the future of banks and financial organizations.

Keywords*:* Blockchain Technology, Assets Management, Banking Securities, KYC.

Introduction

In developing countries like India, where banks are seen as pillars of modern civilization, they act as a catalyst for growth in the economy. (Iqbal and Sami, 2017). The three main tasks that banks perform are asset transformation, liquidity storage, and the provision of financial services (Bunea et al. 2016). Since all banking operations revolve around the assets of the stakeholders, they are all managed in the form of centralized ledgers of transactions for payments, storage, and services (Frame et al. 2018). Convenience banking has significantly replaced "conventional banking" in Indian institutions. Banks utilize a centralized intermediary in order to simplify store assets for use and funding sources with various stakeholder arrangements (MacDonald et al. 2016). The financial system can transition from centralized to

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distributed control using blockchain technology. (Patel et al. 2022). Nowadays, blockchains are employed in a variety of banking applications, such as market forecasts, business-related services, economic transactions, and financial asset settlement (Haferkorn andQuintana Diaz 2014). In addition to manufacturing businesses, a wide range of service industries—from banking to telecom expects benefits from Industry 4.0's digital technologies(Frank et al., 2019). Many new enterprise structures have been made possible by these digitaltechnologies (Sung, 2018). Security is always a problem in the banking and finance sector, hence the IoT has been implemented in payment, banking, and insurance activities (Mani andChouk, 2018). Rising operational costs, an increase in fraudulent transactions, and challengeswith transparency are among the issues the banking sector is currently facing. (Jayadev et al., 2017). To prevent fraud and complete transactions quickly, the banking system has to explore reliable technology (Repousis et al., 2019). Additionally, the system must maintain transparency for its users and regulators in addition cost-effectiveness in its operations (Altankhuyag, 2019; Ray, 2016; Dong et al.,2014). The use of numerous platforms basedon technology by the banking industry has improved the efficiency of financial activities (Palmi´e et al., 2020). Blockchain, a platform and technology that has the ability to record anything, is used to record bitcoin transactions (Gupta,2018). An example of a private blockchain application is online electoral systems. (Thompson,2016)· the innovative usage ofblockchain technology in the banking sector might save up to $20 billion (Accenture, 2018).Most banks would begin collaborating on Blockchain-related projects (World EconomicForum, 2017). Over the past two years, blockchain-based fintech companies have garnered more than $1.4 billion in venture capital funding.

Overview of Blockchain Technology

Every transaction on a network is recorded in a decentralized system called blockchain that is computerized. Every time a participant wishes to transfer value to another, all the other nodes in the network establish connections with one another according to a present process in order to confirm the validity of the new operation. Blockchain is anticipated to be critical for sustained, global economic growth in the future, which will be advantageous for society and consumers in general (Nguyen 2016)[27]. Whenever a transaction is accepted by the network, all copies of the ledger are updated with the new information. A "block" of transactions, which is a collection of related transactions, is often used to update the ledger. Because each block contains information that refers to previous blocks, the chain of blocks connects together in the dispersed identical copies. Moment transactions can be inserted by communicating entities, but after they are examined and approved by the network, they cannot be modified or erased. A

node would lose sync with the rest of the network and be removed from the blockchain if it changed a prior block. The blockchain is working well even though there is no central authority. From the public sector to the healthcare industry, blockchain has the power to transform and disrupt many sectors. The concept of a blockchain was first developed in 2008 by Satoshi Nakamoto. When the first blockchain was created and used as a form of public ledger for transactions involving "Bitcoin," the technology became well-known. Considering how secure it is, blockchain has drawn the attention of numerous researchers ever since it was first developed.

Blockchain Working Process

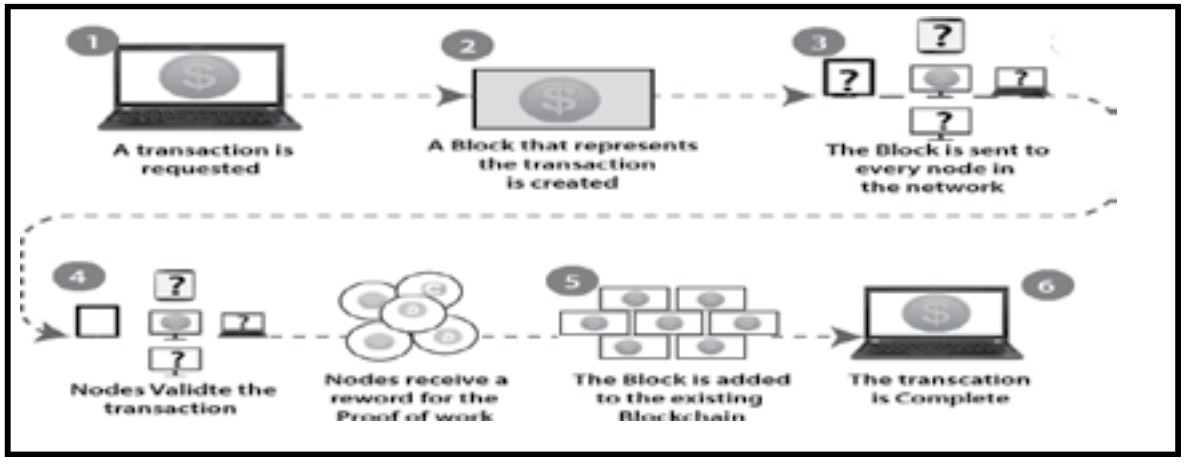

Figure 1. Blockchain working process

- Each Transaction has a record kept: Blockchain operates by an extended procedure that,in essence, goes as follows: The technology must authenticate the entry of a transaction by an authorized participant. That action creates a block that reflects that specific transaction or piece of data. Every network node's computer receives the block.

- It is validated to certify every transaction's legitimacy: Because every block is linked tothe blocks that came before and after it, each transaction can be verified. The object moves in such blocks, creating a sequence of data one place to another. Blocks, which are securely linked to one another to prevent any blocks from being updated or introduced between two already existing blocks, verify the precise time and order of transactions. For the blockchain as a whole, each successive block supports the validity of the one before it.

- ❖ After being verified, a transaction is hashed and placed to a block: Every block is effectively a group of transaction records and has its own unique identity. Every block also contains a hash code that makes it distinct from other blocks on the network. The data's integrityis also guaranteed by the hash, proving that it was not modified since being entered into the block. When a transaction is recorded, the blockchain network must verify its validity.

- ❖ The node has been completed and linked to the blockchain's end: Authorized nodes verify the transaction and add the block to the existing blockchain. The update is transmitted throughout the network, concluding the transaction.

Review of literature

Wu and Tran (2018) a history of the development of Blockchain and Energy Internethad been done in an effort to provide the foundation for prospective Blockchain applications for Energy Internet. First, a thorough introduction to the definition and traits of Blockchain and Energy Internet was given. Second, the two's compatibility was examined. Then, some blockchain application scenarios for the Energy Internet were presented. Lastly, it was examined how difficult it would be to use present blockchain technology on the energy internet. Although the current research was still in its early stages, it was decided that blockchain technology had excellent application prospects in the energy sector. Despite some modest attempts by researchers and businesses, theapplications nevertheless faced significant difficulties.

Knezevic (2018) the influence of the Blockchain technology platform on other industries, including finance. This research's framework was an examination of how technology works. The benefits of commerce and economic activity were then established. The final section of the paper covers how modern technology has affectedbusiness. Using a scenario method and trend analysis, the first hypothesis was very effectively demonstrated. According to research findings, the financial sector was already significantly impacted by the technology that was currently under investigation.Many other industries were also expected to undergo considerable change over the nextfive to ten years.

Ozturan, Atasu and Soydan (2019) tried to assessing how prepared the banking sector is for blockchain technology. addressing the query of the relationship between the deployment of blockchain technology and the field of information systems integration. As a case study, the Turkish banking sector was examined, and the findingswere presented to provide insight into how well-prepared it was for blockchain technology. Turkey and this finding that the banking industry was at the beginning of blockchain led to the discovery that it was difficult to say that any one demographic group was better than another.

Qingquan (2020) due to its properties of decentralisation, unforgeability, and sharing, blockchain technology has been widely used in the financial sector, the exchange of digital assets, and other industries. Blockchain has emerged as a popular topic in fintechresearch, having an impact on how conventional financial formats are developed. It served as the foundation of the digital economy. The properties of blockchain technology, their effects on the management and operation of conventional commercialbanks, and potential blockchain applications in commercial banks are all carefully analysed in this study.

Al Kemyani et al. (2021) tried to find the most recent developments in blockchain technology for critical accounting and financial operations in the commercial banks. The study used focus group interviews and relevant literature to address the following research issues. a) How may blockchain technology be applied to different accountingand financial tasks? b) With reference to the financial industry, what advantages does blockchain technology provide in accounting and finance? c) What are the drawbacks of utilizing blockchain technology? d) How is blockchain being used in the Sultanate of Oman's banking industry? Through its survey, the study learned that this technologyis still fairly new in Oman, where the government will play a role in introducing it through the teaching of courses in finance-related fields and the holding of seminars and workshops for financial industry professionals.

Sun (2021) explained and analysed the fundamental technical components of blockchain additionally, it discusses the viability of asset securitization using blockchain technology as well as the implementation procedure. The study found that the accounts receivable asset securitization example serves as an illustration of how blockchain technology may be used, as well as a source of design ideas and references for businesses looking to use blockchain technology for asset securitization.

Research Gap

The literature review referred to above highlighted a peer-to-peer electronic money system, the influence of cryptocurrencies and blockchain technologies, the possible government use of blockchain technology, and blockchain technology research and development. None of the aforementioned research specifically addressed the impact and challenges of blockchain and financial services of blockchain technology in the banking sector. This paper primarily discusses the implications and difficulties of blockchain technology for financial services and how the banking system might use it. Thus, the purpose of this paper is to provide general information.

Objectives of the study

1. To study the adoption of blockchain technology in the banking sector.
2. To study the effects of blockchain technology on banking-related financial services.
3. To study the challenges faced by the banking sector by using blockchain technology.

To study the adoption of blockchain technology in the banking sector

Payments

Based on a report of FIS Global, India has become the world's largest leading in real-time transactions, processing 41 million transactions daily. According to the survey, Real-time activity has improved further in the nation, with volumes more than doubling this year and transaction value growing by 80%. Which suggests that blockchain technology can be used in India.

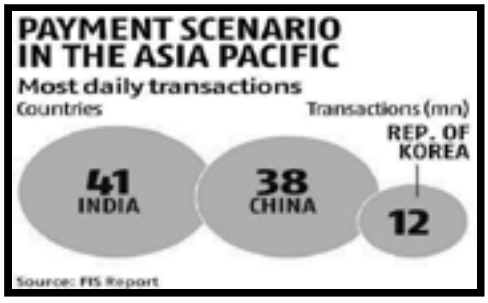

Figure 2. Daily Transactions in India

Existing process:

About 60% of all non-cash-transactions in the country are done using paper-based instruments (such as cheques, drafts, and so on). Due to the deliberate efforts of the Reserve Bank of India to increase the adoption of electronic payment solutions in place of cash and cheques, this percentage has been steadily declining over time. The entire process is based on a centralized system, due to which payments take a long time and there is an increase in third party interference.

Figure 3. Payments Existing process

Improved payments through blockchain technology

Blockchain has the potential to drastically change how payments are handled. As a result, banks will be able to handle payments between businesses and their clients and even among themselves with greater security at a cheap cost. Banks will eliminate all middlemen from the payment processing system by doing this.

Blockchain provides us with a means of protecting digital currency in the form of code. Only those with permission will be able to access the code, which will be running in a secure blockchain environment. Now, you develop a blockchain application and both of you send money to the programmed whenever you need to secure any money or transfer it to another user.

Example: Consider the five users of our blockchain, A, B, C, D, and E, who are connected to a decentralized, distributed network. The banking system will include blockchain technology through this blockchain deployment.

1. A would like to send B 500 rupees.
2. This 500-rupee transaction is shown Online as a block.
3. Then, this block is broadcast to every user on the network (C, D, and E).
4. In this illustration, C, D, and E will serve as the network's validators.
5. This demonstrates that the transaction is genuine.
6. The blockchain now contains this block that contains the transaction.
7. Transfer of the 500 rupees takes place from A to B.

In Step 4, The verifier, C, D, and E carry out a cryptographic algorithm execution and a historical evaluation and verification of the specific blockchain under consideration. The transaction is approved if the evaluation demonstrates that both the history and the hash values are accurate. This is known as distributed consensus.

If C, D and E for some reason cannot validate the information in the blockchain, Following the data's rejection, the block's entry is refused and it is not added to the blockchain.

Figure 4. payments through blockchain technology

Clearance and Settlements Systems

Existing process:

The highest policy-making bodies for payment systems in the country are the Board for Regulation and Supervision of Payment and Settlement Systems (BPSS) and the Central Board, a subcommittee of the Reserve Bank of India. All national payment and settlement systems must be governed and monitored by the BPSS, which has the jurisdiction to authorise, prescribe regulations, and establish standards. The Department of Payment and Settlement Systems of the Reserve Bank of India, which also executes the Board's directions, houses the Board's secretariat. Our financial infrastructure's design is largely to blame for the three-day average settlement time for bank transfers.

It's not just a pain for the consumer. For the institutions themselves, transferring money internationally presents logistical challenges. A straightforward bank transfer between two accounts is possible today has to bypass a complex system of intermediaries, from correspondent banks to custodial services, before reaching any destination. In a vast network of traders, funds, asset managers, and others, the two bank balances will need to be compared in a global financial system.

Improved Clearance and Settlements Systems through blockchain technology

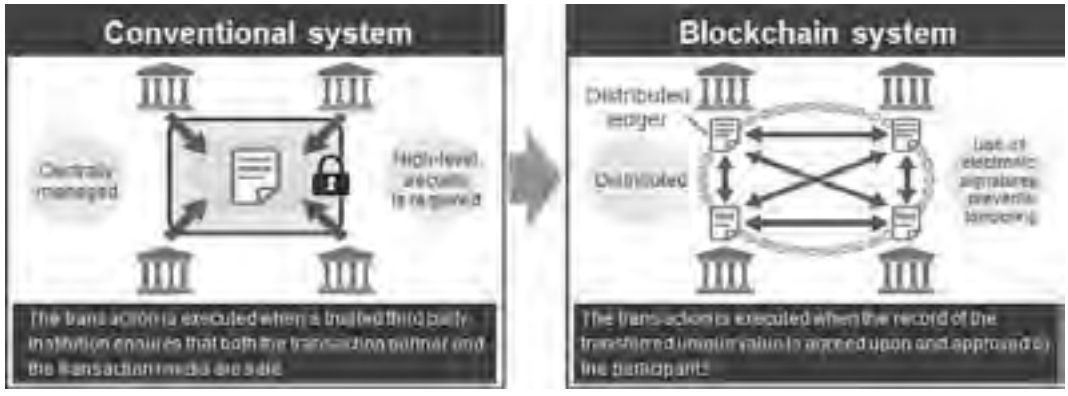

Figure 5. Improved Clearance and Settlements Systems through blockchain technology

Faster payments are possible because blockchain prevents meddling from outside parties. Blockchain technology reduces the amount of time banks spend on the time-consuming process of purchasing and selling stocks and shares. Blockchain technology has a decentralized authority, which enhances performance and lowers transaction costs. eliminates all middlemen or agents from.

This current situation might be changed by blockchain technology, which acts as a decentralized "ledger" of transactions. An interbank blockchain may maintain track of all transactions openly and transparently rather than utilizing SWIFT to match up the ledgers of each financial institution. That suggests that transactions might be settled directly on a public blockchain rather than needing to rely on a network of custodian services and correspondent banks. Additionally, "immediate" transactions—transactions that clear and settle right away after a payment is made—are made possible by blockchain technology.

The present banking systems, which clear and settle a transaction day following a payment, are in contrast to this. That could reduce the enormous expenses associated with maintaining a worldwide network of correspondent banks. Blockchain technology has the potential to reduce the average cost of clearing and settling transactions by $10 billion annually, according to a survey conducted by Accenture among 8 multinational banks.

KYC (Know YOUR Customer)

Existing process:

Along with document and utility bill verification as address proof, the KYC procedure also incorporates biometric and ID card verification. Banks must adhere to KYC and generally pro laundering rules in order to prevent fraud. KYC adherence is the responsibility of the banks. Because banking is a vital part of the economy, the government has been holding it to higher standards in terms of "Know Your Customer" (KYC) laws. Customers will be significantly impacted because the rules apply to all financial institutions. In order to decrease fraud, banks must adhere to KYC, but they also share some of the responsibility for everyone who transacts business with them.

Improved KYC process through blockchain technology

The conventional KYC approach involves an organization or government entity checking each user on an individual basis. Therefore, it is time-consuming to validate each identity.

A single, cryptographically secure, and immutable database can be created using the DLT and blockchain architecture without the need for a third party to attest for the accuracy of the data. It allows for the development of a system where a user only needs to go through the KYC procedure once to authenticate their identity.

With the use of blockchain technology, KYC data is now stored on a decentralized network that can be accessed by the parties with their permission. Additionally, the system provides strong data security because users can only access data with their consent, which lowers the likelihood of unauthorized access.

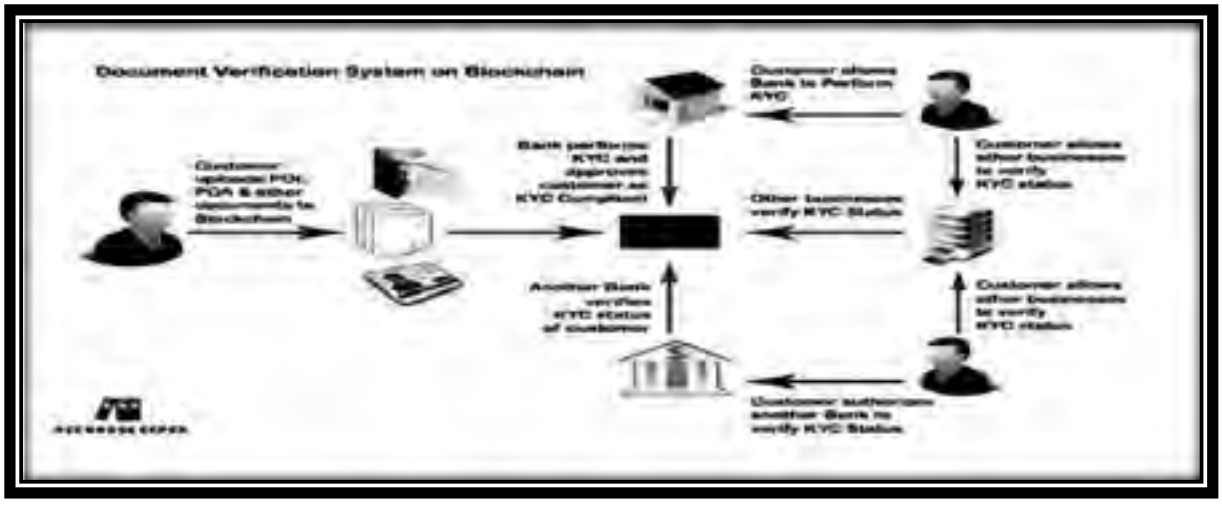

Figure 7. improve KYC process through blockchain technology

To study the effects of blockchain technology on banking-related financial services

Fast settlement in Stock Markets:

Participants in the stock market, including traders, brokers, regulators, and the stock exchange, must go through a lengthy procedure (which takes 3+ days to execute transactions mostly owing to the role of intermediaries, operational trade clearance, and regularity processes). Blockchain can significantly improve stock markets through automation and decentralization. While accelerating the process for quick transaction settlements, it can help lower the significant costs in commission items that are imposed on clients.

Asset Management:

The security and adaptability of transactional data are critical when discussing digital asset management. The multiplicity of transaction channels makes it harder and harder to accomplish this. Blockchain can support transparency and flexibility of your transactional data in a variety of ways. Blockchain has the potential to transform the asset management sector. It has the ability to lower costs, boost productivity, increase transparency, and enable a variety of cutting-edge initiatives.

A distinct ID is used to identify each contract or document and is used to store it on Blockchain. Every time a property transaction takes place, the buyer and seller must verify it using their private keys before the ownership is given to the buyer. The notary utilizes his or her private key in a similar way to replace traditional paper signatures. In a similar manner, Blockchain-based irrefutable proof is used to continuously validate information about the transaction history of assets and contracts.

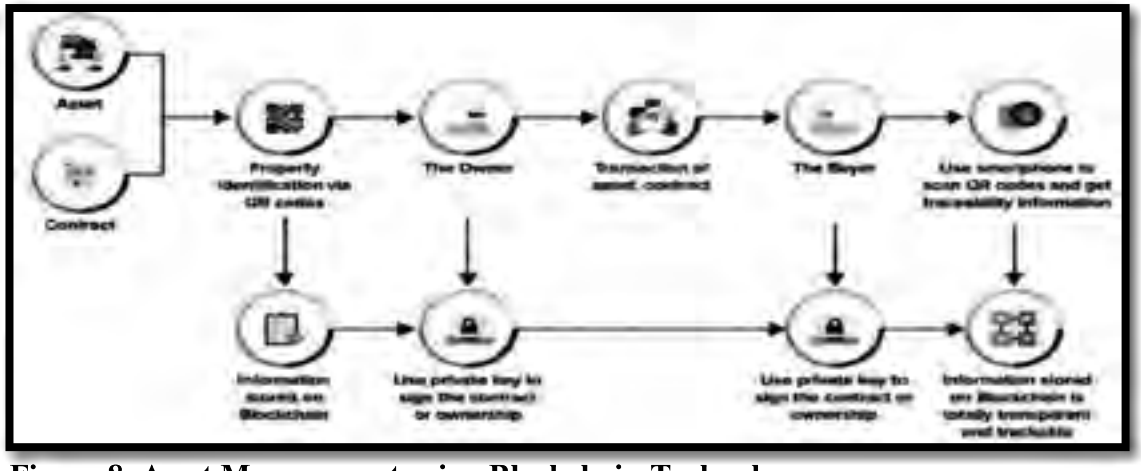

Figure 8. Asset Management using Blockchain Technology

Securities:

A blockchain is, as its name suggests, a collection of digital blocks that store transaction records. All of the blocks before and following a given block are related. Because of this, it is challenging to hack a single record because the hacker would need to change both the record and the block that it is tied to in order to access the data. It could be challenging to accomplish this. The blockchain uses cryptography to secure its records. Participants in the network each have their own private key, which is associated with the transactions they carry out and serves as a personal digital signature. Blockchain is highly useful from a security perspective because if a record is modified, the signature will become invalid and the peer network will know right away that something has happened.

To study the challenges faced by the banking sector by using blockchaintechnology

- ❖ Blockchain technology set up cost is very expensive in Bank
- ❖ It takes a significant amount of computer power to complete the computation using a proof-of-work algorithm in order to verify and process the transaction.
- ❖ All of India's rural and distant locations currently have network issues, which makes the use of Blockchain technology potentially problematic.
- ❖ Lack of Technical knowledge, privacy and security issues will arise.
- ❖ Information cannot be erasable, if once we done a mistake by unknowing also cannot bechange.
- ❖ Lack of public awareness, there is no easy flow of information regarding blockchain technology.
- ❖ It cannot be implemented without knowing its difficulty.
- ❖ Lack of Legal framework in national and international.

Conclusion

The basic technology of banks' credit information and payment clearing systems could be transformed by blockchain technology. Banks should work to advance blockchain as it is a promising technology that has the potential to eventually replace the current banking system. Blockchain adoption in banking and financial operations is still in its infancy in India, nevertheless. Banks considering using the technology should think about how to integrate it with their current centralized systems and blockchain platforms. Banks will be able to streamline their current processes, increase security, and save costs by utilizing blockchain technology. As a result, service costs will drop and customer services will be delivered more effectively. In conclusion, it can be claimed that blockchain technology is the way that banks and other financial organizations will operate in the future thanks to its sophisticated rules, cutting-edge security, accurate identity verification, and capacity to process payments more quickly.

References

Al Kemyani, M. K., Al Raisi, J., Al Kindi, A. R. T., Al Mughairi, I. Y., & Tiwari, C. K. (2021). Blockchain Applications in Accounting and Finance: Qualitative Evidence from the Banking Sector. *Journal of Research in Business and Management,* 10(4), 28-39.

Altankhuyag, D. (2019). Impact of Banking Supervision on the Cost-Efficiency of Banks:a Study of Five Developing Asian Countries. *Asian Economic and Financial Review*, 9(2), 213–231.

Accenture (2018). Building the future-ready bank. Accessed on 16th June 2019- https://www.accenture.com/gb-en/_acnmedia/PDF-78/Accenture-BankingTechnology

Bhattacharyya, B., & Pradhan, S. (2017). Digital revolution in the Indian banking sector. Retrieved from http:// www.forbesindia.com/article/weschool/digital-revolution-in-the-indian-banking-sector/47811/1, Accessed on August 10, 2017.

Bunea, Daniela, Polychronis Karakitsos, Niall Merriman, and Werner Studener. (2016). Profit distribution and loss coverage rules for central banks. ECB Occasional Paper 169: 1–56.

Dong, Y., Hamilton, R., Tippett, M. (2014). Cost efficiency of the Chinese banking sector:a comparison of stochastic frontier analysis and data envelopment analysis. *Econ. Model*. 36, 298–308.

Frizzo-Barker, J., Chow-White, P.A., Adams, P.R., Mentanko, J., Ha, D., Green, S., (2019). Blockchain as a disruptive technology for business: a systematic review. *International Journalof Information* Management,51, 102029.

Frank, A.G., Mendes, G.H., Ayala, N.F., Ghezzi, A. (2019). Servitization and Industry 4.0 convergence in the digital transformation of product firms: a business model innovation perspective. Technology Forecasting Social Change 141, 341–351.

Frame, W. S., Wall, L. D., & White, L. J. (2018). Technological change and financial innovation in banking: Some implications for fintech. Available at SSRN 3261732.

Gupta, S. (2017). How Blockchain Technology is changing the security landscape in the banking sector.

Gupta, A. & Gupta, S. (2018). Blockchain technology: Application in Indian banking sector. Delhi Business Review, 19(2), 75-84.

Guo, Ye & Liang, Chen. (2016). Blockchain application and outlook in the banking industry. Financial Innovation. 2. 10.1186/s40854-016-0034-9.

He, Qingquan. (2020). Application of Blockchain Technology in Commercial Banks. E3S Web of Conferences. 235. 03070. 10.1051/e3sconf/202123503070.

Hassani, H., Huang, X., Silva, E. (2018). Banking with blockchain-ed big data. Journal of Management Analytics 5 (4), 256–275.

Hyvarinen, H., Risius, M., Friis, G. (2017). A blockchain-based approach towards overcoming financial fraud in public sector services. Business & Information Systems Engineering 59 (6), 441–456.

Haferkorn, Martin, and Josué Manuel Quintana Diaz. (2014). Seasonality and interconnectivity within cryptocurrencies-an analysis on the basis of bitcoin, Litecoin and name coin. International Workshop on Enterprise Applications and Services in the Finance Industry, 217,106–20.

Iqbal, B. A., & Sami, S. (2017). Role of banks in financial inclusion in India. Contadina y administration, 62(2), 644-656.

Jayadev, M., Singh, H., Kumar, P. (2017). Small finance banks: challenges. *IIMB Management Review,* 29 (4), 311–325.

Knezevic, D. (2018). Impact of blockchain technology platform in changing the financial sector and other industries. *Montenegrin Journal of Economics*, *14*(1), 109-120.

Mani, Zied; Chouk, Inès (2018). *Consumer Resistance to Innovation in Services: Challenges and Barriers in the Internet of Things Era. Journal of Product Innovation Management,* 35(5),780-807.

MacDonald, Trent J., Darce A., and Jason P. (2016). Blockchains and the boundaries of self-organized economies: Predictions for the future of banking. In Banking beyond Banks and Money. Berlin: Springer, 279–296

Nguyen, Quoc K. (2016). Blockchain-a financial technology for future sustainable development. 3rd International Conference on Green Technology and Sustainable Development (GTSD), Kaohsiung, Taiwan, November 24,51–54.

Ozturan, M., Atasu, I., & Soydan, H. (2019). Assessment of blockchain technology readiness

level of banking industry: Case of Turkey. *International Journal of Business Marketing and Management (IJBMM)*, *4*(12), 01-13.

Palmié, M., Wincent, J., Parida, V., & Caglar, U. (2020). The evolution of the financial technology ecosystem: An introduction and agenda for future research on disruptive innovations in ecosystems. Technological Forecasting and Social Change, 151, 119779.

Patel, Ritesh, Milena M., and M. Oriani. (2022). Blockchain in banking and finance: A bibliometric review. Research in International Business and Finance, 62.

Repousis, S., Lois, P., Veli, V. (2019). An investigation of the fraud risk and fraud scheme methods in Greek commercial banks. *Journal of Money Laundering Control*, 22 (1),53–61.

Ray, S.(2016). Cost efficiency in an Indian bank branch network: a centralized resource allocation model. Omega (Westport) 65, 69–81.

Sung, T.K. (2018). Industry 4.0: a Korea perspective. Technol. Forecast. Soc. Change, 132, 40–45.

Sun, W. (2022). Application of Blockchain Technology in Asset Securitization. *International Conference on Artificial Intelligence and Big Data*, 7-11.

Seijas, P. L., Thompson, S., & McAdams, D. (2016). Scripting smart contracts for distributed ledger technology. Cryptology ePrint Archive.

ESTIMATING GST REVENUE GENERATION OF INDIAN STATES: A DEA APPROACH

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Dr. Smita Dikshit**
Prof R. K. Singh***

Abstract

This research paper critically assesses the efficiency and sustainability of Goods and Services Tax (GST) revenue generation in Indian states in the aftermath of the GST implementation. It aims to identify potential solutions to address any identified inefficiencies. The study seeks to bridge existing knowledge gaps by employing Data Envelopment Analysis (DEA) and Regression techniques to evaluate GST efficiency among Indian states. The research findings provide insights into the efficiency and sustainability levels of revenue generation in both General Category States and Special Category States. The paper concludes by offering recommendations for maintaining fiscal sustainability at both the Union and state levels, along with strategies to enhance revenue generation efforts.

Keywords: GST, Efficiency, Revenue, Sustainability, Data Envelopment Analysis, Regression.

Introduction

The subject of every state ought to contribute towards the support of the government, as nearly as possible, in proportion to their respective abilities" (Adam Smith, 1776). Although taxes have existed for many centuries, Adam Smith's famous book "The Wealth of Nations" laid out the principles of taxation for the first time. These canons of taxation define numerous rules and principles upon which a good taxation system should be sustained for a long period. Canons of taxes are the terms used to describe a tax's administrative aspects. They are concerned with the amount, rate, levy method, and collection of tax. Adam Smith presented four canons of taxation, commonly referred to as the main Canons of Taxation: The Canon of Equality, the Canon of Certainty, the Canon of Convenience, and the Canon of Economy.

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These Canons are the principles of taxation that underpin the philosophy of tax administrations, aiming for greater taxpayer equity by enhancing effectiveness and efficiency. The paper investigates potential methods to address inefficiency and estimate the effectiveness of GST collection in Indian states during the post-GST period. It examines developments in the tax structure, with a specific focus on the evolution of tax revenue, the proportion in which income and consumption taxes are collected, and their associated impacts on economic growth. The interaction between tax policy, government revenue, and economic growth is more relevant now than ever before (Simwaka, 2012).

In the present Indian economy, the country requires a sustainable taxation system. The Goods and Services Tax, an indirect tax regime, has replaced a multi-layered and complex indirect tax system with a simpler tax regime. The effectiveness of the tax administration plays a crucial role in achieving a sustainable tax structure in the country. Ensuring that tax agencies fulfill their mission effectively has always been a high priority for governments. Tax administrators, especially those involved in tax policy in developing countries, have long recognized the administrative aspect of taxation (Goode, 1981). This places significant pressure on revenue collections for states and taxation authorities under the current taxation laws system.

India, as a federation of states, unified the indirect tax structure with GST, aiming for "One Nation, One Tax, One Market." The objective of estimating the GST Collection Efficiency of Indian States in the post-GST era is to find solutions to address the inefficiencies in states and assess the impact on state governments. In this approach, the study aims to examine the efficient allocation of resources between development expenditure and non-development expenditure among Indian states. Increasing tax collection efficiency for both General Category States (GCS) and Special Category States (SCS) could alleviate fiscal pressure while reducing fiscal fraud.

Review of Literature

As far as the researcher explores the review of literature on indirect tax reforms Estimating GST Revenue Generation of Indian States: A DEA Approach, and related literature that have been determined and presented.

Pitabas Biswal and Himanshu Sekhar Rout (2021), in their article, the authors outline their study's aim, which is to measure the tax collection efficiency of Indian states in the pre-GST era and propose solutions to tackle inefficiency. They employ an input-oriented Data Envelopment Analysis (DEA) model to estimate relative efficiency scores separately for

seventeen General Category States and eleven Special Category States. The study's results reveal that General Category States (GCS) are 54% efficient, while Special Category States (SCS) are 72% efficient. Furthermore, they establish a positive and significant correlation between efficiency scores and tax collection per Indian rupee expenditure (Rout, 2021).

ATAF Research (2021), this research emphasizes the crucial role of tax administration in every country. It highlights that the collection of taxes enables governments to provide public services to citizens (taxpayers) and implement welfare programs. The primary objective of the study is to comprehensively measure tax administration's performance, an integral aspect of assessing the overall tax system in any country. The research analyzes revenue collected across five types of taxes, namely VAT, PIT, CIT, customs duties, and excise duties, ultimately evaluating tax administration efficiency through Data Envelopment Analysis (Research, 2021).

Anand Nayyar and Inderpal Singh (2018), in their research article, the authors express their viewpoint on how the implementation of GST has unified the entire nation under a single taxation system. They anticipate that GST will enhance tax collections, boost India's economic development, and remove barriers between Central and State Governments (Singh, 2018).

Ranjan Kumar Mohant and Biresh K. Sahoo (2018), the author of this research article argues that measuring a country's economic performance using a single indicator may not accurately depict its true economic situation. The research's objective is to create a robust macroeconomic performance index for India using Data Envelopment Analysis (DEA) for the period from 1981 to 2016. The study aims to validate whether this index effectively captures India's economic performance (Ranjan Kumar Mohant, 2018).

Keshab Bhattarai (2017), in this research article, the author's objective is to evaluate the micro and macro impacts of GST using a dynamic computable general equilibrium model of the Indian economy. The study employs a dynamic CGE model calibrated to micro-consistent input-output data for the Indian economy to assess the impacts of GST on various efficiency variables, including resource allocation among production sectors, income and employment growth over time, and income redistribution among households. The study concludes that initiatives such as improved education and training, universal healthcare services, and continuous reforms in direct and indirect taxes can accelerate income and employment growth while promoting a more equitable income distribution (Bhattarai, 2017).

Subhash C. Ray and Lei Chen (2009), this research article provides a simple exposition of the neoclassical production theoretic foundations of Data Envelopment Analysis (DEA). It

discusses variables related to technical efficiency (input and output-oriented), scale efficiency, and cost efficiency, along with the corresponding DEA models. The article offers step-by-step instructions on how to write codes for solving various DEA models using the Solver option in MS Excel software (Chen, 2009).

Wade D. Cook and Larry M. Seiford (2009), this research article discusses the development of Data Envelopment Analysis (DEA) models over the three decades since the seminal work of Charnes, Cooper, and Rhodes in 1978. The article is evaluative in nature and suggests various models for measuring efficiency, approaches for incorporating restrictions on multipliers, considerations regarding the status of variables, and data modelling (M. Seiford, 2009).

After reviewing these literature sources, it becomes apparent that evaluating the efficiency and sustainability of GST in special category states is of significant importance. In the literature, various eminent researchers have proposed different methods for evaluating tax revenue efficiency. Three common models include Data Envelopment Analysis (DEA), Deterministic Frontier Analysis (DFA), and Stochastic Frontier Analysis (SFA).

DEA is a nonparametric technique used to measure and evaluate the relative efficiencies of decision-making units (DMUs), initially developed by Charnes, Cooper, and Rhodes (Abraham Charnes, 1978). DFA, on the other hand, estimates parameters that can predict efficiency levels and analyze productivity change, with a focus on least squares estimators and predictors (O'Donnell, 2018). SFA, a parametric technique of economic modeling, has its origins in stochastic production frontier models introduced by Aigner, Lovell, and Schmidt (D.J. Aigner, 1977) and Meeusen and Van den Broeck (1977). These models offer various approaches for evaluating the efficiency of tax revenue collection.

Variables from the Review of Literature

Economists hold varying views on the impact of public finance on a country's economic growth. Public finance, encompassing both expenditures and revenues, can be categorized into three main categories. GST sustainability encompasses aspects of growth, efficiency, and stability. Efficiency, in this context, pertains to the level of performance that utilizes the minimum number of inputs to achieve the maximum number of outputs.

The "Tax and Spend" hypothesis suggests that government revenue mobilization leads to increased government expenditure. In other words, the more taxes are collected, the higher the

level of public spending. This principle was introduced by Milton Friedman in 1987 (Friedman, 1987). Another perspective is the notion that government expenditure influences government revenues, known as the "spend and tax hypothesis." This concept was proposed by Peacock in 1961 and Wiseman in 1971 (Wiseman, 1979).

The third hypothesis regarding the causality between government expenditure and revenues was put forward by Musgrave in 1966, as well as by Chang and Chiang.

These studies primarily focus on constructing models and categorizing the inter-relationships between revenues and expenditures based on the stages of economic growth.

Research GAP

The review of literature above observes that eminent scholars have extensively studied indirect taxes, but there has been a lack of research on the study of Government Expenditure, Revenue, and the sustainability of GST growth in Indian states, as far as the researcher has explored the existing literature on the subject. Therefore, the present research aims to deliberate on the efficiency of GST among the Indian states using Data Envelopment Analysis (DEA) and regression techniques to bridge the existing gap

Objective of the study

- To study the GST revenue collection of Indian states.
- To analyse the efficiency of Indian states generating the GST revenue.
- To make important suggestions to improve the GST generation revenue.

Research Question

Many questions have been highlighted regarding the sustainability of GST in General category states and Special category states:

- Can Indian states collect taxes efficiently?
- If some of them are inefficient, how inefficient are they?
- What should be done to improve the inefficient states' efficiency?

The problem of the study focus on: what aim should be set before implementing the new tax regime, i.e., GST, to achieve full tax collection efficiency? In this context, the study aims to assess the efficiency of GST collection in Indian states during the post-GST period and proposes solutions to address any identified inefficiencies. The study's objective has now been expanded to include the development of a road map for evaluating post-GST efficiency.

Research Methodology

The secondary data for this study was collected based on development expenditure and non-development expenditure from the Reserve Bank of India (RBI). The study period spans from 2017 to 2022. Data on GST revenue collection was sourced from the GST Council website. Data on the cost of tax collection (both development and non-development expenditure) owned by Indian states were used as a sample in the study. According to the Planning commission, NITI Aayog, u/s 22 of CGST Act, 2017 29 states were divided into eighteen General Category States (GCS) and eleven Special Category States (SCS) separately. Special Category States (SCS) are those located in hilly regions of Indian states (Kanukuntla, 2015).

Research design and Variable of the Study

In this study, the efficiency score of 29 Indian states, as listed in section 22 of the CGST Act 2017 and categorized by the NITI Aayog, is measured by considering two inputs (Development Expenditure and Non-Development Expenditure) and a single output (GST tax revenue).

- Input 1: The ratio of average development expenditure from 2017 to 2022 to the average Gross State Domestic Product (GSDP).
- Input 2: The ratio of average non-development expenditure from 2017 to 2022 to the average Gross State Domestic Product (GSDP).
- Output 1: The ratio of average GST tax revenue from 2017 to 2022 to the average Gross State Domestic Product (GSDP).

The purpose of calculating the ratios of average own tax revenue, average development expenditure, and average non-development expenditure to GSDP is to account for the fact that states with higher GSDP may collect more tax revenue compared to states with lower GSDP. To conduct a cross-sectional analysis, the study considers the average development, non-development expenditure, and GST revenue during the period from 2017 to 2022.

Tools and Techniques

DEA is utilized to measure the relative efficiency of Indian states, which are considered Decision-Making Units (DMUs). The measure of efficiency differs from other common measures, such as the C-efficiency ratio for VAT (Aizenman, 2008) or simple tax ratios (e.g., cost-to-revenue), which are often used to evaluate the effectiveness of tax revenue collection. DEA has been employed in various public finance studies to assess the relative efficiency of public spending (Adam, 2011) and taxation (Thanassoulis, 1987). One of DEA's distinctive

features is its ability to consider multiple inputs and outputs. However, including too many inputs and outputs in the model can diminish its discriminatory power (Thanassoulis, 1987).

Tax administrators, particularly those involved in tax policy in developing countries, have long recognized the administrative dimension of taxation (Goode, 1981) (Bird and de Jantsche 1993). The study employs an input-oriented DEA model for efficiency measurement because tax revenue collection depends on numerous exogenous variables over which tax collection stakeholders have no control.

Research Methods

Data Envelopment Analysis model

A relatively new "data-oriented" approach called Data Envelopment Analysis (DEA) is utilized to evaluate the performance of a set of peer entities known as Decision Making Units (DMUs). These DMUs convert multiple inputs into multiple outputs. DEA models are employed to estimate the "best practice frontier" by comparing a DMU's efficiency to that of other DMUs. DEA models determine input and output weights using an optimizing calculation. Units can be classified into efficient and inefficient categories based on this determination. In the case of inefficient units, they aim to adjust the values of inputs and outputs to improve efficiency.

The initial DEA model, originally presented by Charnes, Cooper, and Rhodes (CCR) (Charnes, 1978), built upon the earlier work of Farrell (1957) (William W. Cooper, 2011). This work by Charnes, Cooper, and Rhodes emerged in the early 1970s in response to the thesis efforts of Edwardo Rhodes at Carnegie Mellon University's School of Urban and Public Affairs, which is now the H.J. Heinz III School of Public Policy and Management. The development of frontier estimation techniques in the late 1970s, such as data envelopment analysis (DEA) (Charnes A, 1979), has been used to estimate the efficiency scores of 18 General Category States (GCS) and 11 Special Category States (SCS), considering two inputs and a single output. The model's setup is employed to compute the efficiency of Indian states.

The CCR model is used and presented in an input and output-oriented format to calculate the efficiency of Indian states in the form of a pair of dual linear programs.

(i) The input-oriented CCR DEA model takes the form

$$max = \frac{\sum_{r=1}^{q} UrYrk}{\sum_{i=1}^{m} ViXik} \text{ subject to } \begin{cases} \frac{\sum_{r=1}^{q} UrYrj}{\sum_{i=1}^{m} ViXij} \leq 1 \ (j = 1, \dots, n), \\ Ur \geq 0 \ (r = 1, \dots, q), \ vi \geq 0 \ (i = 1, \dots, m); \end{cases} \quad (1)$$

(ii) The output-oriented CCR DEA model has the following form:

$$min = \frac{\sum_{i=1}^{m} ViXik}{\sum_{r=1}^{q} UrYrk} \text{ subject to } \begin{cases} \frac{\sum_{i=1}^{m} ViXij}{\sum_{r=1}^{q} UrYrj} \geq 1 \ (j = 1, \dots, n), \\ Ur \geq 0 \ (r = 1, \dots, q), \ vi \geq 0 \ (i = 1, \dots, m); \end{cases} \quad (2)$$

Source: (Charnes, 1978)

Model Specification of DEA in order to evaluate DMU_k

Minimize w

subject to: -

$a_{11} x_1 - a_{12} x_2 - \dots - a_{1n} x_n + a_{1k} \quad w \geq 0$

$- a_{21} x_1 - a_{22} x_2 - \dots - a_{2n} x_n + a_{2k} \quad w \geq 0$

$- a_{p1} x_1 - a_{p2} x_2 - \dots - a_{pn} x_n + a_{pk} \quad w \geq 0$

$c_{11} x_1 + c_{12} x_2 + \dots + c_{1n} x_n \geq c_{1k}$

$c_{21} x_1 + c_{22} x_2 + \dots + c_{2n} x_n \geq c_{2k}$

. . . . . .

$c_{q1} x_1 + c_{q2} x_2 + \dots + c_{qn} x_n \geq c_{qk}$

$xj \geq 0 \ j = 1, 2, \dots, n$

Here a_{ij} is the amount of input i used by DMUj for i = 1, …., p and c_{tj} is the amount of output t produced by DMU_j for t = 1, …., q.

DEA Efficiency: If DMUk is efficient, its outputs will be best produced using all of its own inputs. The performance of DMU_0 is fully (100%) efficient

(i) $X_k = 1$

(ii) xj = 0 for all $j \neq k$ and w =1 (w is efficiency number)

Weakly DEA Efficient: If DMU_k is inefficient, its outputs will be best produced by a mixture of other DMUs using a fraction w of all its inputs. The performance of DMU_0 is weakly efficient

(i) $xk \neq 1$

(ii) its efficiency number, is that $0 < w < 1$.

Regression Analysis

Regression analysis is a set of statistical methods used for the estimation of relationships between a dependent variable and one or more independent variables (CFI, 2022).

Regression analysis will provide you with an equation for a graph so that you can make predictions about your data. Regression analysis is widely used for prediction and forecasting.

$$\mathbf{Y_i = \int (X_i, \beta) + \varepsilon_i}$$

Whereas,

Yi = Dependent variable, ∫ = function, Xi = independent variable, β = unknown parameters

εi = error terms

Most regression models propose that Y_i is the function of X_i and β, with ε_i representing an additive error term that may stand in for un-modelled determinants of Y_i.

Results and Discussion

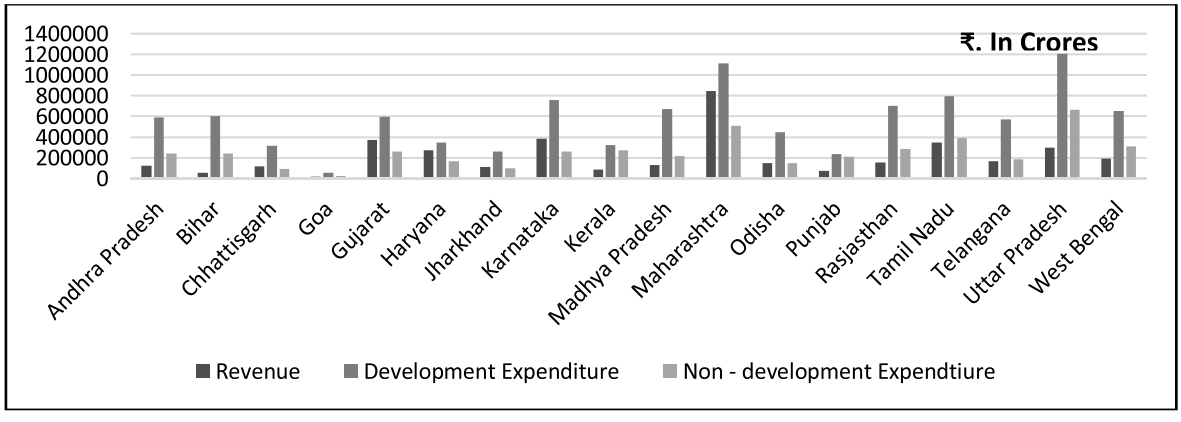
Table No 1: Summary of Input and Outputs of Indian states **₹. In Crores**

	General Category States			Special Category States		
	Output	**Input**	**Input**	**Output**	**Input**	**Input**
	Average GST tax revenue to GSDP ratio	Average development expenditure to GSDP ratio	Average non-development expenditure to GSDP ratio	Average GST tax revenue to GSDP ratio	Average development expenditure to GSDP ratio	Average non-development expenditure to GSDP ratio
Mean	215411.8	568963.5	254052.7	17694.77	101586.8	50875.95
Std. Deviation	191829	296230.4	150818.9	22328.89	93784.59	44085.91
Maximum	844612.1	1205833	662932.7	66855.92	301962.8	131104.5
Minimum	18782.85	55878.6	24308.6	1148.2	25035	12098.1

Source: Authors computed data

Table 1: Efficiency measurement has become a critical topic in the modern times. Achieving more output with less input is a priority for everyone, whether it's a company or a government organisation etc. Goods and Services Tax (GST) collecting efficiency is getting a lot of attention. The descriptive statistics for the input and output variables of GST are shown above in the *Table 1*.

Figure 1: Input and outputs Ratio of General Category States (GCS)

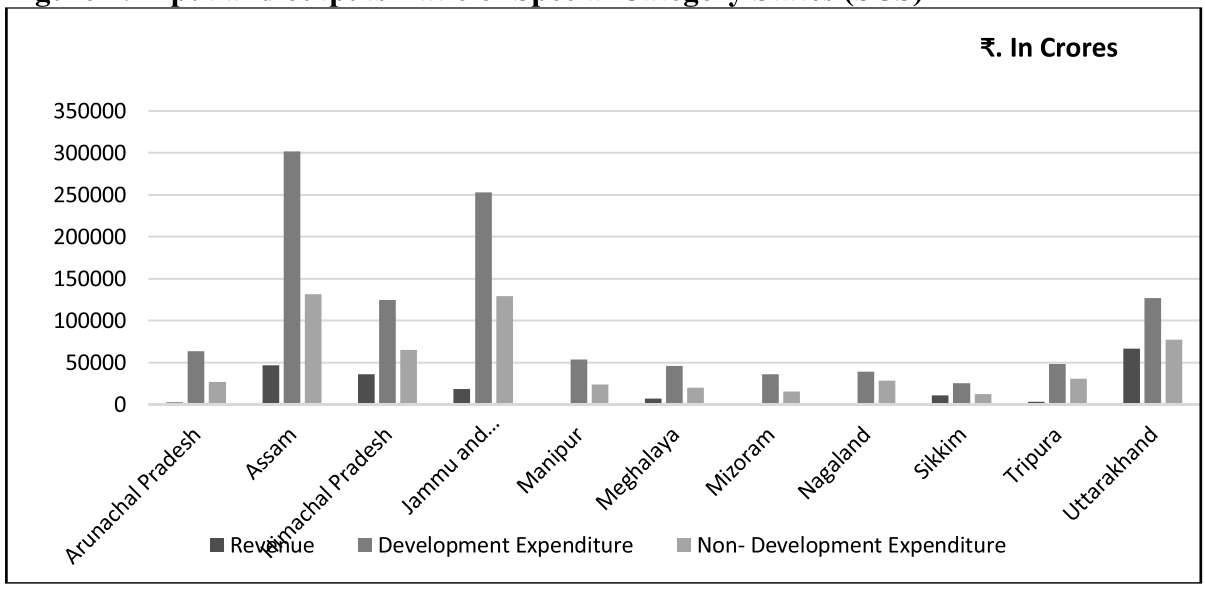


Source: Author complied the data

Figure 1: Two inputs (Development Expenditure and Non-Development Expenditure) a single output (GST tax collection revenue) (General Category States)

The above figure shows that Maharashtra (21.9%) is one of the best management states in the general category state (GCS), with the highest output and lowest inputs. Other states, like Karnataka (9.89%) and Gujarat (9.39%), are likely to be among the best practice states because Haryana (6.22%) has the lowest development and non-development expenditure to GSDP and Gujarat (10.14%) has the average development and non-development expenditure to GSDP. Similarly, states with the highest average development expenditure to GSDP and the lowest average non-development expenditure to GSDP are likely to be inefficient in GST collection. e.g., Goa (0.53%), Bihar (1.36%) and Punjab (1.87%) because of major covid-19 hit the state's economy they are dependence on tourist, agriculture etc.

Figure 2: Input and outputs Ratio of Special Category States (SCS)



Source: Author complied the data

Figure 2: Two inputs (Development Expenditure and Non-Development Expenditure) a single output (GST tax collection revenue) (Special Category States)

In the above figure 2 shows the input and output relation among the special category states (SCS), Uttarakhand (34.34%) and Assam (23.83%) are likely to be among the best management practices states. It's because Uttarakhand have the highest average GST revenue income to GSDP ratio, while Nagaland (0.6%) is the least of GST revenue income sources. In the same way, Manipur (0.8%) and Mizoram (0.52%) are likely to be inefficient in management of GST revenue collection.

DEA Frontier Analyst is employed to apply the input-oriented DEA model for measuring relative technical efficiency. This is because the constant returns to scale assumption is applicable when DMUs are operating efficiently, and variable returns to scale are assumed when computing efficiency scores using data envelopment analysis. The use of DEA allows us to assess the relative tax collection efficiency of each Indian state and determine the degree of efficiency or inefficiency.

For the 29 states, data is available for two inputs: the ratio of average development expenditure to average GSDP and the ratio of average non-development expenditure to average GSDP, along with one output: the ratio of average own GST revenue to average GSDP.

Two independent efficiency studies were carried out, one for 11 SCS and other for 18 GCS. The data for GCS is represented by two into seventeen input matrix and a one into seventeen output matrixes. Similarly, the data for calculating DEA for SCS consists of Eleven into two input matrixes and eleven into one output matrixes.

Table No 2: DEA Analysis of GST Collection Efficiency of General Category States (GCS)

SL.NO	General Category States (GCS)	Efficiency score (X)	Rank	Waste of Resources (1/X)	Performance of DMU_0
1	Andhra Pradesh	0.315	15	68.5	Weak Efficiency
2	Bihar	0.137	17	86.3	Weak Efficiency
3	Chhattisgarh	0.748	4	25.2	Moderate Efficiency
4	Goa	0.467	9	53.3	Weak Efficiency
5	Gujrat	0.866	3	13.4	Strong Efficiency
6	Haryana	1	1	0	Strong Efficiency
7	Jharkhand	0.666	5	33.4	Moderate Efficiency
8	Karnataka	0.898	2	10.2	Strong Efficiency
9	Kerala	0.341	13	65.9	Weak Efficiency
10	Madhya Pradesh	0.353	12	64.7	Weak Efficiency
11	Maharashtra	1	1	0	Strong Efficiency
12	Odisha	0.606	6	39.4	Moderate Efficiency
13	Punjab	0.388	10	61.2	Weak Efficiency
14	Rajasthan	0.322	13	67.8	Weak Efficiency
15	Tamil Nadu	0.549	7	45.1	Moderate Efficiency
16	Telangana	0.537	8	46.3	Moderate Efficiency
17	Uttar Pradesh	0.313	16	68.7	Weak Efficiency
18	West Bengal	0.378	11	62.2	Weak Efficiency
	Average	**0.549**	15	**45.0**	

Source: Author Calculation

Table 2 shows the GCS efficiency result. The efficiency rating ranges from 0 to 1. A state with an efficiency score of 1 is fully efficient, while a score of less than 1 indicates inefficiency. Haryana and Maharashtra are efficient states, according to the efficiency score calculated in the table. As a result, these fully efficient states serve as peers or reference states for both themselves and inefficient states with the aim of efficiency.

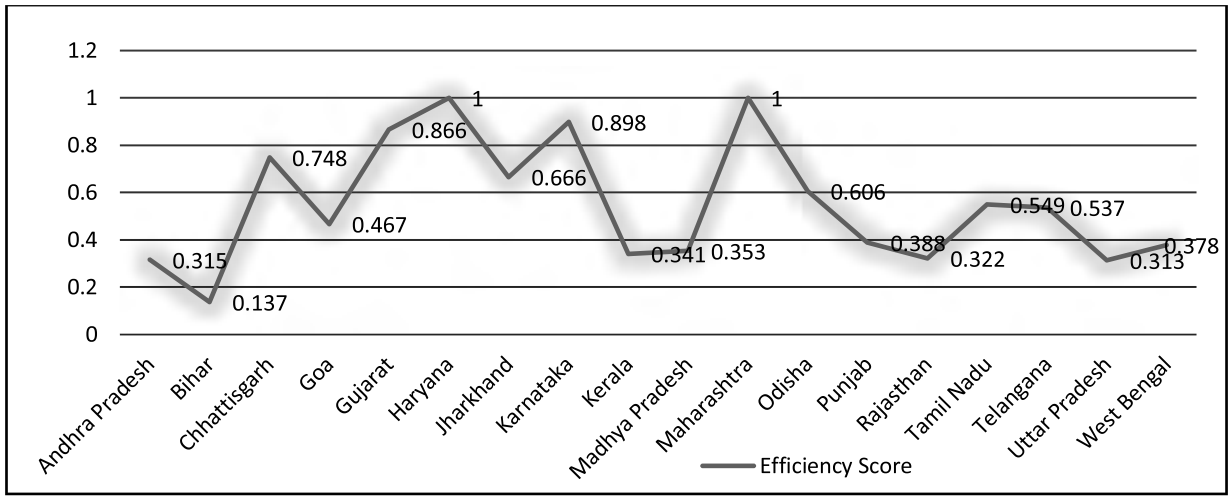
Table No 3: DMUs Reference States and their Weight for General Category States (GCS)

Sl. No	General Category States (GCS)	Reference 1	Weight of Reference 1	Reference 2	Weight of Reference 2
1	Andhra Pradesh	Maharashtra	0.582	Haryana	0.417
2	Bihar	Maharashtra	0.861	Haryana	0.138
3	Chhattisgarh	Maharashtra	0.627	Haryana	0.372
4	Goa	Maharashtra	0.022	Haryana	0.978
5	Gujarat	Haryana	0.833	Maharashtra	0.166
6	Haryana	Haryana	1		
7	Jharkhand	Maharashtra	0.646	Haryana	0.353
8	Karnataka	Haryana	0.811	Maharashtra	0.188
9	Kerala	Maharashtra	0.737	Haryana	0.262
10	Madhya Pradesh	Maharashtra	0.573	Haryana	0.426
11	Maharashtra	Maharashtra	1		
12	Odisha	Maharashtra	0.504	Haryana	0.495
13	Punjab	Maharashtra	0.795	Haryana	0.204
14	Rajasthan	Maharashtra	0.478	Haryana	0.521
15	Tamil Nadu	Maharashtra	0.123	Haryana	0.876
16	Telangana	Maharashtra	0.392	Haryana	0.575
17	Uttar Pradesh	Maharashtra	0.039	Haryana	0.96
18	West Bengal	Maharashtra	0.314	Haryana	0.685

Source: Author Calculation

Table 3 shows the reference states and weights of efficient states as a peer state for inefficient states. Maharashtra, and Haryana are the reference states for Andhra Pradesh, Chhattisgarh, Kerala, Madhya Pradesh, Tamil Nadu, and Uttar Pradesh in the input reduction process.

Figure 3: GST Revenue efficiency score per Rupee Expenditure of General Category States



Source: Author complied the data

Figure 3: GST Collection efficiency score per Rupee Expenditure (General Category States)

In the above graph shows that how efficient or inefficient GCS's states. Highest efficiency score are Maharashtra and Haryana whereas the lowest efficiency is Bihar (0.137) so, the major structural fiscal reform required with a given input.

Table No 4: Regression Analysis of General Category States (GCS)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	P value	Statistical Inference	
		B	Std. Error	Beta			**R = 0.683**	**F value**
1	(Constant)	487620.309	118588.193		4.112	.001	R Square = 0.466	13.980
	Revenue	1.557	.416	.683	3.740	.002	Adjusted R Square = 0.433	Sig = .001

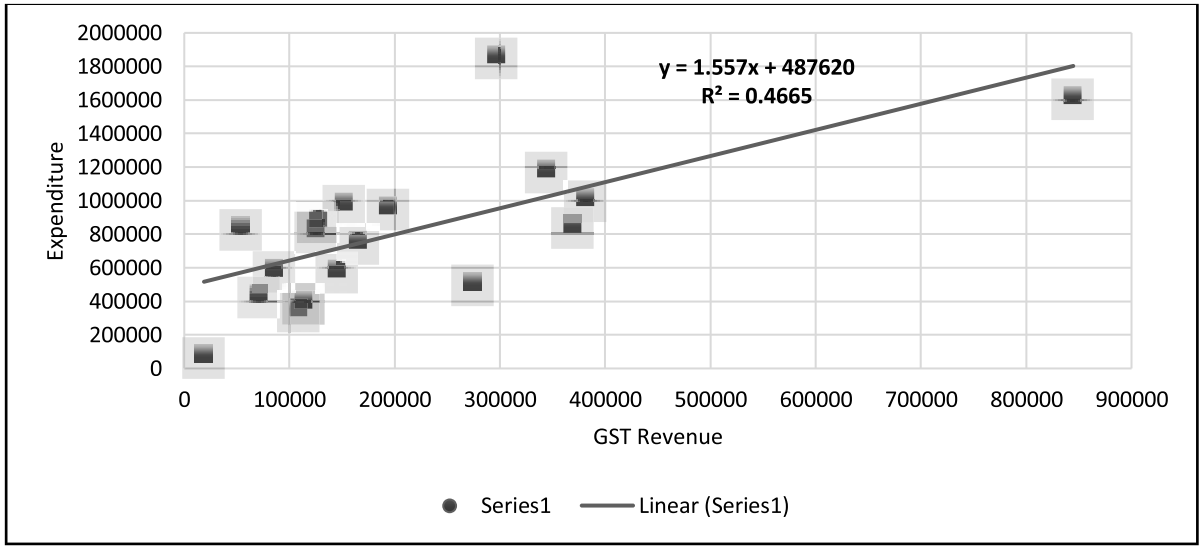
a. Dependent Variable: Expenditure

Source: - Author computed the data

Table 4 summarizes the data envelopment model's performance through linear regression analysis. It is determined that the Adjusted R-square is approximately 43%, indicating that 43% of total expenditure in General Category States (GCS) can be explained by the basis of GST generation. The R-value reflects a score of 0.683, suggesting that the total extent of expenditure in GCS has a positive relationship with the independent variable (GST Revenue). The p-value

is significant, being less than 0.05 [Sig is 0.001], indicating that the model is reliable concerning the dependent variable. The F-value (13.980) is significant, implying that the model is a good fit. A higher value of β indicates a greater impact on the dependent variable (expenditure). The study reveals that GST revenue generation ($p = 0.002$, $\beta = 0.683$) is the most important factor influencing the development of General Category States, given the expenditure. Consequently, infrastructure development can help generate more revenue in these inefficient states.

Figure 4: Regression Plots of General Category States (GCS)



The standardized coefficients Beta column, gives the coefficients of independent variables in the regression equation:

$$y = 1.557x + 487620$$

From the above equation, it is ascertained that there is positive relationship among the independent variable (GST revenue) and dependent variable (Development expenditure and non-development expenditure). If the necessary step to be taken corrective inefficient states which shown in the above *figure 3*.

Table No 5: DEA Analysis of GST Collection Efficiency of Special Category States (SCS)

Sl. No	Special Category States (SCS)	Efficiency score (X)	Rank	Waste of Resources (1/X)	Performance of DMU_0
1	Arunachal Pradesh	0.105	8	89.5	Weak Efficiency
2	Assam	0.409	4	59.1	Moderate Efficiency
3	Himachal Pradesh	0.638	3	36.2	Moderate Efficiency
4	Jammu and Kashmir	0.165	6	83.5	Weak Efficiency

5	Manipur	0.088	9	91.2	Weak Efficiency
6	Meghalaya	0.391	5	60.9	Moderate Efficiency
7	Mizoram	0.085	10	91.5	Weak Efficiency
8	Nagaland	0.071	11	92.9	Weak Efficiency
9	Sikkim	0.995	2	0.5	Strong Efficiency
10	Tripura	0.119	7	88.1	Weak Efficiency
11	Uttarakhand	1	1	0	Strong Efficiency
	Average	**0.369**		**63.03**	

Source: Author Calculation

Table 5 reveals that Sikkim and Uttarakhand have a relative efficiency score of one, signifying their efficiency. Nagaland and Tripura have efficiency scores above 0.5, placing them in the second and third positions, respectively, in the ranking of states according to efficiency score. Arunachal Pradesh, Assam, Himachal Pradesh, Jammu and Kashmir, and Manipur have the lowest efficiency scores, each at 0.071.

The efficiency scores for Special Category States (SCS) have provided a roadmap for improvement. The benchmark states for these improvements are Uttarakhand, Sikkim, Meghalaya, and Mizoram, each with an efficiency score of one. Arunachal Pradesh needs to enhance its efficiency score by 73% by reducing inputs

Table No 6: DMUs Reference States and their Weight for Special Category States (SCS)

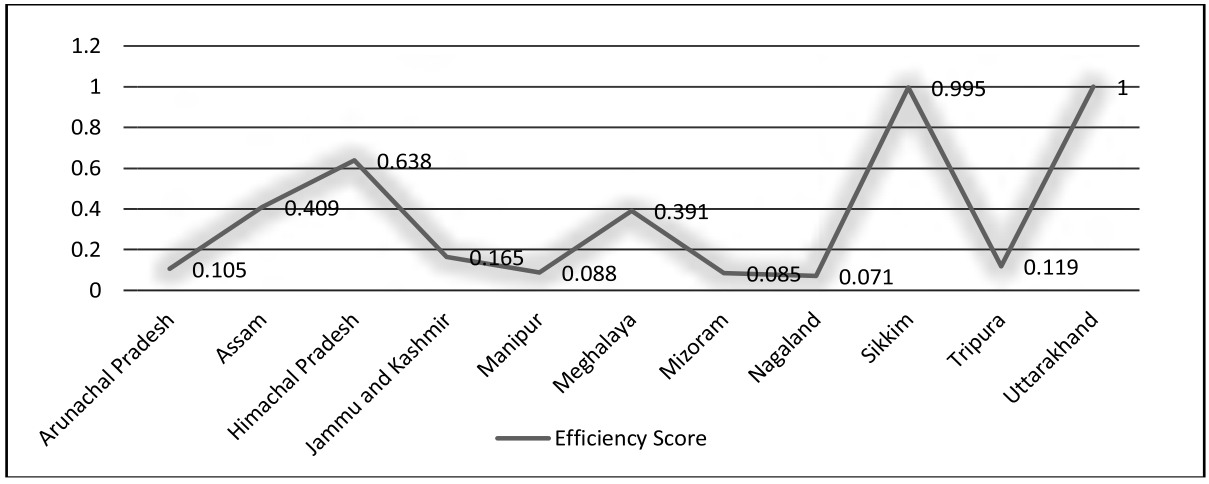
Sl. No	Special Category States (SCS)	Reference 1	Weight of Reference 1	Reference 2	Weight of Reference 2
1	Arunachal Pradesh	Sikkim	1		
2	Assam	Sikkim	0.362	Uttarakhand	0.637
3	Himachal Pradesh	Sikkim	0.547	Uttarakhand	0.452
4	Jammu and Kashmir	Sikkim	0.857	Uttarakhand	0.142
5	Manipur	Sikkim	1		
6	Meghalaya	Sikkim	1		
7	Mizoram	Sikkim	1		
8	Nagaland	Sikkim	1		
9	Sikkim	Sikkim	1		
10	Tripura	Sikkim	1		
11	Uttarakhand	Uttarakhand	1		

Source: Author Calculation

The above table-6 shows that Assam, Himachal Pradesh and Jammu and Kashmir must follow Sikkim and Uttarakhand, which have weights of 0.362 and 0.637, respectively, in reducing

inputs by the specified percentage in order to achieve complete efficiency. Nagaland and Tripura should be consulted by Sikkim to reduce inputs.

Figure 5: GST revenue efficiency score per Rupee Expenditure of Special Category States (SCS)



Sources: Author complied the data

Figure 5: GST Collection efficiency score per Rupee Expenditure (Special Category States)

In the above graph shows that how efficient or inefficient states. Highest efficiency score are Uttarakhand, Sikkim, Mizoram and Meghalaya whereas the lowest efficiency is Nagaland (0.071) so, the major structural fiscal reform required with a given input.

Table No 7: Regression Analysis of Special Category States (SCS)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	P value	Statistical Inference	
		B	Std. Error	Beta			**R = 0.636**	**F value**
1	(Constant)	83213.360	43804.362		1.900	.090	R Square = 0.404	6.117
	Revenue	3.914	1.582	.636	2.473	.035	Adjusted Square = 0.338	Sig = 0.035

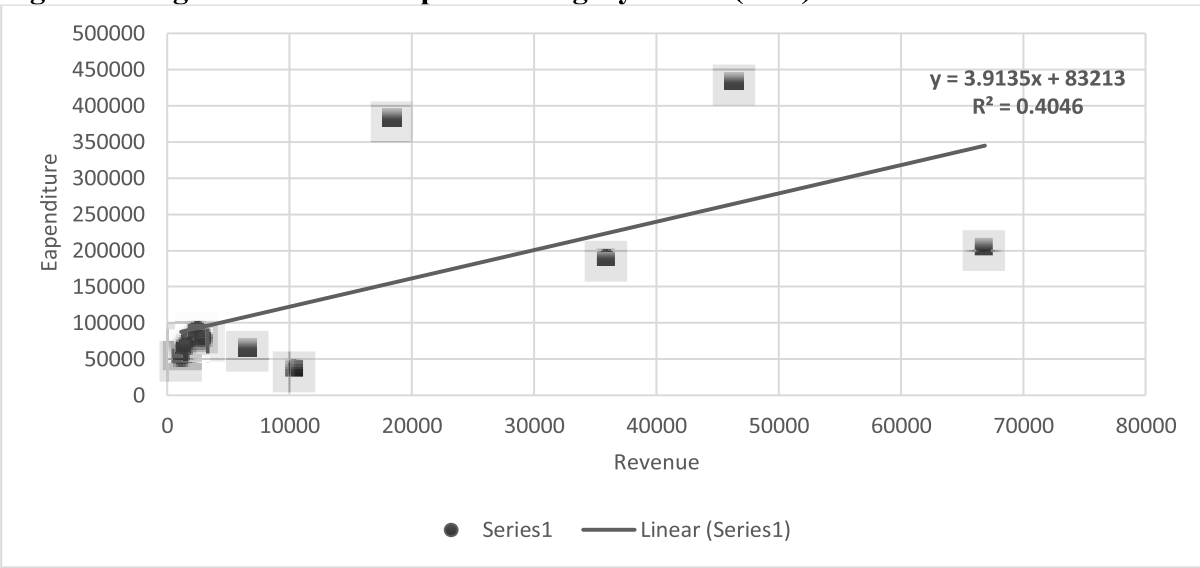
a. Dependent Variable: Expenditure

Source: Author computed the data.

Table-7 The above table summaries the model performance through linear regression analysis. It is ascertained that Adjusted R square is about 3.38%, which states that 3% of the total variability in the GST revenue are explained by the development expenditure and non-development expenditure. R-value refelects the score of 0.636, which states the positive

relationship among the dependent variable and independent variable. F-value is significant which is less then 0.05, [Sig is 0.035] reflects that the model is reliable as dependent variable.

Figure 6: Regression Plots of Special Category States (SCS)



The standarized cofficients Beta column, gives the coefficients of independent variables in the regression equation: y = 3.9135x + 83213.

Findings of the Study

In terms of GST revenue collection efficiency among General Category States (GCS), it is evident from the figure that Maharashtra (21.78%) is collecting the highest tax revenue, followed by Haryana, Karnataka, Gujarat, and Tamil Nadu.

• In terms of GST revenue collection efficiency among Special Category States (SCS), it is evident from the figure that Uttarakhand (34.34%) is collecting the highest tax revenue, followed by Assam, Himachal Pradesh, Jammu and Kashmir, and Sikkim.

• In the case of GCS, Maharashtra (21.78%) is one of the best-managed states, with the highest output and the lowest inputs. Meanwhile, among the SCS, Uttarakhand (34.34%) is likely to be among the best-performing states in terms of management practices.

• As a result, the average efficiency score for GCS is 54.9%, indicating 45% resource wastage, whereas the average efficiency score for SCS is 0.369, indicating 63.03% resource wastage.

• Among GCS, Haryana has been a peer state for inefficient states seventeen times, while Maharashtra has been a reference state for inefficient states seventeen times. The weight value represents the importance of peer states for inefficient ones.

• In the case of SCS, Nagaland is recommended to consult Sikkim to reduce inputs by 92.9 percent. Arunachal Pradesh, Assam, Himachal Pradesh, Jammu and Kashmir, Manipur, and Tripura, on the other hand, have been recommended to reduce their inputs by 89.5 percent, 59.1 percent, 36.2 percent, 83.5 percent, 91.2 percent, and 88.1 percent, respectively.

• The Adjusted R-square is about 43%, indicating that 43% of total expenditure in General Category States (GCS) can be explained by the basis of GST generation. The R-value reflects a score of 0.683, signifying the positive relationship between the total extent of expenditure in GCS and the independent variable (GST Revenue).

• The Adjusted R-square is about 3.38%, signifying that 3% of the total variability in GST revenue is explained by development expenditure and non-development expenditure. The R-value reflects a score of 0.636, indicating a positive relationship between the dependent variable and the independent variable

Suggestions of the Study

The GST provision results in revenue loss, particularly in states with abundant natural resources (e.g., minerals, fossil fuels) such as Jharkhand, Odisha, Chhattisgarh, and Madhya Pradesh, as well as in states where value-added from manufacturing activities is not fully retained within the state's boundaries (e.g., Himachal Pradesh, Uttarakhand). These states could face serious fiscal difficulties beyond the GST compensation period unless this issue is effectively addressed within our intergovernmental fiscal transfer structure.

• Corrective measures can be taken by both the central and state governments, such as minimizing distortions and facilitating compliance, as well as implementing anti-evasion activities against fake billers, which will enhance GST collection.

• To assist tax officers in administration, the use of artificial intelligence and machine learning can be employed to provide newer data and plug revenue leakages.

• An assessment of "rate rationalization" methods, such as the merging of tax rate slabs, which are intended to simplify the rate structure and involve the introduction of special rates within the tax system.

• Identification of potential sources of taxable goods and services that are still hidden from the GST tax perspective.

• Simplification in the GST returns filing procedure should be pursued to simplify GSTR filing and provide an easy IT interface. This would facilitate user-friendly and timely compliance, thereby boosting revenue collections and fulfilling the objectives of GST, including improving the ease of doing business.

Conclusion

The study aimed to examine whether Indian states are effectively collecting GST revenue through the use of Data Envelopment Analysis (DEA). All Indian states were divided into two categories for the study: eighteen general category states (GCS) and eleven special category states (SCS) separately. The average relative efficiency score for states is 0.549, indicating that they are 54.9 percent efficient in collecting tax revenue. SCS, on the other hand, collects its taxes with a 36.9 percent efficiency rate.

While inefficient tax collection is a reality in many Indian states, achieving 100% efficiency is not impossible. Sustainable growth of GST is necessary over time. Tax sustainability means a long-term goal of achieving efficient performance in Indian states. However, beginning in July 2017, India implemented GST as a reform of indirect taxes. A sustainable GST system will help achieve the vision of a $5 trillion Indian economy. As a result, this study sets a goal for the new tax regime to attain 100 percent efficiency in the use of inputs by increasing its tax revenue to Gross State Domestic Product (GSDP), reducing tax collection expenditure to GSDP, or both.

References

Abraham Charnes, W. W. (1978). Measuring the efficiency of decision making units. *European Journal of Operational Research. 2 (6), 2*(6), 429-444.

Adam, A. M. (2011). Public Sector Efficiency: Leveling the Playing Field between OECD Countries. *Public Choice, 146*(1), 163-183.

Aizenman, J. a. (2008). The Collection Efficiency of the Value Added Tax: Theory and International Evidence. *Journal of International Trade and Economic Development, 17*(3), 391-410.

Bhattarai, K. (2017). Impacts of GST reforms on efficiency, growth and redistribution of income in India: A Dynamic CGE Analysis. *ASSA/AIEFS*, 1-42.

CFI, T. (2022, April 26). *Regression Analysis*. Retrieved from https://corporatefinanceinstitute.com/resources/knowledge/finance/regression-analysis/

Charnes A, C. W. (1979). Measuring the efficiency of decision-making units. *European Journal of Operational Research: A short communication, 3*(4), 339.

Charnes, A. W. (1978). Measuring the efficiency of decision making units. *European Journal of Operational Research, 2*, 429-444.

Chen, S. C. (2009). Data Envelopment Analysis for Performance Evaluation: A Child's Guide. *Benchmarking for Performance Evalution, Springer, New Delhi*, 75-116.

D.J Aigner, C. L. (1977). Formulation and estimation of stochastic frontier production functions. *Journal of Econometrics*, 21-37.

Friedman, M. (1987). The Limitation of Tax Limitation. *Policy review (Summer)*, 7-14.

Goode, R. (1981). Some Economic Aspects of Tax Administration. *IMF Staff Papers, 28*(3), 249-274.

Gurave Singh, G. K. (2020). Sustainability growth of GST in Indian Economy-Past, Present & Future. *International Journal of Research in Finance and Management, 3*(2), 22-26.

Kanukuntla, H. (2015). *What are Special Category States? – The History & other Details.* New Delhi: Planning Commission, Finance Commission of India , PRS Legislative Research, India Budget Portal .

M.Seiford, W. D. (2009). Data envelopment analysis (DEA) – Thirty years on. *European Journal of Operational Research, 192*(1), 1-17.

Mtasiwa, A. M. (2016). Factors Causing Inefficiency on Tax Revenue Collection in Tanzania. A Case of Tanzania Revenue Authority Located in Temeke Tax Region. *International Journal of Humanities and Cultural Studies*(3), 1883-1893.

O'Donnell, C. J. (2018). Deterministic Frontier Analysis. *Productivity and Efficiency Analysis* , 281-324.

Panda, A. K. (2016). Estimation of Tax Buoyancy among Indian States: A Comparative Analysis of Pre and Post VAT Period. *Journal of Economic Policy & Research, 11*(2), 4-13.

Petersen, P. A. (1993). A Procedure for Ranking Efficient Units in Data Envelopment Analysis. *Management Science, 39*(10), 1261-1264.

Raghbendra Jha, M. S. (1999). Tax Efficiency in selected Indian states. *Empirical Economics*, 642-654.

Ranjan Kumar Mohant, B. K. (2018). Examining the Eco-Macroeconomic Performance . *National Institute of Public Finance and Policy*, 1-2.

Research, A. (2021). Evaluation of Tax Administration Efficiency: Data Envelope Analysis (DEA). *SSRN*, 1-40.

Rout, P. B. (2021). Tax Collection Efficiency of Indian States: A DEA Approach. *Orissa Journal of Commerce, 42*(1), 78-91.

Sahoo, D. A. (2016). Dynamic Macroeconomic Performance of Indian States: Some Post-Reform Evidence. *Regional Growth and Sustainable Development in Asia*, 181-197.

Simwaka, A. C. (2012). Tax policy developments, donor inflows and economic growth in Malawi. *Journal of Economics and International Finance, 4*(7), 159-172.

Singh, A. N. (2018). A Comprehensive Analysis of Goods and Services Tax. *Indian Journal of Finance*, 58-72.

Thanassoulis, E. R. (1987). Relative Efficiency Assessments Using Data Envelopment Analysis: An Application to Data on Rates Departments. *The Journal of the Operational Research Society, 38*(5), 397-411.

William W. Cooper, L. M. (2011). *Data Envelopment Analysis: History, Models and Interpretations* . Austin: Worcester Polytechnic Institute, Worcester, MA 01609 USA.

Wiseman, A. P. (1979). Approaches to the analysis of government expentiure growth. *Public Finance Quarterly*, 3-23.

EVALUATING THE EFFECTIVENESS OF SEGMENT REPORTING: AN ANALYSIS OF INDIAN SELECTED PUBLIC AND PRIVATE SECTOR BANKS

CMA Dr. Jeelan Basha V*

Sharanappa Kilarahatti**

Abstract

A firm reporting by segments leaves more information in the hands of stakeholders and helps to improve the quality of decisions undertaken by them. IND AS 108 in India mandates listed and other companies to report information by segments. The focus of the study is to evaluate the segment reports of selected public and private sector banks. Source of the study is gathered from annual reports of respective banks for the period of 2012-2021. Empirical results reveal that in segments assets, majority banks wholesale corporate and treasury business segments have more than 1/3 of total assets, while other banking business of all banks have negligible percentage of total assets. IB has the highest amount of total assets are from retail business segments. More than 50% of results are from retail and treasury business segment of majority banks. Other banking business results are varying from 0% of CB to 26.82% of Axis bank of total results. Wholesale corporate business segments have the worst and negative results in all banks except Canara Bank.

Keywords: Segment Report. Segment Revenue, Segment Results and Segment Assets.

Introduction

The International Accounting Standards Board established IFRS 8 (Operating Segments) to improve economic decision-making for investors by providing more clear and transparent financial information.

IND AS 108 aims to regularly review the results of a company's operating segments through its Chief Operating Decision Maker to evaluate its performance and allocate resources effectively.

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(IASB, 2013). Financial statement information is crucial for its intended audience. Segment reporting disclosure (SR) enhances investor understanding by presenting a more comprehensive view of the material information for each part of the company (Geltmeyer, 2010). The extent of disclosure is influenced by several factors, among which corporate governance (CG) has garnered heightened attention in recent times (Agyei-Mensah, 2012).

Segment reporting disclosure enhances the relevance of financial information and performance for each segment to meet the needs of its users, leading to more effective and efficient decisions. Furthermore, it is stated that segment reporting information has significant value that is relevant to a company's share price, which can be utilized by external users to predict stock prices and make investment decisions (Mardini, Tahat, & Power, 2018)

The growth of large companies has been characterized by the diversity of their business and geographical operations, which has led to the need for a more comprehensive form of accountability and disclosure. Segment reporting has gained recognition as a valuable form of disclosure, both domestically and internationally, as it provides investors with valuable information to make informed decisions. It is a crucial aspect of overall corporate disclosure practices.

Globalization and intense competition have made stakeholders more focused on in-depth analysis of company reports. Many companies are also expanding their operations into various segments. A consolidated financial statement does not offer classified information on the performance of a company's different segments, leading to the hiding of information on the performance of individual segments. The lack of complete information on segment performance makes it challenging for stakeholders to make important decisions. Therefore, it is imperative to make segment information readily available to enable stakeholders to make informed economic decisions. Major accounting institutions, including the International Accounting Standard Committee and the Institute of Chartered Accountants of India, have instituted accounting standards that mandate the disclosure of segment reporting information.

Review of Literature

Palakasari and Prasetyo (2021) examined the relationship between experience with ERP and segment reporting and corporate performance using decision-usefulness theory. They found that both ERP and segment reporting experience have a positive and significant impact on corporate performance, both individually and combined.

Tran et.al., (2021) sought to investigate the factors that influence segment reporting disclosure. They found that the size of the board and the proportion of foreign members on the board have a positive effect on segment reporting disclosure.

Jeelan Basha V et al., (2021) revealed that Infosys has been experiencing a slow growth in its MFG, ECS, and RCL segment revenues, despite having a strong performance in its geographical segments. The study concluded that HCL and Mindtree were found to be the best performers across all segments.

Roy and Das (2019) discovered that TCS has been consistently improving in their segment reporting over the years. They have effectively classified their business and geographical segments and have been following the appropriate accounting standard for segment reporting in their financial statements. Additionally, the company has been utilizing the segment reporting information to make important investment decisions.

Shetiya and Saraf (2017) study found that reporting segment data is crucial not only for investors, but also for the long-term growth of the company and the business economy. The study also found that profitability, growth and risk vary depending on the sector and geographical area. Segment reporting provides valuable data for stakeholders to evaluate each unit of business and it highlights which segments are contributing or detracting from the overall value of the firm.

Obradovic and Karapavlović (2016) research revealed that financial institutions tend to provide more extensive quantitative segment information compared to other companies operating in the Republic of Serbia and that firms with larger assets tend to offer more comprehensive segment information. The study implies that there is ample scope for enhancing the practices of external segment reporting in the Republic of Serbia. These results could be of great value for regulators, financial statement preparers and auditors in making informed decisions.

Lucchese and Di Carlo (2016) research findings indicate that the new standard did not lead to substantial changes in the level of segment disclosures as compared to the previous IAS 14R

standard, thus not meeting the expectations set forth by the IASB. Furthermore, their analysis using fixed-effect regression revealed that the level of segment disclosure is inversely related to factors such as growth rate, size, profitability, and ownership diversity

Alanezi et al (2016) study found that the average level of operating segment disclosure was 54%, with a range of 3% to 95%. The research also revealed that companies listed on the KSE that demonstrated a higher degree of compliance with IFRS 8 operating segment disclosure requirements which were likely to be larger in size, demonstrate higher levels of growth and be audited by a reputable Big-4 audit firm.

Julia Alves E Souza and colleagues (2016) studied the factors that impact the disclosure of information regarding the operating segments of Brazilian companies. The study concluded that factors such as company size, debt level, corporate governance, and audit quality significantly influence the level of information disclosed about operating segments in Brazil.

Altaf (2014) evaluated the effect of segment reporting on stock market performance and analyzed the practices of Nifty 50 companies. Results showed that changes in share price are influenced by business segments, geographical segments, EPS, and book value. The P-value for EPS suggests it is a significant factor in explaining these changes, as does the P-value for book value.

Ibrahim and Jaafar (2013) found no correlation between audit committee variables and level of compliance with IFRS 8. Only the attribute of separating board leadership was found to impact voluntary disclosure.

Jalila J and Devi S (2012) results showed that higher family and founding family ownership positively impacted segment disclosure, whereas ownership by GLC, foreign entities and widely dispersed ownership had no significant effect. The research concluded that audit firm size, listing status, and leverage had a significant impact on segment disclosure.

Statement of the Problem

Although some investors possess the knowledge of securities analysis and portfolio management, they are not equipped with the knowledge of segment reporting, which is necessary to analyze a company's financial statements both horizontally and vertically. Hence, an attempt is made to undertake a study on “Evaluating the Effectiveness of Segment Reporting: An Analysis of Indian Selected Public and Private Sector Banks”. This study undoubtedly helps the stakeholders to make appropriate decision with respect to investment policies.

Need for the Study

Several studies have focused on the examination of consolidated and standalone financial statements, however, there has been limited research on the operating segments and geographical segments of a company. These segments provide a comprehensive and accurate representation of each unit's financial stability, profitability, and viability, which is crucial for investors to make informed decisions. Thus, the need for a study on this subject becomes imperative.

Objective of the Study

1. To evaluate the segment reports of selected public and private sector banks in India

Hypothesis development

H_0: There are no significant differences between the means of different segments of bank in segment revenue, segment results, and segment assets.

Research Methodology

The study utilized exclusively secondary data from the annual reports of the selected banks over a period of 10 years (2012-13 to 2021-22). The sample consisted of 6 banks, with three each from the public sector (State Bank of India, Bank of Baroda, and Canara Bank) and private sector (ICICI, Axis Bank, IndusInd Bank). The collected data for the study is presented, tabulated, analyzed and interpreted using both descriptive and inferential statistical tools for analysis.

Results and Discussion

Table No 1: Bank-wise Average Annual Segments Assets to Total Assets

Segments Assets (Crores)							
Segments	**Descriptive**	**Public Sector**			**Private Sector**		
		SBI	**BOB**	**CB**	**ICICI**	**AXIS**	**IB**
Business Segments:							
Treasury	Mean	27.01	39.78	30.33	35.71	35.67	28.08
	CV	0.13	0.19	0.29	0.06	0.06	0.10
	CAGR	0.02	0.03	0.00	-0.01	-0.01	-0.02
Wholesale Corporate Business	Mean	34.06	39.78	41.80	32.79	34.54	27.42
	CV	0.15	0.19	0.09	0.15	0.11	0.16

	CAGR	-0.01	0.03	-0.03	-0.04	-0.03	0.03
Retail Business	Mean	38.33	31.35	27.87	23.01	29.69	44.50
	CV	0.08	1.45	0.30	0.33	0.18	0.06
	CAGR	-0.01	0.03	0.06	0.09	0.06	-0.01
Other Banking Business	Mean	0.60	10.30	0.00	8.48	0.11	0.00
	CV	0.64	1.54	0.00	0.20	0.23	0.00
	CAGR	0.00	-0.31	0.00	-0.05	0.03	0.00
Geographical Segments:							
Domestic	Mean	88.28	72.79	92.14	84.21	83.84	NA
	CV	0.01	0.10	0.02	0.40	0.06	NA
	CAGR	0.00	0.02	0.00	0.00	0.01	NA
International	Mean	11.72	27.21	7.86	16.16	9.12	NA
	CV	0.09	0.27	0.22	0.31	0.24	NA
	CAGR	0.00	-0.05	0.05	-0.08	-0.05	NA

Sources: Author's Compilation

Figure No 1: Graphical representation of CV of Segment Assets

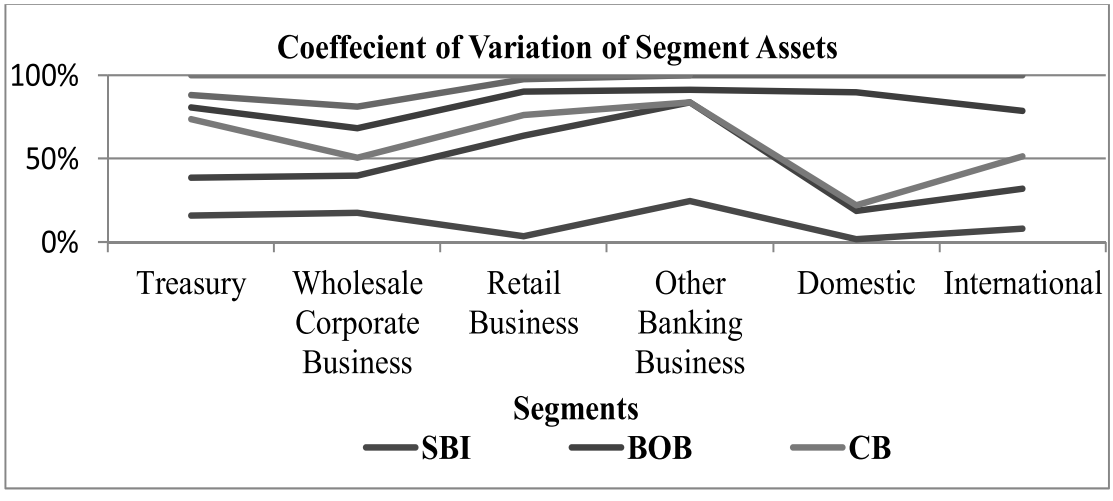
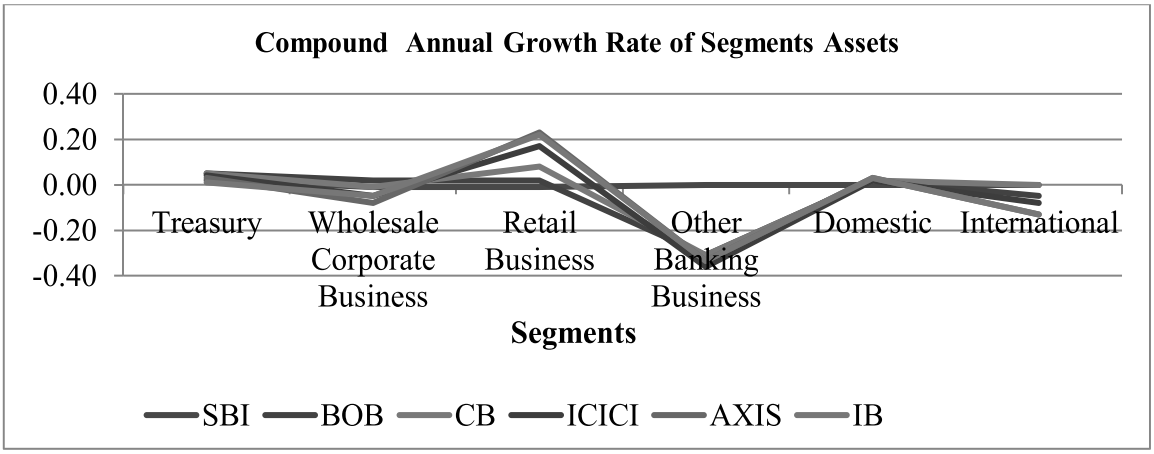


Figure No 1: Graphical representation of CAGR Segment Assets



More than 1/3 of total assets of BOB, ICICI and Axis banks are treasury business segments assets. All banks except IB whose wholesale corporate business segments are more than 1/3 of total assets. IB has the highest total assets are from retail business segments. Other banking business of all banks except BOB and ICICI, have negligible percentage of total assets. BOB has 3% CAGR in treasury, wholesale corporate business and retail business segments. All banks except BOB have consistency of segment assets. All banks except SBI and IB have CAGR of retail business segment. Lion's share of total assets of all selected banks is from domestic segments. CB has growth rate of 5% in international business segment.

Table No 2: Bank-wise Average Annual Segments Revenue to Total Revenue

Segment Revenue (Crores)							
Segments	**Descriptive**	**Public Sector**			**Private Sector**		
		SBI	**BOB**	**CB**	**ICICI**	**AXIS**	**IB**
Business Segments:							
Treasury	Mean	24.73	28.74	25.86	37.84	44.36	14.51
	CV	0.15	0.15	0.08	0.04	0.31	0.54
	CAGR	0.04	0.03	0.01	-0.01	-0.10	0.00
Wholesale Corporate Business	Mean	31.38	37.68	42.01	26.51	22.09	23.87
	CV	0.14	0.09	0.15	0.19	0.13	0.54
	CAGR	-0.03	-0.01	-0.04	-0.05	0.00	0.00
Retail Business	Mean	41.08	27.18	32.12	32.89	32.49	41.40
	CV	0.07	0.15	0.19	0.20	0.37	0.53

	CAGR	-0.01	0.03	0.04	0.05	0.11	0.00
	Mean	2.40	6.40	0.00	2.75	1.07	0.22
Other Banking Business	CV	0.70	0.88	0.00	0.19	0.38	0.65
	CAGR	0.00	-0.12	0.00	-0.06	0.12	0.00
Geographical Segments:							
	Mean	95.51	88.37	97.81	93.30	95.10	NA
Domestic	CV	0.01	0.02	0.00	0.03	0.02	NA
	CAGR	0.00	0.01	0.00	0.01	0.00	NA
	Mean	4.49	11.63	2.19	6.70	4.90	NA
International	CV	0.18	0.18	0.22	0.41	0.31	NA
	CAGR	-0.03	-0.06	-0.01	-0.14	-0.12	NA

Sources: Author's Compilation

Figure No 2: Graphical representation of CV of Segment Revenue

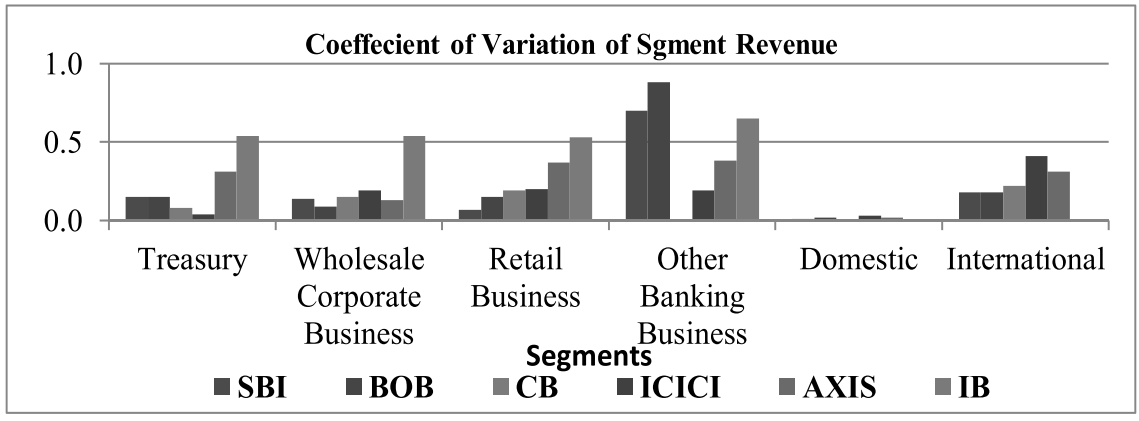
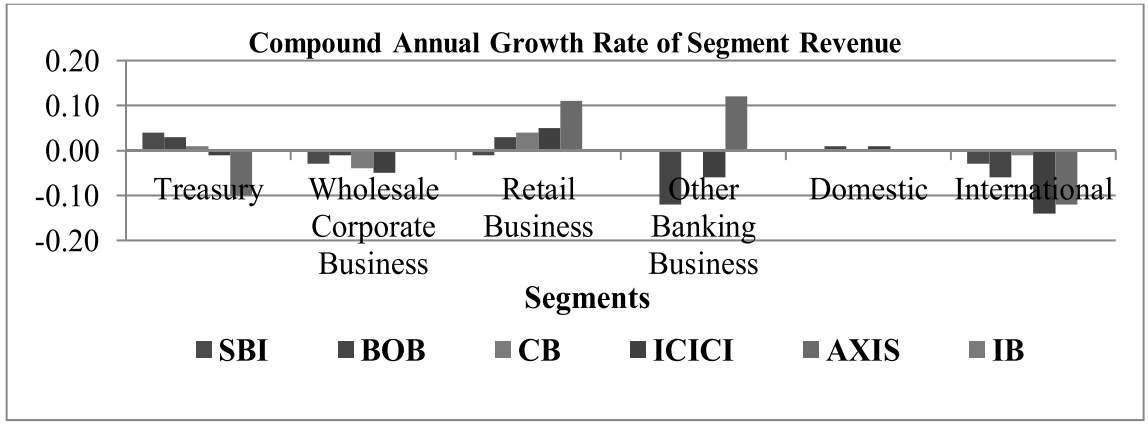


Figure No 2: Graphical representation of CAGR of Segment Revenue



All banks except Axis bank and IB have more than 25% of total revenue in treasury, wholesale corporate and retail business segments. They have consistency in revenue generation of all

segments. No growth in wholesale corporate business of all banks. Retail business has revenue growth in all banks except SBI, which has revenue growth in treasury business segments. Axis bank has the highest 12% growth rate of total revenue. All banks have more or less domestic revenue business more than 90% of total revenue. There is decline rate of international business revenue.

Table No 3: Bank-wise Average Annual Segments Results to Total Results

Segment Results (Rs. Crores)							
Departments	**Descriptive**	**Public Sector**			**Private Sector**		
		SBI	**BOB**	**CB**	**ICICI**	**AXIS**	**IB**
Treasury	Mean	91.97	76.63	45.28	63.96	73.44	10.05
	CV	2.10	1.75	1.02	0.65	2.04	0.34
	CAGR	0.00	0.14	0.33	0.06	0.10	0.09
Wholesale Corporate Business	Mean	-122.42	-86.64	16.73	-22.47	-60.07	29.16
	CV	-3.46	-2.43	4.02	-4.54	-5.10	0.10
	CAGR	-0.05	0.00	0.00	-0.10	-0.13	-0.02
Retail Business	Mean	119.08	90.61	37.99	52.45	62.79	60.51
	CV	1.76	0.79	0.59	1.19	1.70	0.04
	CAGR	-0.05	0.06	0.12	0.14	0.12	-0.01
Other Banking Business	Mean	14.07	18.66	0.00	6.06	26.82	0.29
	CV	1.78	1.29	0.00	0.60	1.94	0.45
	CAGR	0.00	-0.20	0.00	-0.06	0.14	0.00

Sources: Author's Compilation

Figure No 3: Graphical representation of CV of Segment Results

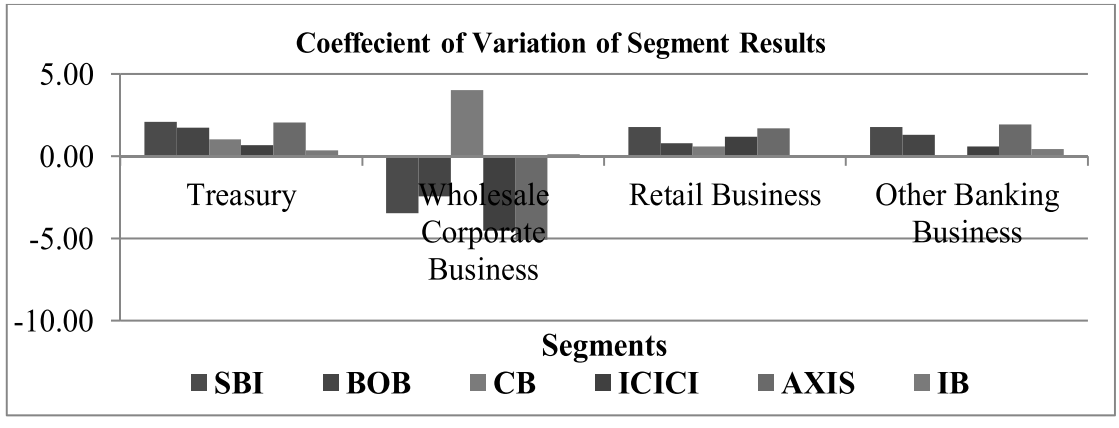
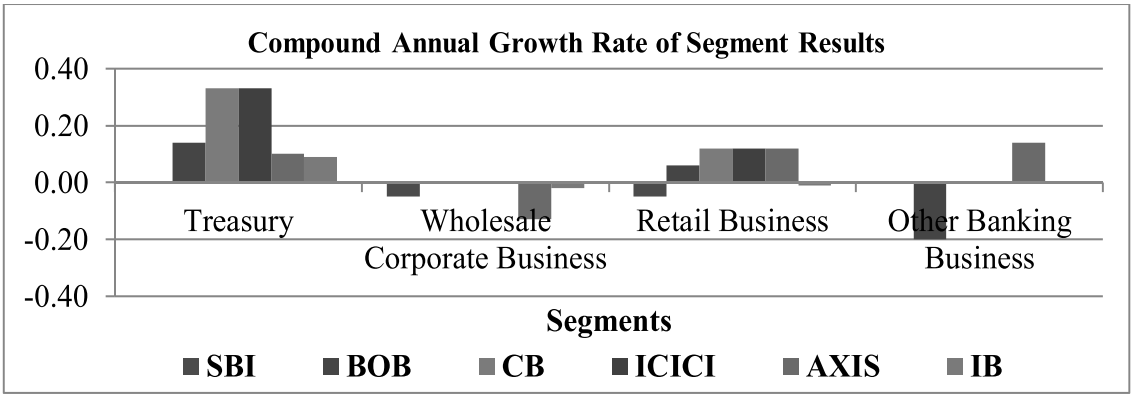


Figure No 3 Graphical representation of CAGR of Segment Results



About 92% of total results of SBI has the highest treasury result. All banks have growth rate ranging from 33% of CB to 0.0% of SBI. IB is the only bank has wholesale corporate business results with compound decline rate. Retail business results of all banks are with maximum 119.08 of SBI and minimum 37.99 of CB while SBI and IB has compound decline rate. IB is the only bank has consistency in all segments result as against SBI and Axis bank. SBI, BOB and Axis have about more than 15% of results from other banking business.

Table No 4: Correlation Matrix

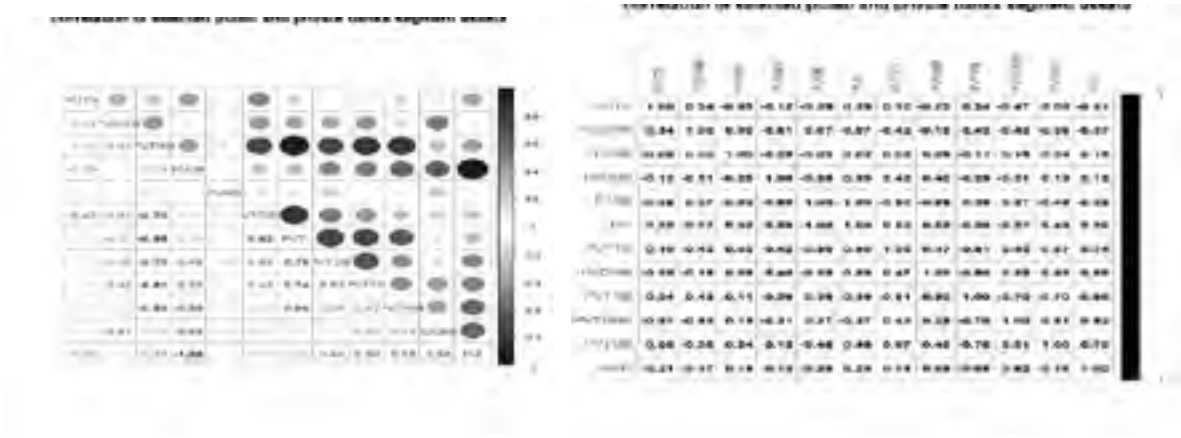
Table No 4.1: Segment Assets

Correlation Matrix						
Segments	*Treasury*	*Corporate Wholesale Business*	*Retail business*	*Other Banking Business*	*Domestic Segment*	*International Segment*
Public Sector Banks:						
Treasury	1					
Corporate Wholesale Business	0.11759	1				
Retail business	-0.51384	0.32649	1			
Other Banking Business	-0.59619	-0.52256	-0.34674	1		
Domestic Segment	0.21279	-0.49582	0.00204	-0.22638	1	
International Segment	-0.21279	0.49582	-0.00204	0.22638	-1	1
Private Sector Banks:						
Treasury	1					

Corporate Wholesale Business	0.43742	1				
Retail business	-0.84279	-0.84658	1			
Other Banking Business	0.41447	0.82487	-0.77754	1		
Domestic Segment	-0.34712	0.40727	-0.04285	0.33385	1	
International Segment	0.4941	0.90599	-0.85483	0.9564	0.38478	1

Sources: Author's Compilation

Figure No 4.1: Graphical Representation of Boxplots of Segment Assets



Most of segment assets have weak positive and negative relationship with each other in public sector banks. Corporate wholesale business segment assets has strong relationship with majority of other segment assets in private sector banks. Other banking business segment assets has strong positive relationship with international segment assets in private sector banks.

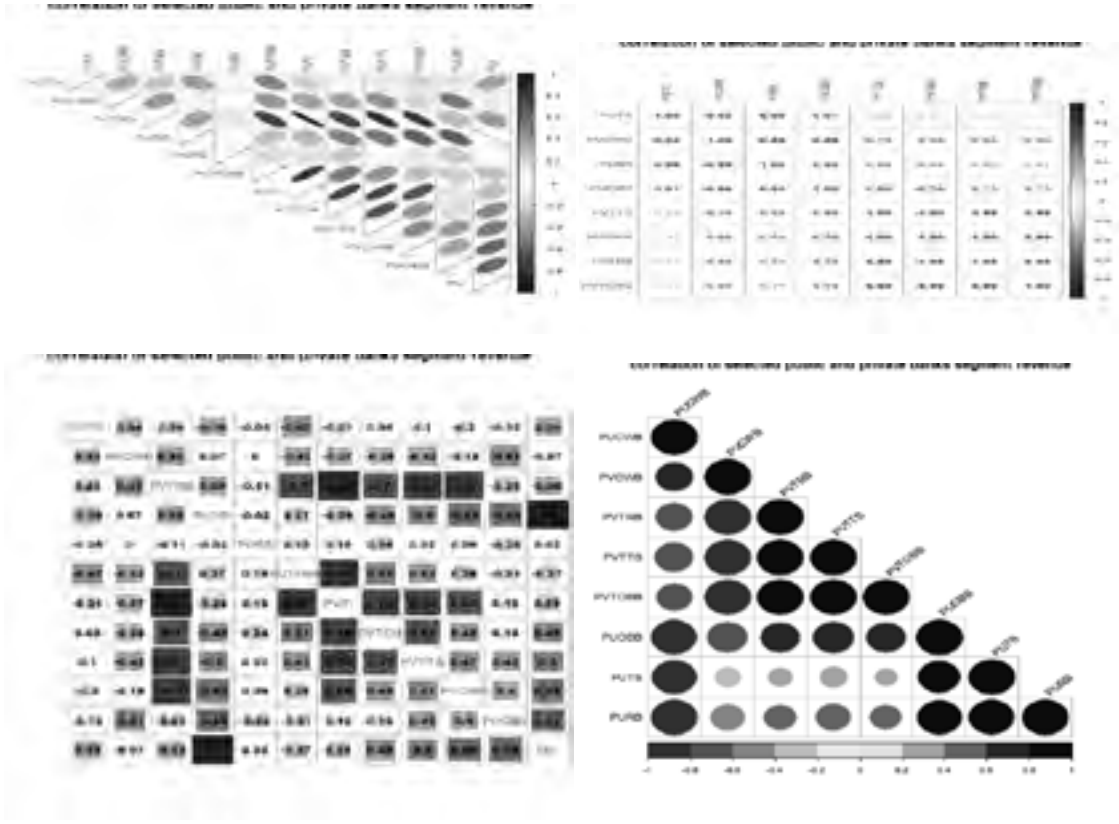
Table No 4.2: Segment Revenue

Correlation Matrix						
Segments	*Treasury*	*Corporate Wholesale Business*	*Retail business*	*Other Banking Business*	*Domestic Segment*	*International Segment*
Public Sector Banks:						
Treasury	1					
Corporate Wholesale Business	-0.65314	1				
Retail business	0.28123	-0.87871	1			
Other Banking Business	-0.60153	0.19872	-0.1156	1		
Domestic Segment	0.36486	-0.63841	0.63027	-0.20699	1	

International Segment	-0.36486	0.63841	-0.63027	0.20699	-1	1
Private Sector Banks:						
Treasury	1					
Corporate Wholesale Business	0.39813	1				
Retail business	-0.29092	0.57676	1			
Other Banking Business	0.15286	0.69388	0.41403	1		
Domestic Segment	-0.67784	0.03087	0.82307	0.00782	1	
International Segment	0.67784	-0.03087	-0.82307	-0.00782	-1	1

Sources: Author's Compilation

Figure No 4.2: Graphical Representation of Boxplots of Segment Revenue



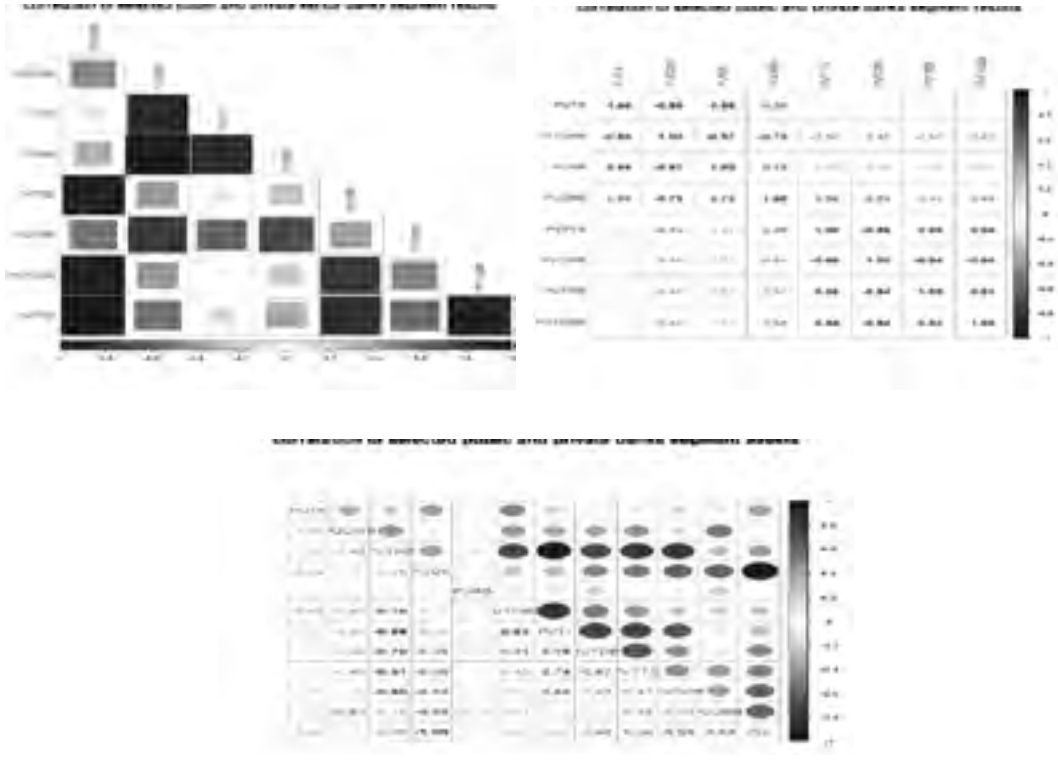
In both sector banks, treasury segment revenue has weak positive and negative relationship with all the segments. Retail business segment revenue has strong relationship with domestic segment revenue in private sector banks. Rest of the segment revenue department has weak positive and negative relationship.

Table No 4.3: Segment Results

Correlation Matrix				
Segments	*Treasury*	*Corporate Wholesale Business*	*Retail business*	*Other Banking Business*
Public Sector Banks:				
Treasury	1			
Corporate Wholesale Business	-0.95648	1		
Retail business	0.93884	-0.9287	1	
Other Banking Business	0.64001	-0.74986	0.63247	1
Private Sector Banks:				
Treasury	1			
Corporate Wholesale Business	-0.98685	1		
Retail business	0.90262	-0.95933	1	
Other Banking Business	0.97494	-0.97123	0.89478	1

Sources: Author's Compilation

Figure No 4.3: Graphical Representation of Boxplots of Segment Results

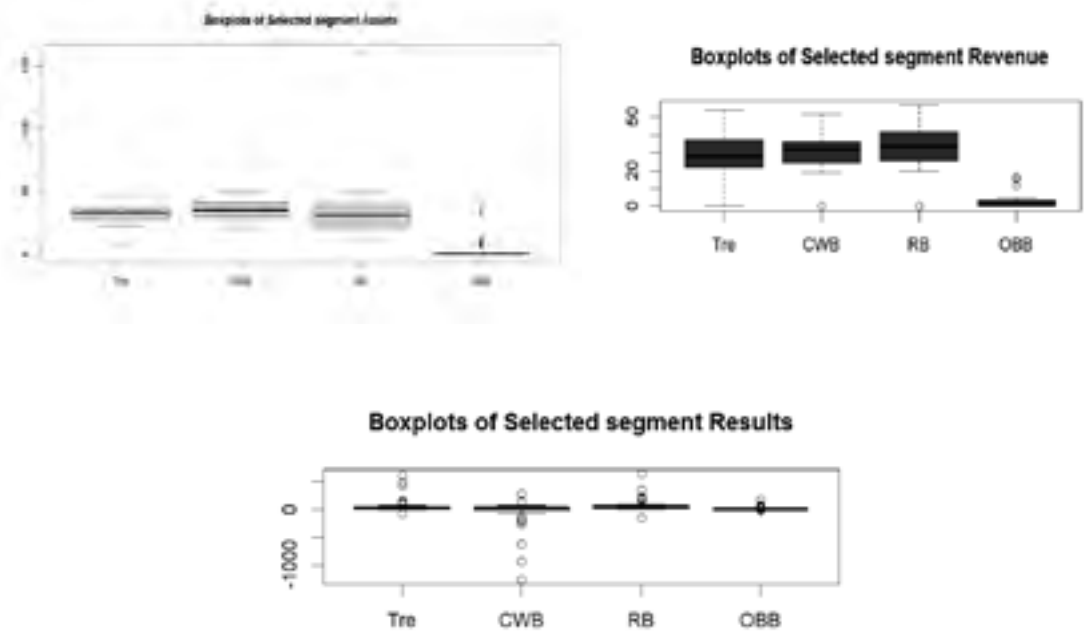


In both the sectors, treasury segment results has strong relationship with retail business and other banking business segment and negative with corporate wholesale business segments. Retail business has strong positive relationship with other banking business segment in both the sectors. Rest of them has strong negative relationship.

Table No 5: ANOVA

P Value			
Variables	**Assets**	**Revenue**	**Results**
Business Segments:			
Sectoral Banks (Public and Private Banks)	0.435	0.434	0.996
Banks (Six Banks)	0.695	0.676	1.000
Four Segments	0.000	0.000	0.000
Geographical Segments:			
Sectoral Banks (Public and Private Banks)	0.003	0.040	NA
Banks (Six Banks)	0.947	#NUM!	NA
Four Segments	0.000	0.000	NA

Figure No 5.1: Graphical Representation of Boxplots of Segment Assets, Revenue and Results



In business segment, there are no significant differences among segment assets, revenue and results of sectoral banks and banks except segments. Hence, null hypothesis is accepted.

In geographical segments, significant difference among segment assets, revenue and results of sectoral banks and segment except among banks as their p value are less than 5% level of significant.

Conclusion

The purpose of this study is to analyse the segment reports of selected public and private sector banks during the period of 2012-2021. In segments assets, majority banks wholesale corporate and treasury business segments have more than 1/3 of total assets, while other banking business of all banks have negligible percentage of total assets. IB has the highest amount of total assets are from retail business segments. BOB has 3% CAGR in treasury, wholesale corporate business and retail business segments. In segment revenue, all banks except Axis bank and IB have more than 25% of total revenue in treasury, wholesale corporate and retail business segments. No growth rate is in wholesale corporate business revenue. Except SBI, retail business has revenue growth in all banks. Axis bank has 12%, the highest growth rate in total revenue. More than 50% of results are from retail and treasury business segment of majority banks. Other banking business results are varying from 0% of CB to 26.82% of Axis bank of total results. Wholesale corporate business segments have the worst and negative results in all banks except Canara Bank. Lion's share of total assets, revenue and results of all selected banks is from domestic segments. There is decline rate in international business revenue, despite 5% growth rate of segment revenue of CB.

References:

Heri Palakasari and Andrian Budi Prasetyo (2021) The Influence of Experience in Using ERP (Enterprise Resource Planning) and Segment Reporting on Corporate Performance (Empirical Study of Manufacturing and Construction Companies Listed on the Indonesia Stock Exchange in the Period of 2017-2019). *International Journal of Arts and Social Science,* Volume 4, Issue 5, Pp 300- 310.

Quoc Thinh TRAN Et al (2021) The Effects of Corporate Governance on Segment Reporting Disclosure: A Case Study in Vietnam. Journal of Asian Finance, Economics and Business, Vol 8, Issue 4, Pp 763-767.

Jeelan Basha V, Bhadrappa Haralayya and Nitesh S Vibhute (2021) Analysis of Segment Reporting with Reference to Selected Software Companies. Journal of Advanced Research in Entrepreneurship, Innovation and SMES Management, Vol 4, Issue 2, Pp 9-26.

Gayatri Guha Roy and Bhagaban Das (2019) Segment Reporting Practices in India: A Case Study of TCS. Emerging Economy Studies, Vol 5(1), Pp 55–62.

Mahavir M. Shetiya and Dr. Parag Saraf (2017) A Study of Segment Reporting Practice in India. International Education & Research Journal [IERJ], Vol 3, Issue 6, Pp 199-200.

Vladimir Obradović and Nemanja Karapavlović (2016) External Segment Reporting in the Republic of Serbia. Economic Themes, Vol 54(1), Pp 155-176.

Manuela Lucchese and Ferdinando Di Carlo (2016) The Impact of IFRS 8 on Segment Disclosure Practice: Panel Evidence from Italy. International Journal of Accounting and Financial Reporting ISSN 2162-3082, Vol. 6, No. 1 Page No 96-126.

Faisal S. Alanezi1 et al (2016) Operating Segments (IFRS 8)-Required Disclosure and the Specific-Characteristics of Kuwaiti Listed Companies. International Business Research, Vol 9, No 1, Page No 136-153.

Júlia Alves e Souza et al (2016) Segment Reporting in Brazil: Factors Influencing the Disclosure. International Journal of Business Management and Economic Research (IJBMER), Vol 7(6), Page No 804-816.

Nufazil Altaf (2014) Impact of Segment Reporting on Stock Market Performance. Journal of Business Management & Social Sciences Research (JBM&SSR), Volume 3, No 6, Page No 64-70.

Kabir Ibrahim and Hartini Jaafar (2013) Corporate Governance and Disclosure on Segment Reporting: Evidence from Nigeria. Proceedings of Global Business and Finance Research Conference, Howard Civil Service International House, Taipei, Taiwan, ISBN: 978-1-922069-34-4, Pp 1-19.

Jalila J and Devi S (2012) Ownership structure effect on the extent of segment disclosure: evidence from Malaysia. Procedia Economics and Finance, Vol 2, Pp 247-256.

IMPACT OF DIGITAL PLATFORMS IN RAISING DIGITAL FINANCIAL INCLUSION EVIDENCE FROM PANDEMIC EFFECT

Mr. Himalaya Singh*

Dr. Shilpa Vardia**

Abstract

Financial inclusion refers to the capacity of individuals and organizations to gain access to advantageous and less expensive financial goods and services that satisfy their demand for transactions, payments, savings, deposits and insurance - delivered over time responsibly and sustainably. While the pandemic creates new opportunities for the economy, it also hurts human life. In this context, researchers have made an effort to examine how digital platforms have improved digital financial inclusion using data from rural and urban youth. The findings about the result indicate that there is an exquisite effect on financial know-how and gender, as well as a significant difference between digital platforms and economic inclusion at some point during the Pandemic and before the Pandemic.

Keywords: Financial Knowledge, Financial Inclusion, Digital Platforms, Digital Financial Inclusion

Introduction

The COVID-19 fitness disaster has created new opportunities for digital monetary services to accelerate monetary inclusion amid social distancing. With the growing popularity of mobile devices, our daily lives have significantly changed, particularly in terms of monetary transactions. Several industries have recently adopted mobile payments on a large scale. In 2021, m-payments will make up 36% of international factors of sales spending, and by 2023, that percentage will have increased to 52%.

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The massive lockdown was prompted by the health crisis, according to the United States government, which chose restrictive containment measures like lockdowns, quarantines, travel restrictions, and other measures to keep the spread of the virus under control.

Through business lockdowns and reopening, fintech, including mobile money, can help people and organizations maintain and expand access to financial offerings. It has created a new avenue for contactless and cashless transactions, which reduces the spread. The pandemic has significantly sped up the adoption of digital payments and seen lending options grow at an exponential rate, resulting in the widespread inclusion of social groups who have not been well-served by conventional economic practices. During the Pandemic, people began to prefer safer methods of conducting financial transactions, increasing the use of digital and contactless payments. Most people now use digital wallets to conduct online transactions. Few people are hesitant to transfer money using digital wallets. Industry experts have referred to e-commerce as the most effective help machine provided to people in cities that have been placed under lockdown to combat the pandemic. With the increased adoption of digital payments, the pandemic has accelerated the push toward digitalization. It is essential to take steps to convert higher digitalization with dreams of monetary inclusion. This will make it easier to deploy digital price acceptance services more widely in as-yet-untapped areas, thereby fostering the development of an ecosystem for digital payments. In conclusion, the research uncovers exhibits that have an impact on digital platforms in promoting digital financial inclusion based on socio-demographic factors that take into account the formative years of rural and urban areas.

Review of Literature

According to research findings from **Benni (2021),** digital finance (and particularly mobile money) has already established itself as a crucial enabler of financial inclusion in developing and emerging economies, particularly when it comes to reaching and providing for the most marginalized and underserved people. Following the pandemic, the rapid increase in interest in fintech solutions (on the part of governments, businesses, and the general public) is bound to have significant implications in terms of increased potential for digital channels to promote global financial inclusion.

According to **Douglas W. Arner, Janos N. Barberis, Julia Walker, Ross P. Buckley, Andrew M. Dahdal, and Dirk A. Zetzsche (2020),** as quarantine procedures are implemented

in most countries, millions of people around the world are being restricted from leaving their homes, a phenomenon known as "social distancing." People's habits are changing as a result of this. This shift can be seen in the significant increase in e-commerce activity, People have been forced to use digital financial services and payment platforms as a key component of the online commercial sphere.

According to **Ratna Sahay, Ulric Eriksson von Allmen, Amina Lahreche, Purva Khera, Sumiko Ogawa, Majid Bazarbash, and Kim Beaton (2020),** technology is changing the landscape of the financial sector, increasing access to financial services in profound ways**.** Nearly all nations in the world are affected by these changes, which have been ongoing for years. Despite social isolation and containment measures, technology has produced new opportunities for digital financial services to accelerate and improve financial inclusion during the COVID-19 pandemic. Furthermore, as digital financial services evolved before COVID-19, the risks that surfaced at that time have become even more significant.

Ital Agar, Soledad Martinez Peria, and Celine Rochon (2020) define the COVID-19 pandemic and the need for social distancing in their article 'Digital Financial Services and the Pandemic: Opportunities and Risks for Emerging and Developing Economies'**.** Digital financial services enable social distancing, allow governments to quickly and effectively disburse funds to those in need, and enable many households and businesses to quickly access online payments and financing. But if the use of digital financial services is expanded quickly during times of crisis without the proper regulations and safeguards, the risks to stability and integrity—always present—might become more severe. The use of digital financial services should be increased, but efforts should be made to prevent widening existing user divides.

Research Problem

Financial inclusion aims to make financial services and products available and reasonable for all people and businesses, regardless of their wealth or scale of business. The goal of financial inclusion is to lower the obstacles that prevent people from engaging with the financial system and utilizing its products to better their lives. However, some studies have revealed that in our society, economically marginalized groups of the population are typically not included in the financial system. They are deprived of financial inclusion, and their livelihoods are typically not monetized. Furthermore, they are not well informed about the banking services that are

offered; on the other hand, banking officials are not well informed about the requirements and capabilities of the people covered by this section. As a result, banks cannot bring them under the financial inclusion umbrella. Researchers highlighted some research questions, such as

1) How does financial literacy affect young people?
2) What effects does financial inclusion have on COVID-19 before and after?
3) What about the significant impact of digital platforms on increasing the level of digital financial inclusion among rural people?

Research Objectives

1) To assess young people's familiarity with digital platforms.
2) To assess the role of digital platforms in increasing financial inclusion both before and during the pandemic.

Research Variables

The study examines the knowledge of digital platforms and financial inclusion among young people in rural areas using demographic variables. It examines how young people learn about digital platforms and how they use them. It also examines the impact of financial inclusion on society, both before and during the COVID-19 pandemic.

Research Hypotheses

The researcher developed some hypotheses based on increased financial inclusion due to the use of digital platforms among the selected respondents, with special consideration given to pandemic situations and the emergence of online transactions.

1) Ho: The levels of financial knowledge among rural youth before and during the pandemic were the same.
2) Ho: Before and during the pandemic, rural youth had the same level of access to financial services.
3) Ho: The attitudes of rural youth toward financial services were the same before and during the pandemic.

4) Ho: The improved opportunities for time effectiveness in financial services among rural youth are the same.
5) Ho: The levels of financial literacy (interest calculation, loan instalment, settlement, and so on) among rural youth were the same before and during the pandemic.

Research Methodology

In the study, primary and secondary data were both used. Questionnaires were used to collect primary data from the selected youth. Secondary information was gathered from journals, magazines, newspapers, and the internet. A questionnaire is used as a data collection method and collects demographic information. The population is the total number of youth. Samples refer to the sum of selected youth from rural areas and general questions about digital platform knowledge and financial inclusion. To select respondents, the researcher used a convenient sampling technique. The chosen youth are classified according to their age, education, and profession. The selected youth who use digital platforms and financial inclusion services. Initially, 215 questionnaires were given out, and 136 respondents completed them. Only 100 out of the total questionnaires were found to be valid for further investigation. Software such as SPSS and MS Excel are used for data analysis.

Table No 1: Demographic Variant Using Descriptive Statistics Analysis.

(A) Gender Wise		
Male		Female
42(42%)		58 (58%)
(B) Qualification Wise		
UG	PG	Ph.D., Ph.D. CAPh.D.CA/CS, CA/CS pursuing
87(87%)	10 (10%)	3 (3%)
(C) Age-wise		
Less than 25 years	25 To 40 year	40 to 60 years
94 (94%) (D) Locality	6 (6%)	0 (0%)
Urban	Semi-Urban	Rural
19(19%)	37 (37%)	44 (44%)

(E) Current Status		
Students	Employee	Others
64(64%)	25 (25%)	11 (11%)

The demographic information is shown in the table above. To gather information about the respondent's demographics, this study selects gender, age, location, education, and current status. According to the data in the table above, 42 per cent of respondents are male and 58 per cent are female. The age has been divided into three categories. The majority of respondents are between the ages of 18 and 25. There are three options for the qualifications. Most of the respondents are graduates. This study selects three current status options. According to the table value, 64% of respondents are students, and 44% live in rural areas.

Data Analysis and Interpretation

Table No 2: Influence of Digital Platforms in Uplifting Financial Knowledge among Rural Youth before and during Pandemic Situations Paired Sample Correlations.

Paired Sample Correlations

Pair 1	**N**	**Correlations**	**Sig.**
Financial Knowledge Before & During the Pandemic	100	0.547	0.00

Paired Sample Test

Paired Differences				**95% Con. interval of diff.**		**t**	**Degree of**	**Sig. (2-tailed)**
Pair 1	**Mean**	**S. D**	**S.E.M**	**Lower**	**Upper**		**Freedom**	
Financial Knowledge Before & During the Pandemic	0.28	0.72	0.071	0.42	-0.14	0.3.967	99	0.00

Because the p-value obtained is less than 0.05, it can be concluded that digital platforms have a greater influence in improving financial knowledge among rural people during pandemic situations than before the pandemic period.

Table No 3: Influence of Digital Platforms on Improved Financial Services Access among Rural Youth before and during Pandemic Situations.

Pair 1	N	Correlations	Sig.
Financial Service Access Before and During the Pandemic	100	0.52	0.00

Paired Sample Test

Paired Differences				95% Con. interval of diff.		t	Degree of Freedom	Sig. (2-tailed)
Pair 1	Mean	S.D	S.E.M	Lower	Upper			
Financial Service Access Before and During the Pandemic	0.25	0.68	0.067	-0.37	-0.12	-3.65	99	0.00

Since the p-value was less than 0.05, it can be concluded that digital platforms have a significant impact on improving rural youth's access to financial services and that this impact is greater during pandemic situations than it was before the pandemic period.

Table No 4: Influence of digital platforms on better utilization of financial services among youth before and during pandemic situations

Pair 1	N	Correlations	Sig.
Utilize financial services among youth before and during the pandemic	100	0.48	0.00

Paired Sample Test

Paired Differences				95% Con. interval of diff.		t	Degree of Freedom	Sig. (2-tailed)
Pair 1	Mean	S.D	S.E.M	Lower	Upper			

Utilize financial services among youth before and during the pandemic	0.24	0.72	0.0703	-0.38	-0.100	-3.41	99	0.01

Since the p-value (0.001) obtained is less than 0.05, it can be said that digital platforms have a significant impact on rural youth's better use of financial services during pandemic situations as compared to before the pandemic situations.

Table No 5: Influence of digital platforms in better possibilities of time effectiveness in utilization of financial services among rural youth before and during pandemic situations.

Paired Sample Correlations

Pair 1	**N**	**Correlations**	**Sig.**
Time effectiveness before and Time effectiveness during the pandemic	100	-0.271	0.22

Paired Sample Test

Paired Differences						**t**	**Degree of Freedom**	**Sig. (2-tailed)**
				95% Con. interval of diff.				
Pair 1	**Mean**	**S.D**	**S.E.M**	**Lower**	**Upper**			
Time effectiveness before & Time effectiveness during a pandemic	0.45	1.15	0.25	-0.054	0.97	1.865	99	0.076

The p-value (0.076) found is greater than 0.05, so it can be said that there is no significant impact of digital platforms on better opportunities for time effectiveness in the use of financial services by rural youth. This indicates that financial services are not always timely and effective before and during pandemic situations.

Table No 6: Influence of digital platforms on the improvement of financial literacy among rural youth before and during pandemic situations.

Paired Sample Correlations

Pair 1	N	Correlations	Sig.
Financial literacy before the pandemic and Financial literacy during the pandemic	100	0.65	.00

Paired Sample Test

Paired Differences						t	Degree of Freedom	Sig. (2-tailed)
				95% Con. interval of diff.				
Pair 1	Mean	S.D	S.E.M	Lower	Upper			
Financial literacy before the pandemic and Financial literacy during pandemic	0.25	.64	0.062	-0.37	-0.12	-3.80	99	.00

Since the p-value (0.001) obtained is less than 0.05, it can be said that digital platforms have a significant impact on improving financial literacy among rural youth during pandemic situations, and this influence is greater than it was before the pandemic period.

Findings

1. Digital structures have improved financial statistics in rural areas during pandemic conditions compared to the pandemic period.
2. Digital structures in accelerated monetary careers gain admission amongst rural adolescents, and their prevalence is higher at some point in the pandemic state of affairs than it was previously.
3. When compared to previous pandemic situations, rural adolescents use digital platforms more for monetary offerings during pandemic conditions.

4. Digital systems have a higher chance of being time efficient in the use of monetary offerings amongst rural youth. To achieve efficiency during pandemic situations, there is some lack of time effectiveness.
5. Digital systems have improved financial literacy among rural adolescents during pandemic conditions, and it is higher than before the pandemic.

Suggestions

1. Before using digital platforms, it is necessary to read the terms and conditions provided by the digital platforms.

2. Promote financial literacy services in banks to increase access to digital platforms.

3. Increasing economic literacy among young people in rural areas requires classified ads.

4. It is critical to increase the use of digital infrastructure in rural areas to reduce pandemic effects there. Therefore, campaigns are carried out with the help of the government or other organizations to boost confidence and spread information about the same.

5. Due to some social issues or difficulties in gaining access to technological devices, it takes too long to access financial options.

References

Bacao, Y. Z. (2021). How Does the Pandemic Facilitate Mobile Payment? An Investigation on Users' Perspective under the COVID-19 Pandemic. How Does the Pandemic Facilitate Mobile Payment? An Investigation on Users' Perspective under the COVID-19 Pandemic.

Benni, N. (2021). Digital finance and inclusion in COVID-19. Digital finance and inclusion in COVID-19.

Douglas w. Arner Janos N. Barberis, j. w. (2020). Digital finance & the COVID crises. Digital Finance, COVID-19 and Existential Sustainability Crises: Setting the Agenda for the 2020s.

Itai Agur, S. M. (2020). Digital Financial Services and the Pandemic: Opportunities and Risks for Emerging and Developing Economies. Services and the Pandemic: Opportunities and Risks for Emerging and Developing Economies.

Rahna sahay, U. E. (2020). The promise of Fintech: Financial inclusion in the post-COVID-19 era. The promise of Fintech: Financial inclusion in the post-COVID-19 era.

Zhang, L. y. (2020). Digital Financial Inclusion and Sustainable Growth of Small and Micro.

Enterprises-Evidence Based on China's New Third Board Market Listed Companies. Digital Financial Inclusion and Sustainable Growth of Small and Micro Enterprises-EvidenceBased on China's New Third Board Market Listed Companies

PERFORMANCE EVALUATION OF GOLD EXCHANGE TRADED FUNDS (GOLD ETFS): VAR MODEL

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Abstract

Gold is chosen as an investment option by investors who are very cautious and get affected by the fluctuations in the debt and equity market. Investors who prefer to invest in gold need not necessarily hold the gold in physical form; they can invest electronically in gold exchange traded funds. The study analyses the performance of the selected 5 Gold Exchange Traded Funds in India. The period of the study is from February 2019 to August 2022.Value at Risk (VaR) model is undertaken to study the performance of the selected Gold ETFs.

Keywords: Gold Exchange Traded Funds, VaR Model, Performance Evaluation

Introduction

Exchange-traded funds, or ETFs, are funds that are exchanged directly on a stock exchange. The ETF's trading price is correlated with the underlying asset's net asset value (NAV). So, for instance, for a Gold ETF, its underlying asset would be gold, and the ETF's price would fluctuate in line with the price of gold. ETFs offer exposure to a portfolio of stocks, bonds, or commodities (such as gold or silver) that are traded on a stock market in the form of units. ETFs have certain characteristics of an equity share in addition to having the same fundamental nature as a mutual fund scheme that mimics the performance of the index. The majority of ETFs in India follow the NIFTY indexes or the BSE Sensex. An ETF is set up in a similar way to how mutual fund units are created. During daily market hours, the units may be purchased or sold directly on any exchange trading platforms. .ETFs provide investors the chance to put money into a fund that tracks the performance of a selection of securities (generally an index). On the exchange, units of this fund can be easily purchased or sold. Similar to an equity share, the price is set by a willing

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seller and a willing bidder. Therefore, throughout trading hours, the price of an ETF would fluctuate based on how much the underlying stock' prices changed.

The Benchmark Asset Management Company Pvt. Ltd. conceived the idea of the real modern gold ETF in India in 2002 and submitted a proposal to the Securities Exchange Board of India (SEBI). A few years later, this suggestion was ultimately accepted, and the first Indian gold ETF was introduced in 2007. More than a dozen different gold ETFs are currently listed on the NSE in India, where they are managed by some of the country's top asset management firms and are traded on a daily basis.

Gold ETFs are passive investment products that are based on gold prices and invest in gold bullion with the goal of tracking the domestic physical gold price. Gold ETFs are securities that track actual gold, which may be in the form of paper or in a dematerialized form. One gram of actual, ultra-high purity gold serves as the backing for each unit of the gold ETF. They mix the simplicity of gold investments with the flexibility of stock investing.

Advantages of Gold ETFs

- Gold ETFs are less expensive than other options to gain price exposure to the gold price
- Transactions can be made quickly with Demat account
- Investors have no storage or security concerns as they are held in demat form
- Price transparency while selling.
- Suitable even to small investors as investment can be done in small quantities
- There is so sales tax or VAT imposed on Gold ETFs
- Can be traded like stocks in the stock exchange and is eligible for long term capital gains after one year, whereas for the physical gold the eligibility for long term capital gains is three years.

Review of literature

Prabhdeep Kaur and Jaspal Singh (2020) compares the relative efficiency of gold traded funds (ETF) to Indian spot gold and gold futures using a set of standard threshold co-integration data.

These findings show that gold futures, spot gold, gold ETFs, and gold ETFs have long-term convergence.

Sathish Kumar B and Ram Raj G (2019) undertook an empirical study on Gold Vs Gold Exchange Traded Fund in India and found that gold exchange traded funds have more return compared to physical gold. They conducted a correlation analysis between physical gold and Gold ETFs and found a positive relationship among them.

Dr. J K Raju, Mr. Manjunath B R and Mr. Rehaman M (2018) conducted a study on the performance of gold ETFs in India by applying evaluation techniques like Sharpe, Treynor and Jensen and have ranked the best performing gold ETFS in India, with the purpose of helping investors to make the right investment.

Methodology

The present study attempts to analyse the performance of 5 Gold ETFs listed in the National Stock Exchange. The study was based on secondary data. To analyse the performance of the selected Gold ETFs the monthly NAV of the funds from 01-02-2019 to 01-08-2022 were taken. For the purpose of performance evaluation, to compare the return from the portfolio, Value at Risk Model was undertaken. VaR is a metric to measure decline in the market value or the possibility of a portfolio incurring loss over a specific time period and with a specific probability. This implies, VaR is a measure which is specifically focuses on the downside risk in investment. Thus, VaR calculates the maximum loss expected (or the worst-case scenario) on an investment over a given time period with specified degree of confidence. Alpha is a metric for calculating the extra return a portfolio generates when compared to the market after required risk adjustments. It also demonstrates how a portfolio manager may choose securities for a portfolio more effectively. A portfolio that has a positive alpha value has outperformed the market on a risk-adjusted basis. An alpha number that is negative indicates that the portfolio underperformed the market. Beta assesses systematic (irreversible) risk. It also demonstrates how a security's price responds to market forces. It examines the extent to which the market has an influence on the return of the fund.

Data Analysis and Interpretations

Period	SBI Gold ETF	IDBI Gold ETF	Axis Gold ETF	Kotak Gold ETF	Quantum Gold Fund	NIFTY 50 (^NSEI)
01-02-2019	--	--	--	--	--	--
01-03-2019	0.268	0.011	0.013	0.003	-0.005	-0.001
01-04-2019	-0.040	-0.040	-0.044	-0.035	-0.036	0.076
01-05-2019	0.003	-0.014	-0.005	0.012	-0.001	0.005
01-06-2019	0.007	0.002	0.017	-0.001	0.014	0.019
01-07-2019	0.043	0.072	0.044	0.041	0.038	-0.010
01-08-2019	0.028	0.030	0.033	0.037	0.036	-0.066
01-09-2019	0.114	0.181	0.109	0.123	0.103	-0.009
01-10-2019	-0.025	-0.054	-0.032	-0.031	-0.035	0.051
01-11-2019	0.031	-0.027	0.036	0.031	0.044	0.032
01-12-2019	-0.014	-0.009	-0.017	-0.021	-0.018	0.021
01-01-2020	0.140	0.040	0.029	0.042	0.023	0.005
01-02-2020	-0.060	0.056	0.075	0.011	0.045	-0.047
01-03-2020	0.030	0.049	-0.003	0.054	0.033	-0.021
01-04-2020	0.084	-0.009	0.045	0.051	0.049	-0.246
01-05-2020	0.054	0.111	0.109	0.083	0.081	0.111
01-06-2020	-0.024	0.100	-0.017	-0.009	-0.022	0.020
01-07-2020	0.045	-0.078	0.024	0.025	0.044	0.061
01-08-2020	0.101	0.166	0.052	0.100	0.091	0.071
01-09-2020	-0.032	-0.066	0.039	-0.028	0.000	0.037
01-10-2020	-0.031	-0.064	-0.056	-0.038	-0.052	-0.009
01-11-2020	-0.002	0.030	0.006	0.017	0.004	0.029
01-12-2020	-0.035	-0.040	-0.047	-0.049	-0.043	0.117
01-01-2021	0.028	0.029	0.032	0.030	0.033	0.071
01-02-2021	-0.022	-0.032	-0.025	-0.014	-0.024	-0.017
01-03-2021	-0.062	-0.038	-0.061	-0.074	-0.063	0.069
01-04-2021	-0.020	-0.028	-0.029	-0.019	-0.030	0.007
01-05-2021	0.037	0.044	0.046	0.036	-0.031	-0.021
01-06-2021	0.045	0.022	0.045	0.054	0.130	0.079
01-07-2021	-0.049	-0.029	-0.049	-0.042	-0.042	0.008
01-08-2021	0.027	0.023	0.028	0.021	0.018	0.008
01-09-2021	-0.017	-0.014	-0.017	-0.023	-0.014	0.083
01-10-2021	-0.020	-0.020	-0.020	-0.016	-0.021	0.020
01-11-2021	0.031	0.021	0.014	0.034	0.033	0.014
01-12-2021	0.000	0.002	0.014	-0.018	0.008	-0.038
01-01-2022	0.004	0.019	0.009	0.023	0.995	0.017
01-02-2022	-0.007	-0.012	-0.012	-0.014	-0.014	0.008
01-03-2022	0.052	0.047	0.057	0.047	0.060	-0.053
01-04-2022	0.024	0.019	0.033	0.020	0.013	0.051
01-05-2022	0.004	0.014	-0.007	-0.003	0.013	-0.029
01-06-2022	-0.019	-0.027	-0.017	-0.011	-0.026	-0.020
01-07-2022	0.001	0.013	-0.001	-0.004	0.006	-0.054

01-08-2022	0.010	-0.005	0.003	0.017	0.008	0.098
Average Monthly Return	**0.017**	**0.012**	**0.011**	**0.011**	**0.034**	**0.013**
Total Return	**0.732**	**0.493**	**0.455**	**0.461**	**1.441**	**0.548**
Yearly Return	**0.209**	**0.141**	**0.130**	**0.132**	**0.412**	**0.156**
Total risk (σ)	**0.060**	**0.055**	**0.040**	**0.040**	**0.158**	**0.061**

Correlation Matrix	**SBI Gold ETF**	**IDBI Gold ETF**	**Axis Gold ETF**	**Kotak Gold ETF**	**Quantum Gold Fund**	**NIFTY 50 (^NSEI)**
SBI Gold ETF	1.000					
IDBI Gold ETF	.448*	1.000				
Axis Gold ETF	.521*	.676*	1.000			
Kotak Gold ETF	.628*	.781*	.853*	1.000		
Quantum Gold Fund	.104	.192	.223	.281	1.000	
NIFTY 50 (^NSEI) (rim)	**-.168**	**-.045**	**-.162**	**-.153**	**-.013**	1.000
Sample size	42	± .304		Critical value .05 (two-tail)		
Systematic Risk (β)	**-0.014**	**-0.003**	**-0.009**	**-0.008**	**-0.003**	
Unsystematic Risk	**0.073**	**0.059**	**0.049**	**0.049**	**0.161**	
Alpha (α)	**0.018**	**0.012**	**0.011**	**0.011**	**0.034**	
VaR-Z value 90% Confidence Level	**0.076**	**0.071**	**0.051**	**0.051**	**0.202**	
95% Confidence Level	**0.098**	**0.091**	**0.066**	**0.066**	**0.259**	
99% Confidence Level	**0.139**	**0.129**	**0.093**	**0.094**	**0.367**	

Interpretation

Above table represents the Value at Risk Model of the selected ETFs and NSE NIFTY relationship. SBI Gold ETF,IDBI Gold ETF Axis Gold ETF,Quantum Gold Fund, Kotak Gold Fund acted as dependent variable and Nifty as an Independent variable. It can be interpreted from the table that the average monthly return is highest for Quantum Gold Fund (0.034), followed by SBI Gold ETF (0.017), IDBI Gold ETF (0.012) and Axis Gold ETF and Kotak Gold ETF (0.011). The total return, yearly return and Total risk (σ) is also high for Quantum Gold fund compared to the other selected Gold ETFs. Standard Deviation (σ) measures the variation or dispersion.

Likewise, there is a significant correlation between IDBI Gold ETF with SBI Gold ETF (r̈=0.448), Axis Gold ETF with SBI Gold ETF (r̈=0.521), Axis Gold ETF with IDBI Gold ETF (r̈=0.676), Kotak Gold ETF with SBI Gold ETF (r̈=0.628), Kotak Gold ETF with IDBI Gold ETF (r̈=0.781) and Kotak Gold ETF with Axis Gold ETF (r̈=0.853). All other correlations are not significant.

Systematic Risk (β) values of the Gold ETFs are compared with the market index, NIFTY50 to find which fund is deviating from the market. Negative beta values of all Gold ETF indicate negative volatility of the Gold. This implies, when there is one-degree positive standard deviation in the volatility of the market, the Gold ETFs will go the corresponding negative standard deviations based on the respective coefficient. The highest negative beta value is for SBI Gold Fund and lowest for IDBI Gold ETF and Quantum Gold ETF. The highest Unsystematic Risk is for Quantum Gold and lowest for Axis Gold ETF and Kotak Gold Fund, but it can be controlled through diversification. The intercept, Alpha (α), is also high for the Quantum Gold fund.

From the study, it is clear that the maximum loss expected (or the worst-case scenario) on SBI Gold ETF from 01-02-2019 to 01-08-2022 with 90% degree of confidence level as per the VaR model is 7.6%, at 95% degree of confidence level, the maximum loss is 9.8% and finally at 95% degree of confidence level, the maximum loss is 13.9%. The maximum loss expected (or the worst-case scenario) on IDBI Gold ETF with 90% degree of confidence level as per the VaR model is 7.1%, at 95% degree of confidence level, the maximum loss is 9.1% and finally at 95% degree of confidence level, the maximum loss is 12.9%. The maximum loss expected (or the worst-case scenario) on Axis Gold ETF with 90% degree of confidence level as per the VaR model is 5.1%, at 95% degree of confidence level, the maximum loss is 6.6% and finally at 95% degree of confidence level, the maximum loss is 9.3%. The maximum loss expected (or the worst-case scenario) on Kotak Gold ETF with 90% degree of confidence level as per the VaR model is 5.1%, at 95% degree of confidence level, the maximum loss is 6.6% and finally at 95% degree of confidence level, the maximum loss is 9.4%. The maximum loss expected (or the worst-case scenario) on Quantum Gold ETF with 90% degree of confidence level as per the VaR model is 20.2%, at 95% degree of confidence level, the maximum loss is 25.9% and finally at 95% degree of confidence level, the maximum loss is 36.7%.

Conclusion

The new science of risk management, otherwise called VaR Analysis has an intuitive appeal. The study showed that under worst-case scenario, irrespective of the confidence level, the maximum possible loss on account of the volatility of the market is for the Quantum Gold ETF, followed by SBI Gold ETF, IDBI Gold ETF, Axis Gold ETF and Kotak Gold ETF. If the investor is ready to accept the risk in investment for each Gold ETF, they can expect for the higher return, which also

implicitly mentioned in the given model and is same order as mentioned in the VaR Model. Therefore, it is recommended to say that a complete knowledge in investment pays the best interest.

References

Sathish Kumar B and Ram Raj G (2019). Gold vs. Gold Exchange Traded Funds: An Empirical Study in India, Economic Affairs, Vol. 64, No. 4, pp. 703-710, December 2019

Prabhdeep Kaur & Jaspal Singh, 2021. "Impact of ETF Listing on the Returns Generated by Underlying Stocks: Indian Evidence," Management and Labour Studies, XLRI Jamshedpur, School of Business Management & Human Resources, vol. 46(3), pages 263-288, August.

Dr. J K Raju, Mr. Manjunath B R and Mr. Rehaman M (2018). A Study on Performance Evaluation of Gold ETFs in India, IJEMR – February 2018 – Volume: 8, Issue 02 - Online – 'ISSN 2249–2585' Prints - ISSN 2249-8672.

https://www1.nseindia.com/products/content/equities/equities/eq_security.html

https://www.etmoney.com/mutual-funds/featured/best-gold-mutual-funds/25

RELATIVE FINANCIAL PERFORMANCE ACROSS URBAN AND RURAL STATE ROAD TRANSPORT CORPORATIONS: A STUDY IN WEST BENGAL

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Abstract

India's State Road Transport Undertakings did an incredible job of connecting urban and rural areas across the country. In contrast, it is an established reality that the financial condition of most of the state transport undertakings is not satisfactory. Due to inadequate economic conditions, most of them become sick and unable to make any contribution towards their growth. As a result, the massive amount of capital investment in various state road undertakings becomes uneconomical. Further, it revealed that the cost recovery rate of urban-based transport undertakings is diverse in comparison to rural operations. The proposed study attempts to compare the operational cost structure between urban and rural state road transport undertakings in West Bengal. The main objective is to conduct a comparative study and find out the differences in cost recovery characteristics of selected undertakings. The result suggests that there is an implication across cost-specific indicators and a suitable relationship exists.

Keywords: Comparative study, Cost Composition, Financial Ratio, Transport Corporations, West Bengal.

Introduction

The Indian transportation sector has grown to be a significant component of the country's GDP. During 2011-12, the transportation sector contributed 6.4 percent of GDP, with road transportation contributing the most (4.5 percent)[1]. Since 1999-2000, the majority of the increase in the percentage share of transport in GDP has come from the road transport sector[2]. Most importantly, Passenger transportation affects all aspects of mobility as well as overall economic development.

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The Road Transport Corporation Act was passed by Parliament in 1950, and State Road Transport Corporations (SRTCs) were established in due course. Gradually, State Road Transport Undertakings dominate the passenger road transport segment in India. However, these public transportation undertakings have faced severe problems in almost every state over the years and have become loss-making. Most SRTCs have accumulated deficits and are unable to meet the public's increasing transportation needs. Currently, all of them are troubled by a variety of issues, some of which are external, but the majority of which are self-inflicted. Improving the performance of public transport undertakings is becoming important as a result of insufficient government funds, increased demand for transportation services, and expanding social needs. Already, the SRTCs have few incentives to run their services efficiently. Perhaps, the state government has a large amount of control over the fares of the SRTCs, which is one of the most important aspects of their performance. With declining financial support from both the Central and State governments, as well as intense competition from private operators, these transport organisations have been forced to defend themselves from a dire situation. Among the public bus services within West Bengal, Calcutta State Transport Corporation (CSTC) ply mostly in Kolkata urban area and South Bengal State Transport Corporation (SBSTC) typically ply in the rural part and some of the adjoining areas of the state. The stagnant and declining conditions of most SRTCs are caused by mismanagement of funds, underutilization of human resources, unscientific route mapping, ineffective operations, and other factors. Moreover, the accumulated losses of these transportation ventures are an unbearable burden not only on the transportation department but also on the taxpayers of the state. As per planning commission report financial performance in terms of rural and urban operations reveals that the recovery rate for rural SRTCs is significantly higher than for urban operations[3]. It is noteworthy that urban operations are sustained by increased subsidies and budgetary support. Furthermore, there may be some other notable differences in the cost composition of urban and rural SRTCs.

Review of Literature

The ability of any performance monitoring research to provide feedback for evaluation and control, as well as to indicate things that are not going as planned. The first attempt is to explain what went wrong. The financial aim of SRTCs is not only to increase returns but also to fulfil social

responsibility goals. As a result, the trade-off between commercial and social responsibility goals of these SRTCs has become a major concern. Several studies have been conducted to evaluate performance in the Indian context. **Patikar's** (2005) study on Nagaland road transport sought to evaluate the micro-level performance of Nagaland's state-owned road transportation. The study suggested that financial experts be hired to improve the project's efficiency. According to **Ravichandran and Prasad** (2007), the Gujarat State Road Transport Corporation (GSRTC) has numerous organisational and tactical inefficiencies. As per the findings, GSRTC management has made it a policy to encourage resource efficiency, business orientation, improved service quality, and the implementation of comprehensive monitoring mechanisms. In her thesis, **Trivedi** (2010) emphasised GSRTC's biggest challenge to be dealing with the resource shortages, high labour costs, unequal competition with private operators, an uneconomic fare structure, and poor operational productivity. **Machhi** (2011) examined the GSRTC's performance evaluations from 2003 to 2009. According to the recommendations, GSRTC require to implement certain commercialization reforms. **Dey and Bhaduri** (2012) discuss the major issues and potential solutions for the survival of SRTC. It was suggested that SRTCs cut costs by instituting a Voluntary Retirement Scheme, reducing the number of buses on certain unprofitable routes and categorising employees based on their skills. Similarly, **Srinivas** (2013) investigated the evaluation of the results of the Andhra Pradesh State Road Transport Corporation (APSRTC). A number of steps have been proposed to reestablish financial strength in the direction of contributions. In another study, **Ghosh** (2015) investigated the organisational and financial efficiency of West Bengal's Urban State Bus Transport. Consistent employment policy, an optimal bus worker ratio, reduced pilferage and wastage, empirical inventory management, and route layout rationalisation were among the recommendations. **Katke and Laxman** (2017) attempted to investigate the North East Karnataka Road Transport Corporation's performance (NEKRTC). The study recommended cost-cutting strategies such as avoiding excessive personnel costs, efficiently managing fuel and tyres, locating potential markets, and so on. **Singh** (2017) set out to assess the technical efficiency of India's publicly operated urban road transport operators. The estimate was based on annual data from an eight-transportation-company survey. According to the study, the majority of the sample operators suffered financial losses and operators must be more effective in services factors. **Vijayan** (2018) reviewed the financial crisis of the Kerala State Road Transport Corporation (KSRTC). The study observed insufficient revenue was largely due to an

increase in operational costs. The ticketing system should be profit-oriented and dynamic in order to improve KSRTC's financial efficiency. **Randhawa and Arora** (2018) conducted a study that compared the physical and financial performance of SRTCs in India's Punjab state to that of other SRTCs in the country. It has also been observed that SRTC productivity in Punjab has remained low due to an overabundance of workers.

According to the above, many studies have been conducted concerning the financial performance of SRTCs. However, there are few studies in the context of comparative structures of urban and rural SRTCs, particularly in West Bengal. Considering the above facts, the current study is designed to compare the operational cost composition of urban-based CSTC and rural-based SBSTC. This cost-performance comparison will help us in determining the strengths and weaknesses of these two transport corporations with commonly used parameters. Hence, the current study intends to accomplish the following objectives:

- To investigate key operational cost component indicators for CSTC and SBSTC.
- To compare the cost composition of CSTC and SBSTC using cost component indicator ratios.
- To examine the significant differences in cost component indicator ratios that appears in the incidence of cost composition between CSTC and SBSTC.

Materials and Method

This performance monitoring study is based on secondary data on state transportation corporations. Efficiency is measured through various operational productivity parameters, which indicate how efficiently the resources of an organisation are utilised. Given the primary goal of the study, metro city-based CSTC and rural-based SBSTC were chosen for evaluation. However, the choice of study from 2000-01 to 2019-20 is mainly constrained by the availability of data in subsequent years. The data presented were gathered from a variety of published sources, including Annual Administrative Reports of SRTCs, various issues of the Central Institute of Road Transport (India), the Open Government Data Platform (India), and others. The data includes total cost breakdowns such as employee costs, fuel costs, tyre costs, spares costs and standing charges. These operating cost items are directly or indirectly related to the running of the buses and relevant cost ratios have been calculated. In addition, the study observed the mean, standard deviation, and correlation

coefficient for each selected ratio. Furthermore, the observed correlation coefficients are tested for significance using Microsoft Excel.

Finding and Analysis

Analysis of the operating cost structure of SRTCs is required in judging the ability to attain the service, which can be measured by using some relationship between total cost and other input parameters. To understand the influence of operating cost components on total cost, it is classified into the following categories:

(i) Staff Cost to Total Cost

Staff costs represent a huge proportion of the operational costs of selected transport undertakings. The efficient use of labour in transport services is a critical component of any performance measure of a passenger transport operators. Staff costs include the cost of staff for administration, traffic, maintenance and repairs.

Formula: Staff Cost to Total Cost Ratio = (Staff Cost ÷Total Cost) ×100

Table No 1: Staff Cost to Total Cost

Year	CSTC		SBSTC		Staff Cost as a % of Total Cost	
	Staff Cost (in Rs. Lakhs)	Total Cost (in Rs. Lakhs)	Staff Cost (in Rs. Lakhs)	Total Cost (in Rs. Lakhs)	CSTC	SBSTC
2000-01	8,083	13,245	2,828	6,826	61.03	41.43
2001-02	9,267	14,978	2,903	7,173	61.87	40.47
2002-03	8,930	15,356	3,156	7,922	58.15	39.84
2003-04	9,334	15,962	2,929	7,692	58.48	38.08
2004-05	9,179	15,811	3,446	8,174	58.05	42.16
2005-06	11,633	21,064	3,008	9,373	55.23	32.09
2006-07	10,966	19,123	3,317	9,405	57.34	35.27
2007-08	11,508	18,958	3,714	10,102	60.70	36.76
2008-09	11,717	19,016	3,782	10,360	61.62	36.51
2009-10	15,197	22,460	5,279	13,575	67.66	38.89
2010-11	17,770	25,143	6,806	14,377	70.68	47.34
2011-12	17,201	23,389	6,964	15,452	73.54	45.07
2012-13	15,369	21,854	7,189	16,578	70.33	43.36
2013-14	16,894	23,053	7,013	17,561	73.28	39.94
2014-15	16,064	23,191	8,302	20,750	69.27	40.01
2015-16	18,085	24,250	8,134	21,151	74.58	38.46

2016-17	22,190	32,408	9,593	23,908	68.47	40.12
2017-18	23,289	44,674	8,456	20,861	52.13	40.53
2018-19	19,842	41,574	9,531	26,424	47.73	36.07
2019-20	24,263	48,730	12,266	29,420	49.79	41.69
Mean					**62.50**	**39.70**
S.D					**7.90**	**3.39**
Correlation Coefficient (r)						**0.44**
p value of r						**0.053**

Source: (i) Compiled from ASRTUs Report, Transport Research Wings, India (2000-01 to 2016-17).
(ii) Compiled from Audit Report of CSTC and SBSTC (2017-18 to 2019-20).

Table no.1 exhibits the staff cost to total cost ratio of CSTC and SBSTC over 20 years of study. In CSTC, the ratio shows an increasing trend during the whole study period except in the year 2002-03, 2004-05, 2012-13, 2014-15 and 2018-19. The percentage has fluctuated between 55.23% in 2005-06 and 74.58% in 2015-16. The mean and standard deviation observed in CSTC are 62.50% and 7.90% respectively. On the other hand, the above ratio shows significant fluctuation in case of SBSTC. It ranges between 32.09% in the year 2005-06 to 47.34% in the year 2010-11 along with a mean value and standard deviation of 39.70% and 3.39% respectively. The said ratio of SBSTC registered considerable changes which results in a substantial fall during the year 2000-01 to 2003-04 and 2010-11 to 2015-16. It can also be noted that the observed mean of CSTC is higher in comparison to SBSTC. The correlation coefficient of Staff Cost to Total Cost Ratio is 0.44 which indicates that there is a positive association and further it is tested for confirming the association between CSTC and SBSTC. To access the strength of the correlation p-value has been observed. As, $p > 0.05$, it can be said that there is no significant association of staff cost to total cost ratio between CSTC and SBSTC.

(ii) Fuel Cost to Total Cost

The performance of SRTCs mostly depends upon the effective use of fuel. Consumption of fuel is the most important criterion for measuring the operating cost performance of bus transport organisation. A higher number of kilometres per litre signify lower operating costs and vice versa. Fuel costs recorded a significant share after staff costs of selected transport undertakings.

Formula: Fuel Cost to Total Cost Ratio = (Fuel Cost ÷ Total Cost) ×100

Table no.2 exhibits the fuel cost to total cost ratio of CSTC and SBSTC over 20 years of study. In CSTC, the above ratio shows unpredictable during the whole study period as it was fluctuating. The ratio ranged between a minimum of 17.60% in the year 2010-11 to maximum of 27.03% in the year 2006-07. The average ratio counts 22.17% with an observed standard deviation of 2.85% in CSTC. On the other hand, the fuel cost to total cost ratio shows significant fluctuation in the case of SBSTC. It ranges from 24.22% in the year 2001-02 to 41.24% in the year 2018-19.

Table No 2: Fuel Cost to Total Cost

Year	CSTC		SBSTC		Fuel Cost as a % of Total Cost	
	Fuel Cost (in Rs. Lakhs)	Total Cost (in Rs. Lakhs)	Fuel Cost (in Rs. Lakhs)	Total Cost (in Rs. Lakhs)	CSTC	SBSTC
2000-01	2,734	13,245	1,669	6,826	20.64	24.45
2001-02	3,369	14,978	1,737	7,173	22.49	24.22
2002-03	3,661	15,356	2,067	7,922	23.84	26.09
2003-04	4,057	15,962	2,215	7,692	25.42	28.80
2004-05	4,185	15,811	2,514	8,174	26.47	30.76
2005-06	4,758	21,064	3,067	9,373	22.59	32.72
2006-07	5,169	19,123	3,210	9,405	27.03	34.13
2007-08	4,871	18,958	3,039	10,102	25.69	30.08
2008-09	4,607	19,016	3,400	10,360	24.23	32.82
2009-10	4,418	22,460	4,285	13,575	19.67	31.57
2010-11	4,425	25,143	3,772	14,377	17.60	26.24
2011-12	4,274	23,389	3,980	15,452	18.27	25.76
2012-13	4,582	21,854	4,694	16,578	20.97	28.31
2013-14	4,439	23,053	5,071	17,561	19.26	28.88
2014-15	5,151	23,191	5,976	20,750	22.21	28.80
2015-16	4,904	24,250	5,897	21,151	20.22	27.88
2016-17	8,144	32,408	6,638	23,908	25.13	27.76
2017-18	8,501	44,674	7,531	20,861	19.03	36.10
2018-19	9,905	41,574	10,898	26,424	23.82	41.24
2019-20	9,202	48,730	11,942	29,420	18.88	40.59
Mean					**22.17**	**30.36**
S.D					**2.85**	**4.67**
Correlation Coefficient (r)						**0.09**
p value of r						**0.81**

Source: (i) Compiled from ASRTUs Report, Transport Research Wings, India (2000-01 to 2016-17).
(ii) Compiled from Audit Report of CSTC and SBSTC (2017-18 to 2019-20).

along with mean and standard deviation of 30.36% and 4.67% respectively. The same ratio of SBSTC registered considerable changes which results in a substantial fall during the year 2010-11 and 2011-12. It can also be noted from above that the observed mean of SBSTC is higher in comparison to CSTC. The correlation coefficient of fuel cost to total cost ratio is 0.09 which indicates that there is a very low positive association and further it is tested for confirming the association between CSTC and SBSTC. To access the strength of the correlation p-value has been observed. As, $p > 0.05$, thus it can be said there is no significant association of fuel cost to total cost ratio between CSTC and SBSTC.

(iii)Tyre Cost to Total Cost

The use of tyres depends upon the condition of the road and thus cannot be considered as strictly controllable. The tyre costs and their useful life are invariably connected to the

Table No 3: Tyre Cost to Total Cost

Year	CSTC		SBSTC		Tyre Cost as a % of Total Cost	
	Tyre Cost (in Rs. Lakhs)	Total Cost (in Rs. Lakhs)	Tyre Cost (in Rs. Lakhs)	Total Cost (in Rs. Lakhs)	CSTC	SBSTC
2000-01	134	13,245	183	6,826	1.01	2.68
2001-02	114	14,978	199	7,173	0.76	2.77
2002-03	204	15,356	187	7,922	1.33	2.36
2003-04	260	15,962	183	7,692	1.63	2.38
2004-05	228	15,811	152	8,174	1.44	1.86
2005-06	221	21,064	174	9,373	1.05	1.86
2006-07	364	19,123	224	9,405	1.90	2.38
2007-08	305	18,958	196	10,102	1.61	1.94
2008-09	304	19,016	218	10,360	1.60	2.10
2009-10	240	22,460	246	13,575	1.07	1.81
2010-11	217	25,143	254	14,377	0.86	1.77
2011-12	359	23,389	240	15,452	1.53	1.55
2012-13	373	21,854	282	16,578	1.71	1.70
2013-14	182	23,053	307	17,561	0.79	1.75
2014-15	255	23,191	335	20,750	1.10	1.61
2015-16	187	24,250	488	21,151	0.77	2.31
2016-17	147	32,408	509	23,908	0.45	2.13
2017-18	155	44,674	488	20,861	0.35	2.34
2018-19	13	41,574	398	26,424	0.03	1.51
2019-20	402	48,730	380	29,420	0.82	1.29

Mean	**1.09**	**2.01**
S.D	**0.49**	**0.39**
Correlation Coefficient (r)		**0.08**
p value of r		**0.68**

Source: (i) Compiled from ASRTUs Report, Transport Research Wings, India (2000-01 to 2016-17).

(ii) Compiled from Audit Report of CSTC and SBSTC (2017-18 to 2019-20).

operational performance parameters. Lower cost and longer life, and higher safety ensure profitability while considering importance of tyre cost.

Formula: Tyre Cost to Total Cost Ratio = (Tyre Cost ÷ Total Cost) ×100

Table no.3 exhibits the tyre cost to total cost ratio of CSTC and SBSTC for 20 years of study. In CSTC, the above ratio shows unpredictability during the entire study period. It ranged between 0.03% in the year 2018-19 to 1.90% in the year 2006-07 and registered a substantial fall during 2018-19. The average ratio count is 1.09% with an observed standard deviation of 0.49%. On the other hand, the same ratio shows significant fluctuation in the case of SBSTC. It ranged from 1.29% in the year 2019-20 to a maximum of 2.77% in the year 2001-02 along with an average ratio and standard deviation of 2.01% and 0.39% respectively. It can also be noted that the mean of tyre cost to total cost ratio of SBSTC is twice in comparison to CSTC. The observed correlation coefficient is 0.08 which indicates that there is a very low positive association and further it is tested for confirming the association between CSTC and SBSTC. To access the strength of the correlation p-value has been observed. Since $p > 0.05$, it can be said there is no significant association of tyre cost to total cost between CSTC and SBSTC.

(iv) Spares Cost to Total Cost

Spares are the interchangeable parts which are used for repair or replacement, such as an automobile. Although few spare parts have a long life, getting a replacement takes some time. The SRTCs ensure that the right spare parts are employed and replaced at the right time.

Formula: Spare Cost to Total Cost Ratio = (Spare Cost ÷ Total Cost) ×100

Table no.4 exhibits the spares cost to total cost ratio of CSTC and SBSTC over 20 years of study. In CSTC, the above ratio shows decreasing trend during the whole study period. It ranged from 0.31% in the year 2017-18 to 8.01% in the year 2000-01. The average ratio count is 2.40% with an observed standard deviation of 1.73% in CSTC. On the other hand, the ratio shows inconsistency but decreases in the case of SBSTC. It ranged between 2.22% in the year 2016-17 to 7.12% in the year 2003-04 along with an average ratio and standard deviation of 4.28% and

Table No 4: Spares Cost to Total Cost

Year	CSTC		SBSTC		Spares Cost as a % of Total Cost	
	Spares Cost (in Rs. Lakhs)	Total Cost (in Rs. Lakhs)	Spares Cost (in Rs. Lakhs)	Total Cost (in Rs. Lakhs)	CSTC	SBSTC
2000-01	1,061	13,245	373	6,826	8.01	5.46
2001-02	550	14,978	503	7,173	3.67	7.01
2002-03	569	15,356	514	7,922	3.71	6.49
2003-04	498	15,962	548	7,692	3.12	7.12
2004-05	529	15,811	512	8,174	3.35	6.26
2005-06	911	21,064	384	9,373	4.32	4.10
2006-07	585	19,123	376	9,405	3.06	4.00
2007-08	452	18,958	479	10,102	2.38	4.74
2008-09	385	19,016	420	10,360	2.02	4.05
2009-10	333	22,460	510	13,575	1.48	3.76
2010-11	271	25,143	645	14,377	1.08	4.49
2011-12	306	23,389	543	15,452	1.31	3.51
2012-13	312	21,854	671	16,578	1.43	4.05
2013-14	322	23,053	393	17,561	1.40	2.24
2014-15	285	23,191	577	20,750	1.23	2.78
2015-16	174	24,250	618	21,151	0.72	2.92
2016-17	381	32,408	531	23,908	1.18	2.22
2017-18	139	44,674	824	20,861	0.31	3.95
2018-19	337	41,574	913	26,424	0.81	3.46
2019-20	1,630	48,730	885	29,420	3.34	3.01
Mean					**2.40**	**4.28**
S.D					**1.73**	**1.45**
Correlation Coefficient (r)						**0.54**
p value of r						**0.005**

Source: (i) Compiled from ASRTUs Report, Transport Research Wings, India (2000-01 to 2016-17).
(ii) Compiled from Audit Report of CSTC and SBSTC (2017-18 to 2019-20).

1.45% respectively. The spares cost to total cost ratio of SBSTC registered considerable fall during the year 2001-02 to 2019-20. It can also be noted that the mean of spares cost to total cost ratio of SBSTC is higher in comparison to CSTC. The observed correlation coefficient of spares cost to total cost ratio is 0.54 which indicates that there is a positive association and further it is tested for confirming the association. To access the strength of the correlation p-value has been observed. As, $p < 0.05$ there is a significant association between of CSTC and SBSTC regarding spares cost to total cost.

(v) Standing Charges to Total Cost

Standing charges are fixed costs which are incurred irrespective of the distance travelled by the vehicles, such as insurance premiums, tax, depreciation, licence fees, garage rent, general supervision, interest on capital, and other contingencies. Standing charges are fixed and not dependent on the distance travelled by the service.

Formula: Standing Charges to Total Cost Ratio = (Standing Charges ÷ Total Cost) ×100

Table No 5: Standing Charges to Total Cost

Year	CSTC		SBSTC		Standing Charges as a % of Total Cost	
	Standing Charges (in Rs. Lakhs)	Total Cost (in Rs. Lakhs)	Standing Charges (in Rs. Lakhs)	Total Cost (in Rs. Lakhs)	CSTC	SBSTC
2000-01	1,233	13,245	1,773	6,826	9.31	25.97
2001-02	1,678	14,978	1,831	7,173	11.20	25.53
2002-03	1,992	15,356	1,998	7,922	12.97	25.22
2003-04	1,813	15,962	1,817	7,692	11.36	23.62
2004-05	1,690	15,811	1,550	8,174	10.69	18.96
2005-06	3,541	21,064	2,740	9,373	16.81	29.23
2006-07	2,039	19,123	2,278	9,405	10.66	24.22
2007-08	1,822	18,958	2,674	10,102	9.61	26.47
2008-09	2,003	19,016	2,540	10,360	10.53	24.52
2009-10	2,272	22,460	3,255	13,575	10.12	23.98
2010-11	2,460	25,143	2,900	14,377	9.78	20.17
2011-12	1,249	23,389	3,725	15,452	5.34	24.11
2012-13	1,218	21,854	3,742	16,578	5.57	22.57
2013-14	1,216	23,053	4,777	17,561	5.27	27.20
2014-15	1,436	23,191	5,560	20,750	6.19	26.80
2015-16	900	24,250	6,014	21,151	3.71	28.43
2016-17	1,546	32,408	6,637	23,908	4.77	27.76

2017-18	12,590*	44,674	3,562	20,861	28.18	17.07
2018-19	11,477*	41,574	4,684	26,424	27.61	17.73
2019-20	13,233*	48,730	3,947	29,420	27.16	13.42
Mean					**11.84**	**23.65**
S.D					**7.32**	**4.08**
Correlation Coefficient (r)						**-0.73**
p value of r						**0.0003**

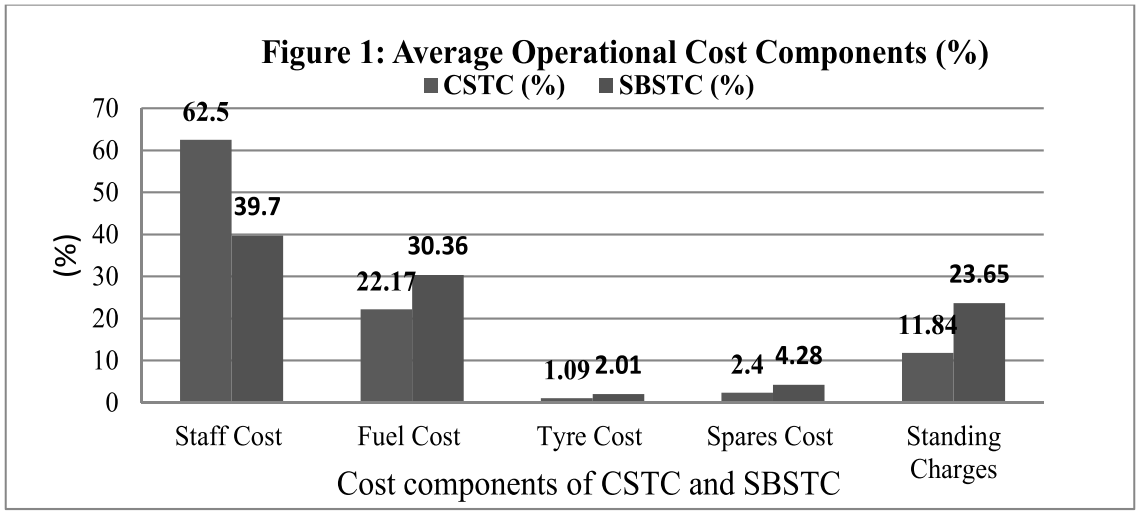
Source: (i) Compiled from ASRTUs Report, Transport Research Wings, India (2000-01 to 2016-17)

(ii) Compiled from Audit Report of CSTC and SBSTC (2017-18 to 2019-20)

* High standing charges likely due to restructuring with CTC and WBSTC during that period.

Table no.5 exhibits the standing charges to the total cost ratio of CSTC and SBSTC over 20 years of study. In CSTC, the above ratio show diminishes during the initial study period. It ranged between 3.71% in the year 2015-16 and 28.18% in the year 2017-18. The average ratio count is 11.84% with an observed standard deviation of 7.32% in CSTC. On the other hand, the said ratio of SBSTC shows slight fluctuation in every corresponding year. It ranged between 13.42% in the year 2019-20 to 29.23% in the year 2005-06 along with an average ratio and standard deviation of 23.65% and 4.08% respectively. It can also be noted that the calculated mean of standing charges to the total cost ratio of SBSTC is much higher in comparison to CSTC. The observed correlation coefficient is -0.73 which indicates that there is a high negative association and further it is tested for confirming the association between CSTC and SBSTC. To access the strength of the correlation p-value has been observed. since, $p < 0.05$ there is a significant association between of CSTC and SBSTC regarding standing charges to the total cost.

Following figure 1 represents Comparative performance of selected cost components of CSTC and SBSTC.



Concluding Remarks

The study incorporates various cost combinations and exhibits in the micro-level performance assessment. The operational status of CSTC and SBSTC has been examined in light of selected parameters. The weakness has been pinpointed by analyzing the relative cost structure of CSTC and SBSTC. Though, the cost of staff and fuel were the two leading cost elements in the cost structure of the both undertakings.

- First, a higher staff cost to total cost ratio has been observed of CSTC in comparison to SBSTC, it signs as operational inefficiency. High staff strength and salary discrimination may be the concern. Although no statistical significance has been found in regards to incurring staff cost mechanisms between these two. However, in the case of staff cost to total cost ratios concern, rural SRTCs results better.

- Second, fuel cost to total cost ratios concern, urban-based CSTC has shown advantaged performance in respect of SBSTC. Although no statistical significance has been found in regards to incurring fuel cost mechanisms between these two. It is very relevant for SBSTC to control fuel cost by its economic use and it is only controllable by improving kilometre run per unit of fuel. So far, both SRTCs should pay attention to looking into the stagnant and declining financial condition.

- Third, as per the average tyre cost to total cost, the efficiency showed by service operated in the city ranged CSTC. However, no significant relation exists between CSTC and SBSTC in comparison of tyre cost to total cost.

- Fourth, urban based CSTC depicted efficiency on spares cost to total cost ratio in comparison to SBSTC. A difference also noted that urban-based SRTCs have better control than SRTCs operating in rural parts in terms of spares cost. There is a significant relationship exists between the two SRTCs considering the performance pattern of spars cost. A statistical significant has been found among CSTC and SBSTC in respect of total spares cost.

- Fifth, CSTC has been found to have a lower standing charge to total cost ratio in comparison to SBSTC. A difference also noted that urban-based SRTCs have better control than SRTCs operating in rural parts in terms of standing charges. A statistical significant has been found among CSTC and SBSTC on the pattern of incurring standing charges.

To conclude, in contrast to the comparative cost structure staff cost became a major concern in the case of CSTC. Alternatively, fuel cost and standing charges need to be relooked by SBSTC. Tyre cost and spares cost has very little implication in this regard.

Limitation of the Study

The reported data on SRTUs is no longer up to date. The study's most recent database would provide more insight into possible causation. Furthermore, this study does not contain all of the performance measures that can be found in the SRTC's annual reports. Even though the parameters are extensive, the outcome is limited to that.

References:

Annual Administrative Report on West Bengal, CAG (2001-02 to 2009-10).

Dey, T., & Bhaduri, S. (2012). Changing profile of state transport undertakings in mass transport services: a case of Kolkata city. Researchers World, 3(2), 45–56.

Ghosh, P. (2015). Evaluation of Operational and Financial Performance of Urban State Bus Transport in West Bengal with Special Reference to Calcutta State Transport Corporation (Unpublished doctoral Thesis). University of Calcutta.

Katke, S. R., &Laxman, R. (2017). Financial performance evaluation of state road transport corporations – a study with a focus on NEKRTC. Paripex: indian journal of reserach, 6(3), 515–521.

Machhi, H. K. (2011). Performance analysis of Gujarat state road transport corporation (Unpublished doctoral Thesis). Sardar Patel University.

Pratiker, G. (2005). Performance evaluation of State owned Road Transport in Nagaland (Unpublished doctoral Thesis). Nagaland University.

Randhawa, G., & Arora, S. (2018). Status of state road transport undertakings (SRTCS) in Punjab. Uttranchal Business Review, 8(2), 1–19

Ravichandran, N., & Surya Prasad, M. V. N. (2007, May 3). Reviving Gujarat state road transport corporation: An agenda for action [Research and Publications].

Singh, S.K. (2017) Efficiency of Urban Bus Companies in India: A Stochastic Frontier Analysis. Theoretical Economics Letters, 7, 1925-1939. https://doi.org/10.4236/tel.2017.77130

Srinivas, D. (2013). Performance Evaluation of A.P. State Road Transport Corporation (APSRTC) With A Perceptional Focus on Turnaround (Unpublished doctoral Thesis). Andhra University.

State Road Transport Undertakings Profile and Performance (2009-10 to 2015-16), CIRT, Pune.

Statistical Abstract, Bureau of Applied Economics and Statistics, Govt. of West Bengal (From 2000-01 to 2012-13)

Trivedi, S. M. (2010). An Analysis of Financial Performance of State Road Transport Corporation in Gujarat (Unpublished doctoral Thesis). Saurashtra University.

Vijayan, I. (2018). Financial crisis of state transport undertaking - a case study of Kerala state road transport corporation (KSRTC). International journal of research in commerce & management, 9(7), 22–30.

Twelfth Five Year Plan (2012–2017), Planning Commission, Government of India

Eleventh Five Year Plan (2007–2012), Planning Commission, Government of India.

Working Group on Road Transport For The Eleventh Five Year Plan.

End Notes:

1. Transport Research Wing, Ministry of Shipping, Road Transport & Highways, Government of India.
2. Working Group on Road Transport for the Eleventh Five Year Plan, Government of India.
3. Working Group on Road Transport for the Eleventh Five Year Plan, Government of India.

Abbreviation:

1. **APSRTC:** Andhra Pradesh State Road Transport Corporation
2. **ASRTU:** Association of State Road Transport Undertakings
3. **CSTC:** Calcutta State Transport Corporation
4. **GDP:** Gross Domestic Product
5. **GSRTC:** Gujarat State Road Transport Corporation
6. **KSRTC:** Kerala State Road Transport Corporation
7. **NEKRTC:** North East Karnataka Road Transport Corporation's performance
8. **SRTCs:** State Road Transport Corporations
9. **SBSTC:** South Bengal State Transport Corporation

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