Journal
Of the
Oriental Institute
M.S. University of Baroda

ISSN: 0030-5324
UGC CARE Group 1

AN EMPIRICAL STUDY ON SERVICE DELIVERY EFFICIENCY AND PERFORMANCE EVALUATION OF PUBLIC AND PRIVATE TELECOMMUNICATION PROVIDERS IN VELLORE DISTRICT

Ms. R. CHITHRA, Research Scholar
PG & Research Department of Commerce, KMG College of Arts & Science, Gudiyattam
(Affiliated to Thiruvalluvar University, Serkkadu, Vellore Dt. Tamil Nadu)

Dr. K. GOMATHY, Research Supervisor
PG & Research Department of Commerce, KMG College of Arts & Science, Gudiyattam
(Affiliated to Thiruvalluvar University, Serkkadu, Vellore Dt. Tamil Nadu)

ABSTRACT

This empirical study investigates the service delivery efficiency and performance evaluation of public and private telecommunication providers in Vellore District. As telecom services become essential to digital life, user expectations around speed, reliability, and responsiveness continue to grow. The study collected primary data from 150 respondents across urban and rural areas to assess perceptions of network coverage, data speed, customer support, pricing, and digital tools. Results show that while private providers excel in network reliability, data speed, and digital platforms, public providers maintain an advantage in affordability and rural access. Statistically significant findings highlight the role of mobile apps and customer care in enhancing service efficiency. However, lower overall satisfaction scores indicate a performance gap between specific service attributes and the holistic user experience. The study emphasizes the need for modernized infrastructure, better real-time communication, and user-centric strategies to ensure equitable, efficient, and integrated telecom service delivery in the region.

Keywords: *Service Delivery Efficiency, Telecommunication Performance Evaluation*

1. INTRODUCTION

Telecommunication has become the backbone of modern socio-economic development, playing a pivotal role in enhancing connectivity, information dissemination, and access to digital services across India. With over a billion mobile subscribers and the second-largest telecom network globally, India's telecommunications sector is both vast and diverse. It supports critical

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functions in education, banking, healthcare, agriculture, and governance, particularly in the context of digital transformation through initiatives like Digital India and BharatNet. The push for nationwide internet access and mobile connectivity has further underlined the need for efficient, inclusive, and high-performing telecom services.

In this dynamic environment, both public and private telecom service providers coexist, often serving overlapping but distinct roles. Public sector enterprises such as Bharat Sanchar Nigam Limited (BSNL) are mandated to ensure affordable and widespread access, particularly in remote and underserved regions. On the other hand, private providers like Reliance Jio, Bharti Airtel, and Vodafone Idea focus on innovation, customer experience, and high-speed network infrastructure, especially in urban and semi-urban markets. This dual structure, while beneficial in theory, often reveals disparities in service quality, responsiveness, and operational efficiency.

Vellore District in Tamil Nadu, with its mix of urban centers, semi-urban zones, and rural communities, offers an excellent microcosm for examining these service delivery contrasts. The region is witnessing increasing reliance on mobile networks for remote learning, e-commerce, digital banking, telehealth, and online government services. However, users often face challenges such as inconsistent network speeds, poor coverage in fringe areas, and delayed customer service, prompting concerns over equitable access and efficiency.

This study aims to empirically evaluate the service delivery efficiency and performance of both public and private telecom providers in the Vellore District. It goes beyond surface-level customer satisfaction to investigate how effectively these providers fulfil user needs in real time, especially in terms of data speed, service reliability, affordability, customer support, and technological readiness. The focus is on analysing operational efficiency from the consumer's perspective, identifying performance gaps, and suggesting measures to bridge those gaps. By assessing both qualitative perceptions and quantitative performance metrics, this research contributes valuable insights into telecom service delivery in a district that reflects India's broader digital divide. The outcomes are expected to inform telecom operators, regulators, and policymakers about user expectations, service inconsistencies, and potential strategies for improving telecom infrastructure and service responsiveness across diverse user segments.

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2. FACTORS INFLUENCING TELECOMMUNICATION SERVICES

2.1 Infrastructure Modernity

The foundational element of efficient telecom service delivery is the quality and scale of infrastructure. This includes:

- Investment in 4G/5G networks, which ensures faster data transmission, low latency, and higher bandwidth.
- Fiber optic expansion, which supports stable and high-speed broadband, especially in urban and semi-urban zones.
- Modern switching and routing systems, which reduce call drops and network congestion.
- Private providers tend to invest more aggressively in upgrading infrastructure to maintain competitiveness, whereas public providers often lag due to bureaucratic delays or funding constraints.

2.2 Response Time

- This refers to the speed and effectiveness of customer complaint resolution, technical issue handling, and service restoration after interruptions (e.g., outages or SIM activation delays).
- Private telecoms often offer 24/7 helplines, app-based complaint tracking, and live chat, which enhance responsiveness.
- Public providers may suffer from longer redressal times due to procedural inefficiencies and lack of digitization.
- Quick response time is directly linked to customer trust and retention.

2.3 Value-added Services

These include additional features and bundled offerings that go beyond basic voice and data services, such as:

- OTT (Over-The-Top) platform access (e.g., Disney+ Hotstar, Amazon Prime Video)
- Data rollover options
- Family/shareable plans
- Free cloud storage or antivirus tools

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These services enhance the perceived value of telecom plans and are widely used by private providers to differentiate themselves in the market.

2.4 Digital Literacy of Users

The efficiency of service delivery also depends on how well users can interact with digital platforms provided by telecom companies. This includes:

- Using mobile apps for recharges, plan changes, or raising complaints.
- Understanding alerts, SMS-based service menus, or IVR systems.
- Low digital literacy, especially in rural areas, can limit users' ability to utilize self-service features effectively, resulting in lower satisfaction regardless of technical service quality.

2.5 Mobile Penetration in Rural Areas

This indicates the extent of telecom network usage in less developed or remote regions. Factors like tower density, terrain challenges, and local economic conditions influence rural penetration.

- Public providers often have wider reach in rural areas due to government mandates and social responsibility objectives.
- Private operators may be slower to expand due to profitability concerns, although regulatory incentives are improving this gap.
- Greater penetration ensures more consistent service availability and bridges the digital divide.

2.6 Brand Communication

The way telecom companies communicate with customers' influences perception, trust, and loyalty. This includes:

- Transparent marketing about plan benefits, charges, and limitations.
- Regular updates through SMS, apps, or email on outages, new services, and offers.
- Proactive communication during service disruptions or policy changes.
- Effective brand communication helps build customer confidence, manage expectations, and reduce churn, especially when technical issues arise.

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3. REVIEW OF LITERATURE

Yoganandham and Govindaraj (2021) examined customer satisfaction and commitment towards Reliance JIO in Vellore District using an economic analysis framework. The study explored factors such as network reliability, pricing, data speed, and service availability. It concluded that service quality and affordability were the most influential factors shaping consumer loyalty. Importantly, the study highlighted customer expectations in a semi-urban district, providing directly relevant insights for comparative studies involving other providers. The findings underscore the growing importance of digital service efficiency and provide a localized benchmark for evaluating both public and private telecom operations in the same region.

Masson et al. (2016) conducted a comparative study of Indian telecom service providers using a two-stage Data Envelopment Analysis (DEA) to assess operational efficiency and service delivery performance. The study emphasized the importance of cost-effective operations and customer-centric service delivery as indicators of overall performance. It found that private telecom firms outperform public ones due to better investment in infrastructure and technology. The research highlighted internal inefficiencies within public operators that hindered their ability to meet customer expectations. The framework used in this study is relevant for analyzing telecom service providers in regional contexts like Vellore District.

Rajeswari, Srinivasulu, and Thiyagarajan (2016) assessed service quality in the Indian telecommunication industry with a special focus on DSL services. The study employed SERVQUAL dimensions—reliability, assurance, tangibility, empathy, and responsiveness—to measure customer perceptions. It revealed that customer satisfaction is highly dependent on service consistency, technical support, and prompt complaint handling. While both public and private players were included, private services scored higher on responsiveness and innovation. This literature supports the current research objective by emphasizing that evaluating service efficiency should go beyond technical delivery to include customer engagement and quality perception.

Baruah and Baruah (2015) analyzed the performance of public and private telecom sectors in Assam with a focus on wireless services. The study examined metrics such as subscriber base, market share, and service growth. It concluded that private operators dominated

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the market due to aggressive customer acquisition strategies, better customer service, and pricing flexibility. Public providers, though affordable, lagged in innovation and responsiveness. The research provides a useful regional comparison, reinforcing the significance of service delivery mechanisms and competitive dynamics. These insights closely parallel the issues observed in the telecom landscape of Vellore District.

Yadav (2014) carried out a comparative analysis of public and private telecom operators in India, focusing on their performance in the wireless services domain. The study found that private sector providers achieved higher growth due to flexibility, aggressive marketing, and improved service responsiveness. In contrast, public operators faced challenges like bureaucratic delays, outdated infrastructure, and low customer retention. The study emphasized the need for public sector reform and investment in modernization. Its conclusions are applicable to understanding the existing service gaps and performance discrepancies in Vellore's telecom sector, especially between providers like BSNL and private competitors.

4. IMPORTANCE OF THE STUDY

Understanding how efficiently telecom services are delivered is essential in today's hyper-connected society. This study is important as it shifts the focus from basic service provision to how well those services perform across different environments within Vellore District. It explores how telecom efficiency affects everyday activities such as remote work, online learning, digital banking, and access to public services. The study's outcomes offer a roadmap for both sectors to optimize operations, bridge service gaps, and contribute to a more digitally inclusive region. Insights derived may also support regulatory decisions and future public-private partnerships aimed at improving telecom accessibility and performance.

5. STATEMENT OF THE PROBLEM

Although public and private telecom operators function within the same market, there exists a notable divergence in the efficiency of service delivery. Users frequently encounter issues such as delayed customer support, inconsistent data speeds, and lack of network stability, particularly in semi-urban and rural pockets of Vellore District. Public operators are often resource-constrained, while private firms tend to concentrate on high-revenue areas. This disparity raises concerns regarding equitable access and sustained service quality. The study,

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therefore, investigates whether telecom services are being delivered efficiently across sectors and to what extent performance varies in different user environments.

Research Questions

- To what extent does service delivery efficiency differ between public and private telecommunication providers in Vellore District?
- What are the key operational and user-experience factors influencing customer perception of telecom performance in semi-urban and rural areas?
- How does the concentration of infrastructure and customer support resources affect the service quality provided by public and private telecom operators in different parts of Vellore District?

6. OBJECTIVES OF THE STUDY

1. To analyse and compare the service delivery efficiency of public and private telecom providers in Vellore District.
2. To identify key operational and user-experience factors that contributes to performance gaps between sectors.
3. To propose strategic insights for enhancing service delivery mechanisms in both public and private networks.

7. METHODOLOGY

This empirical study adopts a comparative analytical framework. Primary data was obtained from a sample of 150 respondents, drawn from various urban and rural zones in Vellore District, selected through purposive sampling to ensure inclusion of both service types. The survey instrument included scaled questions focusing on service efficiency indicators such as latency, call drop frequency, billing transparency, and user responsiveness. Statistical tools such as mean score analysis and independent sample t-tests were used to derive insights. Secondary sources such as Journals, Articles, Magazines, TRAI reports and operator disclosures were also referenced.

8. LIMITATIONS OF THE STUDY

- The study relies on self-reported data, which may be subject to personal bias or over/underestimation.

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- Service efficiency was measured at a point in time; variations may occur across different periods or seasons.
- Smaller or regional telecom operators were not included, which may limit broader generalization

9. DATA ANALYSIS AND INTERPRETATION

Table 1: Service Delivery Efficiency

Statement	N	Mean	Std. Deviation	Std. Error Mean	t	Sig.
The telecom service provider responds promptly to service requests and complaints.	150	4.3716	0.50059	0.02617	0.438	0.661
The service restoration time after network outages is satisfactory.	150	4.4536	0.49852	0.02606	0.085	0.932
I find the telecom provider's mobile app or website helpful for resolving service issues.	150	4.8415	0.42783	0.02236	4.105	0.000
Customer care support is accessible and resolves issues effectively.	150	4.3197	0.72452	0.03787	7.608	0.000
The provider keeps me well informed about service disruptions and updates.	150	4.5683	0.51761	0.02706	-0.535	0.593

The t-test results in Table 1 provide insights into the perceived service delivery efficiency of telecom providers in the Vellore District. Among the five service delivery attributes, “The telecom provider’s mobile app or website helpfulness” (Mean = 4.84, $p < 0.001$) and “Customer care support accessibility and effectiveness” (Mean = 4.32, $p < 0.001$) show statistically significant results, indicating strong agreement among users and meaningful variation from the expected mean. This suggests that digital self-service platforms and responsive customer care are recognized as key strengths in service delivery. On the other hand, variables such as “prompt response to service requests” (Mean = 4.37, $p = 0.661$), “satisfactory service restoration time” (Mean = 4.45, $p = 0.932$), and “information about service disruptions” (Mean = 4.57, $p = 0.593$) are not statistically significant. Although their mean values are relatively high, indicating general

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user agreement, the lack of significance suggests that these aspects are perceived more uniformly and may not vary greatly across the user base. Overall, the findings indicate that while users generally perceive service delivery efficiency as favourable, digital support platforms and effective customer care stand out as particularly valued dimensions. These insights underscore the importance of continuous improvements in customer engagement tools and support systems.

Table 2: Performance Evaluation of Public and Private Telecom Providers

Statement	N	Mean	Std. Deviation	Std. Error Mean	t	Sig.
The network coverage of my service provider is reliable in my area.	150	4.918	0.27469	0.01436	5.135	0.000
I experience consistent data speed during internet usage.	150	4.5191	0.50032	0.02615	2.309	0.021
The call quality (voice clarity, connection stability) is satisfactory.	150	4.2814	0.61935	0.03237	3.096	0.002
The pricing and plans offered by the provider are reasonable and affordable.	150	4.3962	0.68956	0.03604	2.189	0.029
Overall, I am satisfied with the performance of my telecom service provider.	150	3.2486	1.01546	0.05308	2.116	0.035

The t-test results for the performance evaluation of public and private telecom providers indicate that all five service attributes are statistically significant at the 5% level ($p < 0.05$), suggesting meaningful differences in user perceptions. Among the evaluated factors, network coverage shows the highest mean score (Mean = 4.918, p = 0.000), indicating that users overwhelmingly agree on the reliability of coverage in their area. Similarly, consistent data speed (Mean = 4.52), call quality (Mean = 4.28), and affordable pricing (Mean = 4.40) are also positively rated, reflecting strong user satisfaction with these aspects of telecom performance. However, the overall satisfaction score is comparatively lower (Mean = 3.25), suggesting that while users are generally content with specific service components, their overall experience may be affected by other operational or contextual factors. This points to a potential gap between

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individual service features and cumulative user satisfaction, highlighting the need for a more holistic and consistent service experience across all touch points.

10. KEY FINDINGS

- It is found that users strongly agree that telecom providers' mobile apps and websites are helpful in resolving service-related issues, highlighting the effectiveness of digital support tools.
- It is found that customer care support is perceived as accessible and capable of resolving issues effectively, indicating a key strength in service delivery across providers.
- It is found that although the promptness in responding to service requests received a high mean score, it is not statistically significant, suggesting consistent perceptions among users without notable variations.
- It is found that the restoration of services after network outages is generally viewed favorably but lacks statistical significance, implying that this aspect is uniformly experienced by most users.
- It is found that the dissemination of service disruption information is moderately rated and shows no significant variation, indicating that while users are informed, expectations may be stable across the board.
- It is found that network coverage is rated as highly reliable, with a statistically significant mean score, showing that users trust their providers for consistent connectivity in their areas.
- It is found that consistent data speed during internet usage is a strong contributor to performance satisfaction and shows statistically significant variation across users.
- It is found that call quality, including voice clarity and connection stability, is positively perceived and contributes meaningfully to overall telecom service performance.
- It is found that pricing and plan affordability are rated positively, confirming that cost-effective services remain an important factor for user satisfaction.
- It is found that overall satisfaction with telecom providers is comparatively lower than satisfaction with individual service features, suggesting the presence of broader operational or experiential gaps that impact user perception.

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11. SUGGESTIONS

1. It is suggested that telecom providers enhance their mobile applications and online platforms with more intuitive features to promote faster issue resolution and user independence.
2. It is suggested that both public and private operators strengthen real-time communication regarding service disruptions through proactive alerts via SMS, email, and mobile apps.
3. It is suggested that customer service teams be trained regularly in soft skills and technical troubleshooting to improve responsiveness and maintain consistency in user experience.
4. It is suggested that public telecom providers invest in infrastructure modernization, especially in semi-urban and rural areas, to match the performance levels of private competitors.
5. It is suggested that operators conduct regular performance audits and gather structured feedback to identify emerging service gaps and implement customer-centric improvements.

12. CONCLUSION

The study offers valuable insights into the service delivery efficiency and overall performance of public and private telecommunication providers in Vellore District. With increasing dependence on mobile and internet connectivity for education, business, healthcare, and social interaction, telecom services have become a fundamental necessity across both urban and rural segments. Findings reveal that users acknowledge strong network coverage, consistent data speed, and affordable pricing across both sectors. Notably, digital platforms such as mobile apps and self-service portals emerged as major contributors to perceived service efficiency, particularly among tech-savvy users. Customer care accessibility also played a significant role in shaping satisfaction levels.

However, the study highlights a notable disparity between satisfaction with individual service features and overall service experience. This suggests that while telecom providers are meeting user expectations in specific areas, the cumulative delivery — such as responsiveness during outages, real-time updates, and integration of services — requires further improvement. Public providers must focus on infrastructure upgrades and faster adoption of digital tools to

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compete with private operators, who already lead in speed and user engagement. Simultaneously, private providers should expand their rural presence to support equitable access. Hence, service delivery efficiency is no longer defined by coverage and cost alone. It now demands real-time responsiveness, technological integration, and customer-centric strategies. Bridging the performance-expectation gap will be key to sustaining customer trust and ensuring inclusive digital growth in Vellore District and similar regions.

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