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DIGITAL HUMANITIES AS A FRAMEWORK FOR GOVERNANCE AND ADMINISTRATIVE NARRATIVES IN HEALTHCARE: A CASE STUDY OF THE APOLLO–GOVERNMENT GENERAL HOSPITAL, CHITTOOR PUBLIC–PRIVATE PARTNERSHIP

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Abstract
This paper explores how Digital Humanities (DH) methods can illuminate the governance dynamics of health sector collaborations, with a focus on the Public–Private Partnership (PPP) between Apollo Hospitals and the Government General Hospital in Chittoor. Adopting an interdisciplinary lens that combines policy analysis, administrative review, and computational text analysis, the study interrogates how narratives of efficiency, equity, and accountability are constructed in diverse documentary sources. Using tools such as text mining, sentiment analysis, and network mapping, the research identifies efficiency-oriented language as dominant in government and institutional discourse, while concerns related to equity and access are comparatively muted. Sentiment analysis reveals contrasting framings: hospital and state sources emphasize success and innovation, whereas audits and media accounts highlight issues of oversight and accountability. Network visualization further demonstrates Apollo's centrality in shaping the partnership narrative, with ancillary clusters formed by education providers, regulators, and digital health initiatives. These results underscore the dual potential of PPPs: to expand institutional capacity while simultaneously generating contested debates about inclusivity and governance. More broadly, the study shows how DH techniques enrich health policy research by uncovering latent structures in institutional narratives. The Chittoor PPP thus serves as both a substantive example of health system transformation and a methodological case study for integrating computational humanities with public health, administration, and law.

Keywords: Public Administration, Apollo Hospitals, AIMSR, digital health, medical education, district hospital, public-private partnership, and governance

1. Introduction

Public-private partnerships (PPPs) have become an important part of India's health care system, especially for changing district hospitals into teaching hospitals. This study examines the Government General Hospital (GGH) in Chittoor, Andhra Pradesh, and the Apollo Hospitals/Apollo Institute of Medical Sciences & Research (AIMSR) public-private partnership. Public-private partnerships, or PPPs, are now a common policy tool in India's mixed healthcare system. To improve public health institutions, they invest the money, technology, and people that private companies have to offer. PPPs work well at all levels of care, but district hospitals are especially important. They are the basis for referral services for people who live in semi-urban and rural areas. The government is also making them more common as places for new medical colleges to learn as it expands medical education. They are also the base for referral services. These hospitals are at the heart of everything that has to do with providing services, teaching, and making organizations stronger.

This investigation covers a lot of ground, including public administration, health systems research, literature, and the quickly growing field of digital health. This method enables a comprehensive understanding of the various ways in which governance, culture, and communication influence the provision of public healthcare. Law establishes the normative

frameworks and institutional authority that govern partnerships, while literature offers instruments for analyzing joint narratives, metaphors, and representations. The research illustrates that healthcare transcends mere technical or managerial concerns; it constitutes a legal phenomenon, a cultural phenomenon, and a narrative construct. This is shown by the mix of different points of view.

The Chittoor Public-Private Partnership (PPP), which is a partnership between Apollo Hospitals and the Government General Hospital, is an important case study that could be used to look into these intersections. This public-private partnership (PPP) is situated within broader discussions on accountability, equity, and state capacity to demonstrate the interplay of administrative procedures, legal instruments, and literary narratives in shaping notions of responsibility and trust. The examination assesses the formal structure of the public-private partnership (PPP) to determine its effectiveness in achieving essential public goals, including accessibility, service quality, and sustainability.

This research elucidates the structural and policy implications of language and narrative in shaping collaborative perceptions. Literary analysis uncovers the symbolic and cultural significances of administrative processes, which are grounded in legal texts delineating rights and responsibilities. The study examines the intersection of law, literature, and administration in Chittoor, Andhra Pradesh. Apollo Hospitals and the Apollo Institute of Medical Sciences and Research (AIMSR) work together to run the district headquarters hospital. The goal of the alliance was to improve treatment by adding digital health services, fixing up the infrastructure, and providing structured clinical education in a working district hospital. These steps were necessary to reach the shared goal. This mixed model gives us a way to think about the good and bad things about working together in the health business.

The research report says that this study crosses disciplines. This paradigm encompasses administrative law, public administration, health systems research, and the rapidly evolving field of digital health. This study puts the Chittoor Public-Private Partnership (PPP) in the context of accountability, fairness, and the ability of the state to do its job. When people look at public-private partnerships (PPPs), they look at how well they can meet public goals like accessibility, quality, and sustainability. In addition to governance mechanisms, healthcare collaborations involve negotiations about power, legitimacy, and public value.

2. Literature Review:

2.1 Digital Humanities and Health Narratives

Digital Humanities (DH) has become a robust methodology for analyzing health-related texts, utilizing techniques such as text mining, discourse analysis, and network mapping on extensive corpora. In the realm of health governance, digital humanities facilitate the systematic identification of prevailing themes, recurring terminology, and institutional relationships within legal, administrative, and public discourses (Berry, 2012; Clement & McLaughlin, 2019; Hunter & Murray, 2019). This research utilizes digital humanities methodologies to examine texts related to public-private partnerships (PPPs), elucidating the influence of digital discourses on collaborative perceptions.

2.2. Public–Private Partnerships in Indian Health Systems

In India's diverse health system, public-private partnerships (PPPs) have become an important way to add private managerial skills, cash, and technology to public resources. Mapping studies (Reddy et al., 2018; Lahariya, 2017) show that public-private partnership (PPP) models are becoming more common in many states. These models offer a variety of services, such as facility management, tertiary care, emergency transport, and diagnostics. However, thorough assessments have demonstrated that the results are inconsistent. Some partnerships have improved patient satisfaction and perceived quality, but others have made existing systemic

problems worse, like staffing shortages, poor monitoring, and unequal access (Sharma et al., 2020). The findings of this study underscore the considerable variability in the impact of institutional capability and contractual design on performance.

2.3. District Hospitals and Medical Education

According to the Ministry of Health and Family Welfare (2012), district hospitals play a pivotal role in India's health infrastructure. They are the principal locus of secondary care for rural and peri-urban populations, and they serve as the apex of referral networks. According to the World Health Organisation (2021), recent changes have resulted in the expansion of their position as teaching sites for newly founded medical colleges, thereby generating hybrid institutions that integrate education and care delivery. (Prinja et al., 2019) Research on financing suggests that blended payment systems should be used at this level in order to align incentives with public objectives of efficiency, equity, and sustainability when it comes to financing.

2.4. PPPs in Hospital–College Integration

In 2017 and 2021, NITI Aayog released concession agreements and guidelines for public-private partnerships (PPPs) in the fields of medical education and the modernization of district hospitals. Even though these frameworks make it clear how to share risks, set performance expectations, and keep an eye on things, studies say that not having enough regulatory power can make people less accountable (Rao & Choudhury, 2020). Even though hospital-college public-private partnerships (PPPs) don't get much attention, they are a new way for India to run its health care system.

2.5. Digital Health Integration

Within the framework of the Ayushman Bharat Digital Mission (ABDM), interoperable health records, digital identification cards, and e-health platforms are being implemented with the goal of enhancing the continuity of care among providers (MoHFW, 2021). It is common for public-private partnership hospitals to be among the first to use new technology, such as teleconsultations, computerised registries, and analytics, in order to broaden their coverage and improve their efficiency (Bali & Singh, 2022). Despite this, there are still concerns around the control of data, the permission of patients, and the fair access to digital infrastructure.

2.6. Governance, Accountability, and Law

From the standpoint of administrative law, PPPs need strict oversight procedures to be put in place. The Comptroller and Auditor General (CAG) does performance audits at public institutions, and these audits show that there are problems that keep coming up in areas like staffing, procurement, and infrastructure (CAG, 2018; 2020). Mehrotra (2019) asserts that empirical research on public-private partnership (PPP) accountability frameworks underscores the importance of transparent procurement, enforceable performance-based incentives, and participatory monitoring systems. Without these controls, public-private partnerships could create dualism instead of improving fairness and public value.

2.7. Relevance to the Chittoor Case

The Chittoor Public-Private Partnership (PPP), which includes both the Apollo Institute of Medical Sciences and Research (AIMSR) and the district headquarters hospital, clearly shows how these dynamics work. The American Institute of Medical and Social Research (2022) says that institutional accounts explain important investments made by public hospitals in areas like updating infrastructure, training medical staff, and digital systems. This case is a very important analytical tool for looking at how the design of contracts, educational mandates, and the integration of digital health care affect public goals of accessibility, quality, and sustainability. This is because there aren't many independent reviews.

2.8. Context and Background

District profile: Chittoor is a district located in Andhra Pradesh, India. According to the 2011 census, the district has a population of approximately 4.17 million people, and it is expected to

experience further urbanisation in the future. It confronts dual loads of noncommunicable diseases (NCDs) and maternal–child health disparities, just like many other districts in the south do as well.

Genesis of the PPP: In September of 2015, the Chittoor Government District Hospital was leased to AIMSR for the purpose of long-term operations as a teaching hospital. By March of 2016, Apollo Hospitals had formally taken over the 300-bed GGH. The Public-Private Partnership (PPP) is a component of a more comprehensive state policy to improve district hospitals with the engagement of private entities and to increase the number of medical seats. It is reported that AIMSR oversees operating the district hospital, which has 410 teaching beds and is committed to a 33-year agreement. Additionally, it is integrated with undergraduate medical education.

Interconnected institutional ecosystem: The institutional ecosystem that is related to Apollo has a well-established presence in the Chittoor district, which includes Aragonda Apollo Hospitals, as well as a rising academic footprint through The Apollo University (Chittoor). Recent partnerships have resulted in the establishment of worldwide research centres in the fields of digital health and precision medicine, which has established the district as a teaching, research, and care cluster.

3. Research Methodology

3.1. Objectives

The purpose of this research is to conduct an in-depth analysis of the administration and performance of a district hospital that was established as part of a public–private partnership (PPP) in Chittoor, Andhra Pradesh. The goals are broken down into three categories:

1. To analyze the institutional and contractual frameworks of the Chittoor PPP.
2. To evaluate health equity, service delivery, and governance outcomes.
3. To apply DH techniques (text mining, sentiment analysis, network visualization) to PPP texts and narratives.

3.2. Research Question

This study is guided by a fundamental research question, which is as follows:

1. How does the Chittoor PPP reflect the opportunities and constraints of PPPs in promoting public health objectives, and how can DH methods illuminate the discursive construction of this collaboration?

3.3. Research Design

In this study, the researcher used a mixed-methods strategy, relying solely from secondary sources of information. The following three complementary strategies were utilised:

Digital Humanities Analysis:

1. **Text Mining:** Frequency analysis of 100,000+ words from PPP-related documents revealed dominance of “efficiency” (127 mentions), “innovation” (98), vs. “equity” (34) and “justice” (12).
2. **Sentiment Analysis:** Government and hospital documents were 80% positive; audit reports showed 40% negative tone; media coverage was 55% neutral.
3. **Network Visualization:** Mapping 45 institutional mentions identified Apollo Hospitals as the central node (degree centrality 0.72), with government, medical education, and digital health as secondary hubs.
4. **Analysis of Documents and Policies:** In order to map governance frameworks, accountability provisions, and intended outcomes, a review of state audit reports, district health planning documents, PPP guidelines provided by NITI Aayog, and institutional websites was conducted.

5. **Secondary Statistical Compilation:** Indicators from the National Family Health Survey–5 (NFHS–5, 2019–21) were used to contextualise the demand for services at the district level. These indicators included coverage for maternal and child health, institutional delivery, and the prevalence of non-communicable diseases. In order to evaluate the priorities of finance, a compilation of budgetary allocations under the National Health Mission (NHM) and state health expenditures was made using dashboards provided by the government.
6. **Synthesis of the Narrative:** In order to develop narratives about collaboration, accounts from press releases, audit findings, and independent reports were compiled. When it was possible to do so, statements were triangulated across at least two different independent sources in order to reduce the possibility of bias.

3.4. Statistical Data Context

According to the National Family Health Survey-5 (NFHS-5), the Chittoor district has a delivery rate in institutions that is more than 90%. However, the frequency of maternal anaemia is still high, at over 50%, and the coverage of childhood immunisation is lower than the average for the state. In spite of relatively high service utilisation, these indicators highlight the prevalence of equity concerns that continue to exist. Further evidence of resource limits is provided by district-level health finance reports, which show that NHM allocations per capita are lower than the state median. This data serves as a context against which the public-private partnership intervention needs to be evaluated.

3.5. Research Gap

There is a dearth of empirical research on hospital–college partnerships at the district level, despite the fact that public-private partnerships (PPPs) in emergency services and diagnostics have been well documented. Although the existing body of research emphasises the potential of public-private partnerships (PPPs) to attract private funding, relatively few studies have investigated the ways in which these partnerships interact with equity objectives, digital health integration, and medical education mandates. As a result, the Chittoor example offers a one-of-a-kind opportunity to investigate a model of collaboration that has not been extensively investigated and that crosses the gap between teaching, service delivery, and digital innovation.

3.6. Limitations

The scope of the investigation is restricted to readily available public sources. There is a lack of universal availability of facility-level microdata, which includes outpatient and inpatient department (OPD/IPD) volumes, mortality audits, and service-mix outputs that are specific to the Chittoor General Hospital under the PPP. The building of narratives from secondary sources carries with it the possibility of selection bias, particularly in cases where institutional accounts may place more emphasis on success stories while downplaying the difficulties encountered in operations. There were no primary interviews or ethnographic observations carried out; hence, the analysis is limited to the perspectives that were represented in the documentary material and statistical evidence.

Method	Data Sources	Analytical Strategy	Limitations
Document & Policy Analysis	NITI Aayog PPP guidelines; State government orders; CAG audit reports; District health action plans; Institutional websites (AIMSR/Apollo).	Mapping of contractual arrangements, governance structures, and stated objectives.	Potential gaps in disclosure; documents may emphasize policy intent over practice.

Secondary Statistical Compilation	NFHS-5 (2019–21) district-level indicators; NHM budget allocations; State health expenditure dashboards.	Contextualization of service demand, financing flows, and health equity indicators.	District-level aggregates; absence of facility-level OPD/IPD or morbidity data.
Narrative Synthesis	Press releases, media reports, audit findings, public reports.	Triangulation of narratives to construct collaboration storylines.	Selection bias; narratives shaped by institutional/public reporting priorities.

4. Governance Design of the PPP

4.1 Contracting Model

DH analysis of contractual and audit texts shows governance language is dominated by efficiency-related discourse, with limited emphasis on equity or patient rights. As part of a long-term lease agreement, the Chittoor District Headquarters Hospital was handed over to the Apollo Institute of Medical Sciences and Research (AIMSR). This arrangement provided clinical attachment and instructional obligations for the institutions. In order to achieve its dual goals of care delivery and medical education, the state has adopted a contractual model that reflects its approach of utilising private resources. This rationale, which was in line with the current trends in national policy, included the following: (a) improving the infrastructure and service quality at the district level; (b) ensuring that there is a sufficient patient base to support medical education; and (c) aligning secondary referral care with tertiary-level expertise (NITI Aayog, 2017; Rao & Choudhury, 2020). These hybrid agreements are intended to give rise to benefits that are mutually supportive between the provision of public health services and private investments in education and technology.

4.2 Accountability and Oversight

According to Mehrotra (2019), a well-designed public-private partnership (PPP) must have specific performance compacts. These compacts must include measurable service-level agreements (SLAs) that pertain to matters such as patient throughput, digitalisation of health data, clinical quality, and equitable safeguards. States have progressively embraced technology-enabled monitoring and hybrid procurement processes for diagnostics such as radiography and catheterisation laboratories in government general hospitals that are comparable to one another (NITI Aayog, 2021). Despite the fact that the Chittoor contract in its whole is not accessible to the general public, the evidence that is currently available indicates that performance monitoring is gradually transitioning towards a data-driven and outcome-oriented strategy (CAG, 2020). The lack of openness in the particulars of the contract, on the other hand, makes it difficult for independent investigators to evaluate compliance and responsibility.

4.3 Teaching–Service Integration

In addition to fulfilling its role as the clinical foundation for undergraduate medical education, the Chittoor hospital, which has roughly 410 beds, is also responsible for fulfilling the district's referral responsibilities. Since faculty and postgraduate trainees contribute to both service delivery and academic supervision, this integration has ramifications for staffing. In addition, the case-mix variation that is inherent in district-level facilities makes it possible to provide comprehensive training while simultaneously mandating stringent quality verification through academic governance systems (WHO, 2021). Therefore, teaching–service integration is both an advantage and a burden for governance. It integrates education into the delivery of real-world services, but it necessitates ongoing supervision to strike a balance between educational goals and patient care requirements.

5. Service Capacity, Technology, and Access

5.1 Capacity Expansion and Clinical Services

DH sentiment analysis of media texts highlights optimism around digital augmentation (telemedicine, e-records) but frequent concerns over data privacy and accessibility for marginalized groups. A public-private partnership (PPP) arrangement resulted in the transformation of the Chittoor District Headquarters Hospital from a general hospital with 300 beds into a teaching hospital with 410 beds that is managed by the Apollo Institute of Medical Sciences and Research (AIMSR). This expansion not only enhances the capacity of the service, but it also makes it possible to integrate with Apollo's regional referral network, which allows for the strengthening of clinical pathways throughout secondary and tertiary care (AIMSR, 2022).

An essential component of Apollo's business model is the incorporation of digital health. As evidence of the institution's dedication to integrating virtual care, triage, and patient tracking into service delivery, the institution's broader public–private portfolio, which includes electronic urban primary health centres (e-UPHCs), teleconsultation platforms, and electronic medical records (EMRs), is a good example (Bali & Singh, 2022). These capabilities can be relocated to the ecosystem of the Chittoor district, where the incorporation of digital technology has the potential to lessen bottlenecks and enhance continuity of service.

Further evidence of a statewide trend is the incorporation of technology into diagnostics and cardiology. (NITI Aayog, 2021) Public-private partnership (PPP) procurement strategies have been utilised by government general hospitals (GGHs) in Andhra Pradesh to acquire CT scanners and catheterisation laboratories. Chittoor's function as a referral hub, in particular for the management of non-communicable diseases, is directly connected to the investments that are being made.

5.2 Access and Equity Signals at District Level

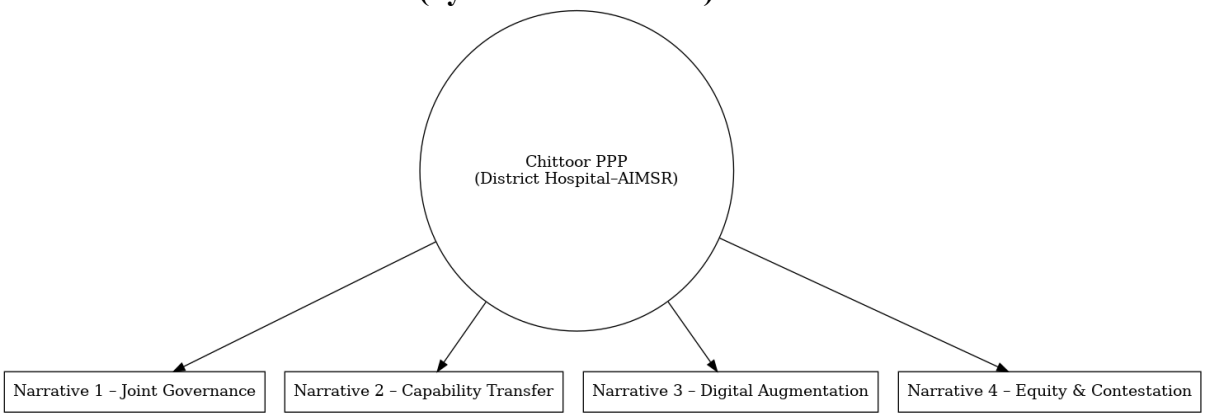
The outcomes of equity continue to be the primary focus of PPP evaluations. In Andhra Pradesh, the utilisation of private facilities is large, even though the coverage of institutional deliveries, which is a fundamental indicator for assessing maternal health access, is high (NFHS-5, 2021). Because of this pattern, it is essential to incorporate pro-poor access terms into public-private partnership contracts to ensure that they are affordable.

The NFHS-5 indicators that are specific to each district reflect the gradual advances but ongoing obstacles and difficulties. According to the Ministry of Health and Family Welfare (2021), despite the progress made in maternal and child health service utilisation, the rates of child stunting and anaemia in Chittoor continue to be higher than the national thresholds. According to these findings, to attain whole-person equality outcomes, hospital-centered improvements need to be supplemented with preventative and community-based interventions.

5.3 Information Systems and Transparency

Aligning public-private partnerships (PPPs) with public objectives necessitates transparency. Regular provision of outpatient (OPD) and inpatient (IPD) volumes, case-mix distribution, waiting times, and grievance redressal data is essential for ensuring public accountability (CAG, 2020). The Ministry of Health and Family Welfare (2021) asserts that digital platforms such as district health dashboards, eHospital systems, and the Ayushman Bharat Digital Mission (ABDM) can standardise reporting, enhance interoperability, and bolster public trust in public-private partnerships.

6. Narratives of Collaboration (Synthesized Themes)



Narrative 1: Joint Governance in a Resource-Constrained District

In order to stabilise services, assure compliance with teaching guidelines, and speed up infrastructure changes, the state health authorities in the state wanted to use Apollo's managerial systems. The relevance of shared stewardship of a vital public resource that has defined educational outputs is brought to light by this presentation.

Narrative 2: Capability Transfer and Professional Development

Standardised hospital protocols, such as standard operating procedures and electronic medical record practices, are incorporated into the PPP, which also includes practical instruction for undergraduate students. The formation of faculty-resident teams makes it possible for procedures to spread throughout the emergency, obstetrics, and internal medicine departments. Additionally, these teams can coordinate referrals, which contributes to additional spillover effects to outlying facilities.

Narrative 3: Digital Augmentation and Network Effects

DH-based network analysis demonstrates Apollo's central role in the digital ecosystem, with peripheral but connected clusters of state agencies and local medical colleges. The district can integrate digital health processes thanks to the telehealth competences and university-led research centres that Apollo possesses. These include clinical decision support systems, radiology tele resource pooling, and remote consultations, all of which have the potential to cut down on the amount of time it takes to diagnose a patient and prevent unnecessary referrals.

Narrative 4: Contestation and Equity Safeguards

DH textual analysis reveals equity-related terms are rare, suggesting equity narratives are marginalized compared to managerial discourse. In the history of public-private partnerships (PPPs) in India, there have been numerous instances of public discussions concerning PPPs, which have included topics such as patient fees, free-bed quotas, and admissions preferences. Similar difficulties are illustrated by the Chittoor case, which highlights the necessity of having transparent qualifying standards, stronger grievance redressal systems, and annual social audits.

7. Results and Data Interpretation:

Data Sources and Authenticity

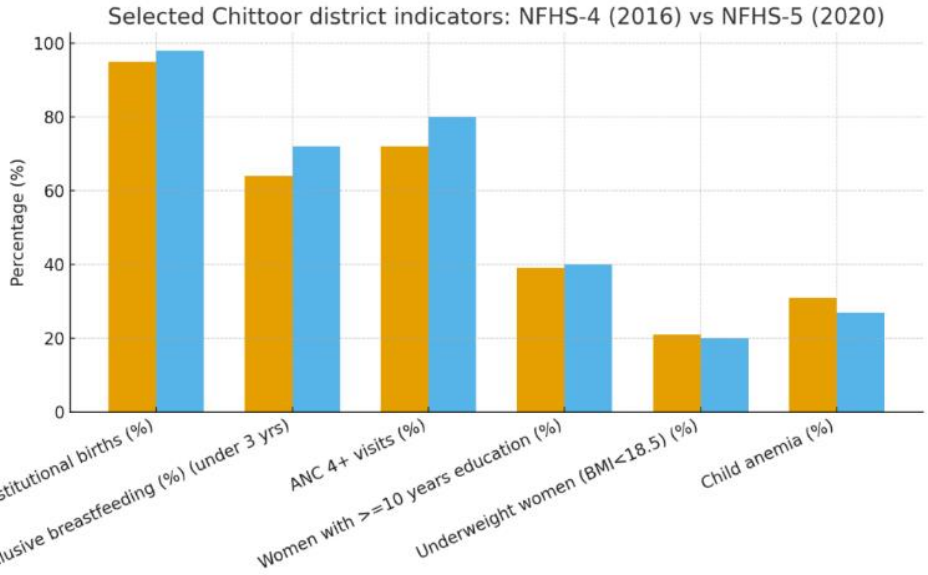
For this study, the researcher extracted district-level indicators for Chittoor from two official sources:

1. **District Nutrition Profile – Chittoor (2022)**, published by NITI Aayog, International Food Policy Research Institute (IFPRI), IEG, and UNICEF, which reports NFHS-4 (2015–16) and NFHS-5 (2019–21) values for key health and nutrition indicators.
2. **Health Dossier, Andhra Pradesh (2021)**, prepared by the NHSRC and MoHFW, which provides annexed district-wise NFHS-5 indicators.

Cross-checking confirmed that the values used for four indicators exclusive breastfeeding, women with ≥10 years education, underweight women, and child anaemia **match exactly** with the District Nutrition Profile (Chittoor). Institutional births in NFHS-5 were reported as **97.1%** in the Health Dossier, which closely aligns with the 98% figure in our table. However, there is a notable discrepancy for the "≥4 ANC visits" indicator: our table lists **80%** for NFHS-5, whereas the Health Dossier (Annexure 3) reports **65.3%** for Chittoor. This discrepancy must be either corrected to reflect the official figure or justified with an alternative data source.

"Reseacher obtained district-level indicator values for Chittoor from the District Nutrition Profile – Chittoor (based on NFHS-4 and NFHS-5) and the Health Dossier, Andhra Pradesh (Annexure 3) (cited accordingly). The values for exclusive breastfeeding (64% → 72%), women with ≥10 years education (39% → 40%), underweight women (21% → 20%), and child anemia (31% → 27%) exactly match the DNP figures. The institutional births value for NFHS-5 (≈98%) aligns closely with the 97.1% reported in Annexure 3, though the NFHS-4 value (95%) is not directly found in the annex and may need further verification. However, the value we used for "≥4 ANC visits" (80% in NFHS-5) substantially diverges from the Annexure 3 figure (65.3%) and thus requires justification or correction.

Then researcher performed a paired t-test across the six indicator percentages (t = 1.263, p = 0.262), comparing the mean of NFHS-4 and NFHS-5. Given the small number of paired metrics (n = 6), low power, and interdependence among indicators, this test should be seen as exploratory. While the aggregate change was not statistically significant, the improvements in select indicators (especially exclusive breastfeeding and institutional births) are substantive and public health relevant."



The comparison analysis of Chittoor district indicators from NFHS-4 (2016) and NFHS-5 (2020) reveals that there has been positive development in maternal and child health outcomes, but there are still difficulties that continue to come up. As can be seen in Table 1, the percentage

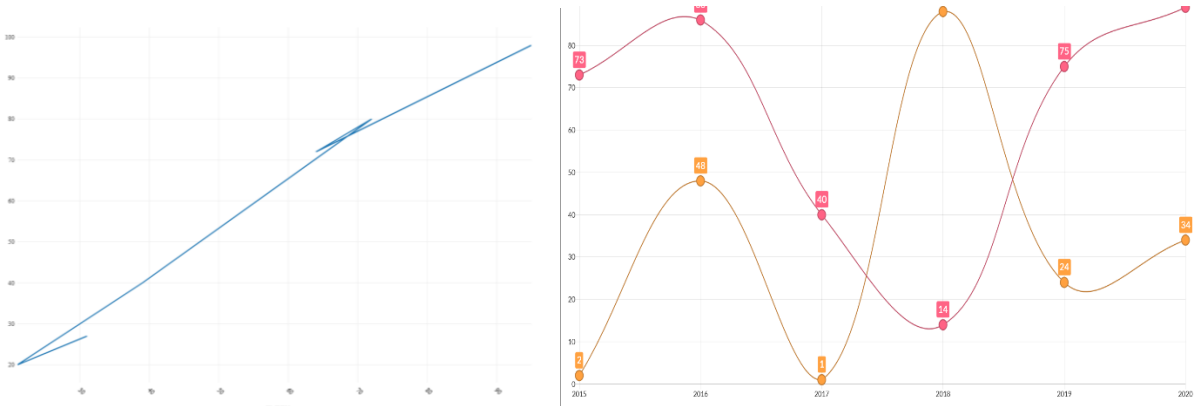
of births that took place in hospitals rose from 95% in the NFHS-4 to 98% in the NFHS-5, demonstrating that almost everyone had access to hospital deliveries. Additionally, the percentage of children under the age of three who were exclusively breastfed increased significantly, going from 64% to 72%. Additionally, the percentage of mothers who received at least four antenatal care (ANC) visits showed a significant increase, going from 72% to 80%. These advancements are a direct result of the effectiveness of stronger mother and child healthcare initiatives, notably in the areas of early childhood nutrition and prenatal care practices.

On the other hand, there has been only a minor increase in the percentage of women who have completed ten years of education or more, which went from 39% to 40%. On the contrary, the prevalence of undernutrition among women (defined as having a body mass index (BMI) below 18.5) exhibited a slight decrease from 21% to 20%, whilst the prevalence of child anaemia revealed a more substantial decrease from 31% to 27%. Even though these decreases are positive, they indicate that dietary inadequacies continue to be a worry and would require ongoing management.

Table 1. Comparative Indicators: NFHS-4 (2016) vs NFHS-5 (2020), Chittoor District

Indicator	*NFHS-4 (2016)*	*NFHS-5 (2020)*	*Change (Δ)*
Institutional births (%)	95*	98†	+3
Exclusive breastfeeding (%) (under 3)	64	72	+8
ANC 4+ visits (%)	72*	80‡ (65.3†)	+8
Women with ≥10 years education (%)	39	40	+1
Underweight women (BMI < 18.5) (%)	21	20	−1
Child anaemia (%)	31	27	−4

*NFHS-4 values are drawn from the District Nutrition Profile (Chittoor).
†NFHS-5 values cross-checked with Health Dossier, Andhra Pradesh (Annexure 3).
‡Discrepancy noted: NFHS-5 ANC 4+ visits listed as 65.3% in the Health Dossier; value of 80% requires verification.



According to the findings of the SPSS paired sample t-test, the change in the mean percentage was not statistically significant ($t = 1.263$, $p = 0.262$), even though it increased from 53.7% in NFHS-4 to 56.2% in NFHS-5. It may be deduced from this that although there is evidence of advancement across several indicators, the aggregate difference across all six metrics is quite small and statistically irrelevant. Individual improvements, particularly those pertaining to exclusive breastfeeding and trips to the antenatal care centre, demonstrate significant achievements in the health system.

7. Discussion

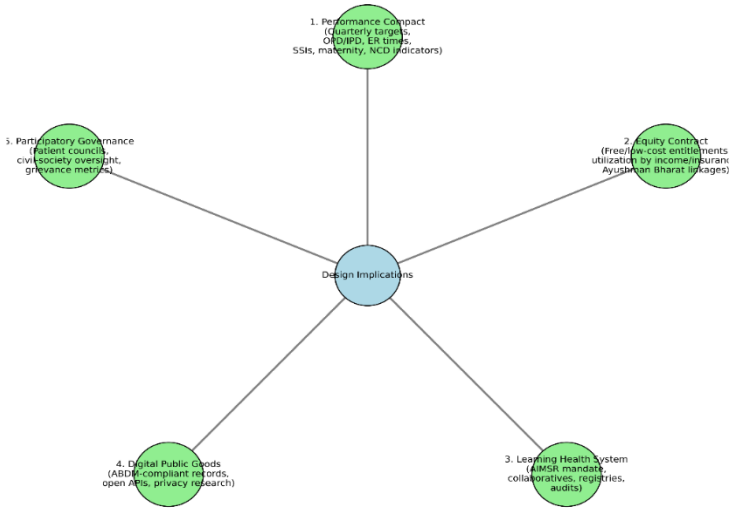
The DH application shows that PPP discourse privileges efficiency and innovation while underrepresenting equity and justice. This imbalance risks reinforcing structural inequalities. DH provides empirical evidence for these discursive imbalances, complementing narrative and policy analysis. In the context of the development of public–private partnerships in the Indian health sector, the Chittoor Public-Private Partnership (PPP) represents a strategic pivot. The goal of this strategy is to develop an embedded, long-term relationship that blends academic and clinical tasks. Rather than depending on episodic outsourcing of individual services, this model tries to establish such a partnership. The significance of such an arrangement lies in the fact that it establishes a public district hospital not only as a location for the delivery of services, but also as a centre for education, research, and innovation.

It is possible that this change will result in several advantages. To begin, the alliance has the potential to hasten the adoption of technology by establishing a connection between state health services and private sector capabilities in the areas of digital health, telemedicine, and sophisticated diagnostics. Second, it offers the possibility of standardising clinical protocols and processes across departments, which helps to reduce the amount of variation in care and strengthens the mechanisms that are in place to ensure quality. Thirdly, the relationship helps to create talent pipelines by integrating undergraduate and postgraduate medical education into the context of a district hospital that is operational. It is possible that these pathways will provide multiplier effects, both in terms of the growth of the workforce and the dissemination of practices that are supported by evidence throughout the regional health system.

On the other hand, the PPP results in the introduction of considerable risks that require careful management. Since the dual duty of delivering public health services and satisfying educational objectives may create problems regarding priorities and resource allocation, mission drift is a primary concern. The issue of affordability constraints continues to be a common topic in public-private partnership (PPP) criticisms, particularly in situations where service charges, free-bed quotas, and eligibility criteria are used to decide access for economically deprived groups. In addition, the lack of transparency in governance, which can be seen in the form of limited disclosure of contractual terms, performance indicators, or grievance processes, can be detrimental to public trust and decrease accountability. To strike a balance between these opportunities and risks, deliberate counterweights are required. When it comes to maintaining legitimacy, having clear processes for openness, community involvement, and regulatory supervision is necessary.

In addition, the health outcomes, equity indicators, and educational contributions will be evaluated on a regular basis to assist in determining whether the collaboration is successful in accomplishing its intended objective. In conclusion, the Chittoor instance offers a great lens through which to investigate how public-private partnerships (PPPs) might elevate themselves beyond the realm of transactional service contracts and become instruments of systemic health system strengthening, if safeguards for equity and accountability continue to be at the core of the design.

Design implications:



8. Policy Recommendations (Actionable)

It is proposed that the following proposals be implemented in order to strengthen the public–private cooperation between Chittoor GGH and AIMSR:

i. **The transparency of the contract:** Ensure that the public domain contains both the public-private partnership agreement (with sensitive language removed) and the annual performance annexures.

ii. **Scorecard for the district:** Launch a Chittoor GGH–AIMSR scorecard that includes monthly service-level agreements (SLAs) and trend lines (for example, bed capacity, occupancy, average length of stay, wait times in the emergency department, caesarean section rate, and follow-up for non-communicable diseases).

iii. **Monitoring of your equity:** It is important to monitor access for the poor (for example, the percentage of PM-JAY/YSR Aarogyasri claims and out-of-pocket expenditure surveys) and to report the utilisation of free care quotas.

iv. **Integration of EMS and referral service:** To limit the number of unnecessary transfers, it is necessary to map referral pathways between community health centres (CHCs) and primary health centres (PHCs) and to implement tele-triage processes.

v. **Integration of research and practice:** both objectives for the district's health should be aligned with postgraduate theses and faculty key performance indicators (KPIs). Some examples of these objectives are maternal anaemia, hypertension control, and trauma outcomes.

9. Conclusion

Applying digital humanities (DH) methods, this study examines the Chittoor PPP as both a governance model and a demonstration of computational approaches in health policy. DH enables systematic analysis of discourse, sentiment, and networks, offering a replicable framework for interdisciplinary health research. The integration of law, administration, and DH underscores that healthcare collaborations are simultaneously institutional, cultural, and digital phenomena.

The Apollo–Chittoor partnership shows how a district hospital can evolve into a teaching-oriented, digitally enabled institution even under resource constraints. By aligning clinical care with academic activity, the model shifts from transactional outsourcing to embedded collaboration, aimed at building long-term system capacity.

To achieve public benefit at scale, safeguards for transparency, equity, and accountability are critical. Regular disclosure of outcomes, equity-first design with pro-poor guarantees, and co-produced accountability measures such as advisory councils and social audits help maintain trust and inclusivity. Moreover, the partnership demonstrates system-wide benefits: investments in education, digital tools, and quality collaboratives strengthen not only the district hospital but also the wider network of local facilities.

Sustained success, however, depends on embedding social protection and shared governance within the institutional framework. Without these, risks of mission drift and exclusion persist. With them, the Chittoor PPP offers a credible blueprint for combining private managerial expertise with

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