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Municipal Digitisation and E-governance in North-Western India: Emerging Issues and Alternatives (Some Evidences from Recent Studies)

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Abstract

This paper critically examines the trajectory and impact of municipal digitisation and e-governance reforms under the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) in North-Western India, with empirical insights from Shimla, Srinagar, Dehradun, and selected towns in Punjab. Against the backdrop of rapid urbanisation and infrastructural deficits, the paper explores how digital interventions have reshaped service delivery, citizen engagement, and governance efficiency using some study-based evidences. Using a mixed-method approach including surveys, focus group discussions and stakeholder interviews, the research reveals high user preference for online services (89.6%) and significant gains in transparency, convenience and administrative responsiveness. However, it also uncovers persistent challenges such as low awareness (only 22.7% aware of AMRUT components), digital divides, infrastructural gaps and limited institutional capacity. The paper argues that while AMRUT has catalyzed meaningful reforms, achieving inclusive and sustainable urban governance requires deeper citizen-centric design, multilingual platforms, robust monitoring and capacity building. The findings contribute to policy discourse on digital public infrastructure and its alignment with Sustainable Development Goals (SDGs), offering strategic recommendations for scaling e-governance across diverse urban contexts.

Keywords: Digitisation, E-governance, Urban Rejuvenation, Transformation and SDGs

Introduction

The evolution of e-governance has been transforming governance paradigms across the globe, enabling municipalities to shift from manual, opaque administrative systems to more transparent, accountable and citizen-centric models. In developed contexts, municipal digitisation has not only facilitated efficient service delivery but also contributed to greater civic participation and trust in local governance structures. These global transitions reflect a broader normative shift wherein digital governance is no longer an auxiliary reform, but a foundational element of urban sustainability and participatory democracy.

In India, the national trajectory of e-governance has been shaped by a series of decentralisation and administrative reform initiatives. With the enactment of the 73rd and 74th Constitutional Amendments, the foundation was laid for empowering Urban Local Bodies (ULBs) as key agents of urban development. This was further reinforced by successive policy frameworks, including the National e-Governance Plan (NeGP) and mission-based interventions like the Jawaharlal Nehru National Urban Renewal Mission (JNNURM). However, it was the launch of the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) in 2015 that foregrounded digital reforms as a core mandate for municipal transformation. AMRUT aimed at strengthening basic urban infrastructure and introduced a reform agenda that prioritised the digitisation of services such as water supply, sewerage, property tax, building permissions and grievance redressal systems.

In the regional context of north-western India, e-governance reforms have followed a varied and uneven path, influenced by institutional capacities, geographic specificities and socio-political dynamics. Urban centres in this region including both hilly and plains municipalities have made considerable strides in adopting digital tools for citizen service delivery. Online portals for birth and death registration, payment of municipal charges and grievance tracking have witnessed a notable increase in user preference, signaling a growing receptiveness among citizens toward digital platforms.

This paper seeks to critically examine the recent developments, emerging best practices and issues and alternatives in implementation of AMRUT scheme in India, with some evidence from the recent studies from northwestern region. This paper will evaluate the successes and shortcomings of the digital initiatives in the context of increasing urbanization and technological initiatives. The journey from conventional methods of governance-to-governance models that are participatory, inclusive, and responsive to the socio-spatial realities of diverse urban contexts, require a critical assessment of policies, their implementation and peoples' perception.

Trends of Urbanization

In this section an effort has been made to understand the context and need of the scheme emanating from the growing urbanization, deficiencies in infrastructure and services in the North-western region comprising Punjab, Haryana, Himachal Pradesh, Jammu and Kashmir, Uttarakhand and Chandigarh.

Urbanization in India

The total population of the country has grown little more than five times i.e. from 238.4 million in 1901 to 1210.2 million in 2011. India's urban population has grown faster than rural population. The level of urban population increased from 10.8% in 1901 to 31.2% in 2011. The number of towns has grown from 1917 in 1901 to 3060 in 1951 and 7935 in 2011. The largest increase in number of towns (2774) was recorded during the last decade of 2001-11. This increase was primarily due to the entry of a large number of census towns. Looking critically and objectively at the increase in urban population and the growth of towns, it can be easily concluded that both are not on the same frequency and wavelength. If the urban population has grown by 14.59 times during the last 11 decades, the number of urban centres has merely multiplied by 4 times, indicating a high degree of concentration in the existing towns leading to congestion, and unplanned and haphazard growth.

Table 1

Urbanization in North-Western India

State/UT	Total Population (Crores)	% of India's Population	Urban Population (Crores)	% of NW Urban Population	Urbanization Notes
Punjab	2.77	2.29%	1.04	38.09%	Highest urban population in NW region
Haryana	2.54	2.09%	0.88	32.23%	Second highest urban population

Jammu & Kashmir	1.24	1.04%	0.34	12.45%	Most urbanized among hilly states
Uttarakhand	1.01	0.83%	0.3	10.98%	Moderate urbanization among hilly states
Himachal Pradesh	0.68	0.57%	0.07	2.56%	Least urbanized among hilly states
Chandigarh (UT)	0.11	0.09%	0.1	3.66%	Highly urbanized, but small population base
Total NW Region	**8.35**	**6.89%**	**2.73**	**100%**	Percentage of Urban Population of NW Region: 32.69%

Source: Compiled from Census of India

North Western scenario: The urbanization patterns in north-western region of India show an interesting picture. The total population of the North-west region in 2011 was 8.35 crores constituting 6.89% of India's population. Among the North-western states, Punjab had a population of 2.77 crores, Haryana 2.54 crores, Himachal Pradesh 0.68 crores, Jammu and Kashmir 1.24 crores, Uttarakhand 1.01 crores and Chandigarh 0.11 crores. The percentages of population of these states to the total population in the country were placed at 2.29, 2.09, 0.57, 1.04, 0.83 and 0.09 percent respectively. Urbanization in North-western region of India comprising Himachal Pradesh, J&K, Uttarakhand, Punjab, Haryana and Chandigarh is growing and the urban population of the region in 2011 was 2.73 crores. The percentage of urban population in North-west region (32.69%) is slightly higher than the percentage of India's urban population (31.16%).

While total urban population of North-west region is 2.73 crores, Punjab accounts for 38.09% (1.04 crores), Haryana stands at 32.23% (0.88 crore), Jammu and Kashmir at 12.45% (0.34 crore), Uttarakhand 10.98% (0.30 crores) and Himachal Pradesh at 2.56% (0.07 crore). The share of Chandigarh UT in population merely stands at3.66% (0.10 crore). The dominance of the states of Punjab and Haryana in the total urban population of the region is visible. Among hilly states, Jammu and Kashmir is most urbanized followed by Uttarakhand and Himachal Pradesh. The rural population in the northwestern region is approximately double the prevailing urban population. However, the proportion is likely to change in future with the level of urbanisation going up in the states. In this context of urbanization and dynamically changing landscapes of governance, this paper seeks to analyse the policies, peoples' perceptions and challenges lying ahead.

AMRUT, E-Governance and SDGs

The Atal Mission for Rejuvenation and Urban Transformation (AMRUT), launched on 25th June 2015, is a centrally sponsored scheme aimed at providing basic urban infrastructure across 500 cities in India. Its core components include water supply, sewerage and septage management, storm-water drainage, green spaces and promotion of non-motorised transport (Ministry of Housing & Urban Affairs, 2022). With a focus on the poor and underserved, AMRUT strives to ensure access to tap water, sewerage connections, flood mitigation, pollution reduction and enhanced urban amenity value through public spaces like parks (AMRUT Mission Statement & Guidelines, 2015).

A key innovation under AMRUT has been its integrated reform agenda, especially the focus on e-governance in urban management. The digitisation of ULBs included creating official websites, e-newsletters and online service delivery for key civic services such as birth/death registration, property tax, licenses, and water charges within 24 months. Guidelines also proposed mandatory e-procurement and digital staff/project management within 36 months (AMRUT Guidelines, 2015). These ICT-led reforms were aimed at improving transparency, accountability and citizen convenience, particularly benefiting the elderly, women, entrepreneurs and those with disabilities, who face mobility constraints.

According to Murugaiah et al, (2018), AMRUT reforms like professionalizing municipal cadres, introducing double-entry accounting, reviewing building bylaws, improving municipal tax systems, and linking with Swachh Bharat—were designed to strengthen governance frameworks and reduce malpractice. As Hardeep Puri, (former Minister of Urban Development) noted, AMRUT 2.0 is a product of the "confidence gained" from the earlier phase and a commitment to expanding basic services universally. Ultimately, AMRUT and its digital governance reforms serve not only the unserved urban poor but also promote efficiency and accountability in India's evolving urban governance landscape.

This integration of digital technologies into municipal governance is not merely a matter of administrative ease, but also is a strategic imperative for achieving the Sustainable Development Goals (SDGs) put forth by United Nations. As we continuously face challenges such as administrative inefficiency, climate change, inequality and institutional bottlenecks, these data-driven solutions can accelerate our progress across multiple SDG targets. Digital technologies have enormous potential to directly influence a majority of SDG targets. For example, smart infrastructure and IoT enabled urban systems contribute to SDG 11 i.e. Sustainable Cities and Communities by enhancing public service delivery reducing emissions and enhancing the efficiency of resources. Similarly, SDG 16- Peace, Justice and Strong Institutions can be better addressed with e-governance platforms and digital tools. These tools, if utilized properly foster accountability, reduce corruption and enable transparent and participatory decision making.

Digital Economy and Society Index (DESI), an index that summarized indicators of digital performance and tracked the performance of EU countries, further reveal that digital innovation not only speeds up the performance of SDG, but also mediates economic performance. It suggests a virtuous cycle between technological adaptation and sustainable outcomes (Vărzaru, 2025). In this regard, municipal digitization becomes a medium of inclusive growth. Cities are able to deliver services more equitably, efficiently while enhancing resilience to socio-economic and environmental shocks. Moreover, the digital public infrastructure that serves as foundational digital services and systems has gained prominence as a foundational enabler of SDG delivery. It enables public and private sector entities to deliver essential services, fostering economic growth and social inclusion by providing open, interoperable platforms for identity, payments, and data exchange. Just like our physical infrastructure serves as foundation for our economic and social activities, Digital Public Infrastructure improves access to justice, facilitates digital cash transfers and supports e-health and educational initiatives in particularly low- and middle-income countries. These infrastructures, therefore, exemplify how digital governance can be utilized to serve populations digitally, right from grassroot levels and thereby democratizing access to essential services and rights. (UNDP, 2023)

In sum, technological interventions and e-governance initiatives, such as those under AMRUT, when aligned strategically with sustainability goals, can transform municipal governance into a robust engine of inclusive growth and development (UNDP, 2023; Bocean, 2025). By embedding digital systems into the fabric of local institutions, cities can not only enhance

transparency, accountability and efficiency, but also contribute meaningfully to the global 2030 Agenda.

Exploring the Patterns, and Issues of Municipal Digitization and e-governance under AMRUT

This section is based on a recent study by the co-author of the paper (Teotia, 2024), titled as Digital and E-governance Reforms for Good Local Governance under AMRUT in Hilly Towns of Northern India: A Study of Shimla, Srinagar and Dehradun. The research critically evaluates the extent and impact of digital and e-governance reforms in the capital cities of Shimla, Srinagar, and Dehradun. This has been done by exploring the status, trends, patterns and issues of municipal digitization and e-governance under AMRUT reforms in the larger context of urban transformation, while critically assessing the policy paradigms and implementation mechanisms at the level of ULBs. These urban centers, marked by their challenging topographies and socio-economic constraints, present a crucial context for analyzing the effectiveness and inclusiveness of digital reform in India. The focus is not only on the implementation of specific reform schemes but more importantly on how these are perceived at the citizen level and the institutional challenges they face. Therefore, the perceptions of the citizens, their opinions, feedback has been carefully analyzed in order to bring about a nuanced understanding of ground level impact of digital reforms. Also, an effort has been made to link these initiatives with improved governance outcomes and suggest policy initiatives and alternative strategies.

Globally, the significance of digital governance has been emphasized in various scholarly works, pointing to its potential in improving administrative efficiency, transparency, and accountability (Heeks, 2001; UN E-Government Survey, 2018). In India, the drive toward digital governance gained momentum with the National e-Governance Plan and later urban missions, including JNNURM. Scholars such as Misra (2004) and Chatterji (2018) have acknowledged its transformative potential while also drawing attention to gaps in infrastructure, the persistence of the digital divide, and uneven access to technology across different population groups. Despite notable strides, very less empirical studies have captured the on-ground perceptions of urban residents, particularly in mountainous terrains where connectivity and access issues are distinct. This research helps fill that empirical void by integrating both citizen voices and official insights from three hilly towns.

Methodologically, the study employs a mixed-method approach. Primary data was collected through structured interviews. Supplementary information was gathered via Focus Group Discussions (FGDs) and interviews with municipal functionaries and officials from state urban development departments. These were triangulated with secondary data sources such as Census reports, AMRUT-related documentation, and municipal portals. Data interpretation relied on descriptive statistics and qualitative thematic analysis. Table 2 gives an overview of Municipal online portals and services in selected ULBs.

Table 2

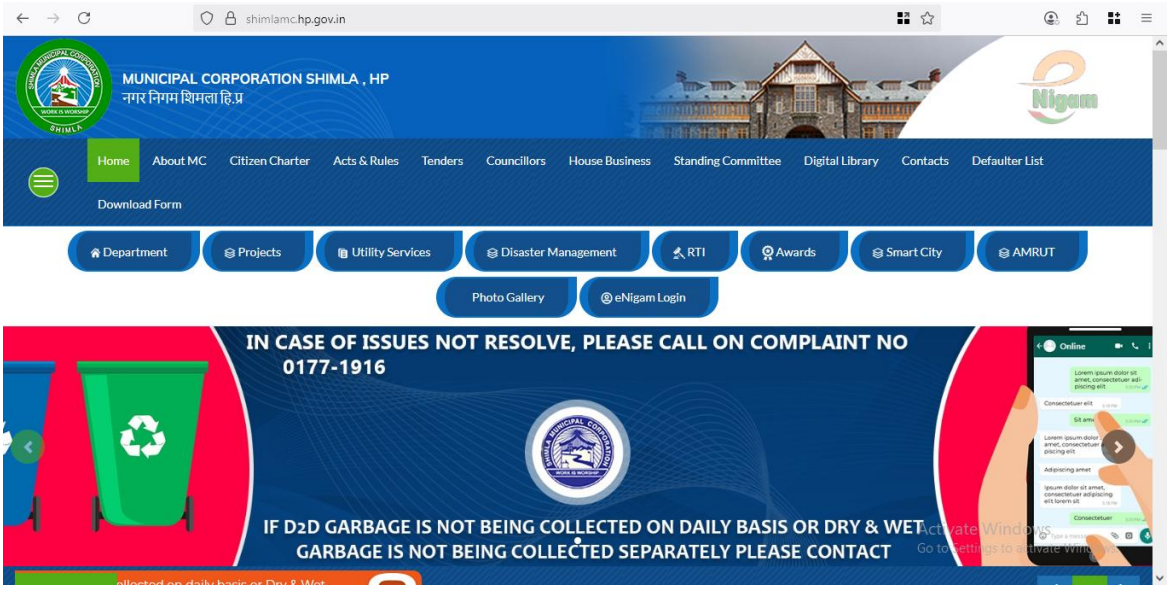
Municipal Online Portals and Services in Selected ULBs

Name of ULB	Application/Portal/Website	Usage/Services Provided
Shimla	Property Tax	Collection of property tax
	Garbage Billing	Collection of garbage bill payments

	Online Building Planning Permission Application	Online approval of maps/building planning permissions
	Trade License	Issuance of trade licenses (NPFA)
	Permission for Dumping of Malva	Online permission for dumping
Srinagar	Janparichay	Municipal services
	Jansugam	Municipal services
	OBPS	Building permissions
	Umang	Municipal services
	e-Unnat	Municipal services
	LRIS	Mutations, land records, etc.
Dehradun	Nagar Nigam Dehradun	Property tax payment
	Nagar Nigam Dehradun	Mutation, Birth & Death, Grievance redressal, Social media, Pet & Dairy, Ward information, Self-assessment, Service requests

Source: Municipal corporations of Shimla, Srinagar and Dehradun.

Screenshot of Website of Shimla Municipal Corporation:

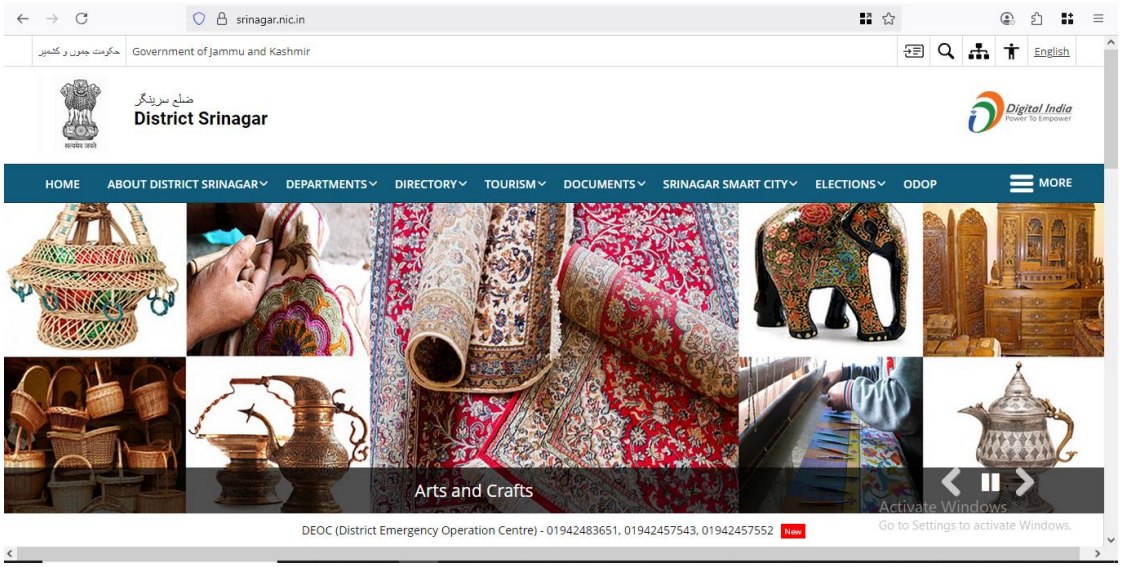


Source: https://shimlamc.hp.gov.in/

Screenshot of Website of Dehradun Municipal Corporation:

Source: https://nagarnigamdehradun.com/

Screenshot of Website of Srinagar Municipal Corporation:



Source: https://srinagar.nic.in/

As the study relied on varied sources of primary and secondary data, the upcoming section gives information about the findings collected using field survey of 450 respondents: 15 from each of the 10 wards in Shimla, Srinagar and Dehradun. The tables have been provided for a lucid presentation of citizens' responses. A total of 450 respondents across 30 municipal wards were systematically selected through multi-stage sampling, supplemented with interviews of ULB functionaries, councillors, and citizens who had used digital municipal services. The primary survey (62 questions) captured respondents' awareness, usage, and perceptions of e-governance, while FGDs and expert interviews provided qualitative insights into efficiency, convenience, corruption reduction and service delivery challenges. Secondary data was collected from municipalities, policy documents, reports and online sources, guided by a 13-section questionnaire.

Table 3

Awareness and Participation in AMRUT Components and Campaigns (N = 450)

ULB	Aware of AMRUT Components	Not Aware	Participated in Awareness Campaign	Did Not Participate	Need More Awarenes s	Do Not Need
Dehradun (n = 150)	43 (28.7%)	107 (71.3%)	38 (25.3%)	112 (74.7%)	37 (24.7%)	1 (0.7%)
Shimla (n = 150)	56 (37.3%)	94 (62.7%)	37 (24.7%)	113 (75.3%)	33 (22.0%)	4 (2.7%)
Srinagar (n = 150)	3 (2.0%)	147 (98.0%)	2 (1.3%)	148 (98.7%)	2 (1.3%)	0 (0.0%)
Total (N = 450)	102 (22.7%)	348 (77.3%)	77 (17.1%)	373 (82.9%)	72 (16.0%)	5 (1.1%)

Source: Teotia (2024)

The majority of respondents i.e. 77.3% (348) replied they don't have any information about the components of AMRUT and only 22.7% (102) respondents have awareness about components of the AMRUT Mission. Although, the majority of respondents in all three cities replied they lack awareness, Srinagar lags much behind as only 3 respondents were aware of the components of AMRUT. Among the total 450 respondent's majority i.e. 82.9% (373) have never participated in any awareness campaign on the AMRUT scheme. Only 17.1% (77) respondents have participated in awareness campaigns, when asked do they need further awareness on AMRUT and ULBs digital services only 93% (72) replied yes, they need further awareness and just 6.4% (5) respondents replied they don't need any further awareness on AMRUT and digital services of municipal corporations.

Table 4

Respondents Preferring Online Services and their Reasons

Name of ULB	**Do you prefer online services**		**Reason**										
	Yes	**No**	**Due to easy process**	**Easy to access**	**Saving time**	**More Transparency**	**Less corruption**	**24*7 available service**	**More Convenient**	**Easy to use**	**Travel Saving**	**No more waiting in a queue**	**Due to busy life style**

Dehradun	135	15	28	16	42	9	9	17	14	1	1	0	0
	(90.0)	(10.0)	(18.7)	(10.7)	(28.0)	(6.0)	(6.0)	(11.3)	(9.3)	(0.7)	(0.7)	(0.0)	(0.0)
Shimla	127	23	8	23	18	2	2	36	8	20	5	4	1
	(84.7)	(15.3)	(5.3)	(15.3)	(12.0)	(1.3)	(1.3)	(24.0)	(5.3)	(13.3)	(3.3)	(2.7)	(0.7)
Srinagar	141	9	5	36	44	0	2	7	81	28	2	0	0
	(94.0)	(6.0)	(3.3)	(24.0)	(29.3)	(0.0)	(1.3)	(4.7)	(54.0)	(18.7)	(1.3)	(0.0)	(0.0)
Total	403	47	41	75	104	11	13	60	103	49	8	4	1
	(89.6)	(10.4)	(9.1)	(16.7)	(23.1)	(2.4)	(2.9)	(13.3)	(22.9)	(10.9)	(1.8)	(0.9)	(0.2)

Source: Teotia (2024)

The majority of respondents i.e. 89.6% (403) prefer online services instead of manual or offline services. The preferences for online services are similar shown by respondents at three selected cities. Srinagar tops with 94% (141) (Individual city level percentages are counted from 150 respondents which is the sample size for each city) respondents prefer online services, next comes Dehradun with 90% (135) and Shimla retains the third spot with 84.7% (127) respondents prefer online services. There are multiple reasons given by respondents as to why they prefer online services.

Table 5

General Online Services Being Used by Respondents

ame of ULB	**General online services being used by Respondents**							
	Banking	**Health**	**Passport**	**Driving License and Chillan**	**Registry of Lands**	**Education**	**Pension**	**Payments and Fees**
Dehradun	58 (38.7)	59 (39.3)	4 (2.7)	42 (28.0)	12 (8.0)	73 (48.7)	10 (6.7)	93 (62.0)
Shimla	2 (1.3)	122 (81.3)	0 (0.0)	22 (14.7)	3 (2.0)	86 (57.3)	4 (2.7)	44 (29.3)
Srinagar	139 (92.7)	13 (8.7)	9 (6.0)	55 (36.7)	3 (2.0)	61 (40.7)	0 (0.0)	126 (84.0)

Total	199 (44.2)	194 (43.1)	13 (2.9)	119 (26.4)	18 (4.0)	220 (48.9)	14 (3.1)	263 (58.4)

Source: Teotia (2024)

Table 5 shows the active engagement of respondents in availing of online services, with respondents having used more than one or multiple services. The most used services are online payments and fees. More than half of the respondents i.e. 58.4% (263) have used online services for payments. Education is the second most used online service with 48.9% (220) respondents having used or are availing online education, then comes online banking which is used by 44.2% (199), next comes online health services used by 43.1% (194), and online services of driving license and challan used by 26.4% (119) respondents.

Table 6

Respondents' Perceptions on Online Portals

ULB	Complicated	Somewhat Complicated	User Friendly
Dehradun (n=150)	8 (5.3%)	34 (22.7%)	108 (72.0%)
Shimla (n=150)	7 (4.7%)	48 (32.0%)	95 (63.3%)
Srinagar (n=150)	2 (1.3%)	7 (4.7%)	141 (94.0%)
Total (N=450)	17 (3.8%)	89 (19.8%)	344 (76.4%)

Source: Teotia, (2024)

Table 6 shows that the majority of respondents i.e. 76.4% (344) replied that online portals are user friendly. Only 19.8% (89) respondents found these portals somewhat complicated and 3.8% (17) replied they found them complicated.

Table 7

Level of Satisfaction of Beneficiaries Availing Digital Services of MC

ULB	Very Dissatisfied	Somewhat Dissatisfied	Neutral	Somewhat Satisfied	Very Satisfied	Total
Dehradun (n=150)	2 (1.3%)	5 (3.3%)	17 (11.3%)	87 (58.0%)	39 (26.0%)	150 (100%)
Shimla (n=150)	1 (0.7%)	7 (4.7%)	33 (22.0%)	75 (50.0%)	34 (22.7%)	150 (100%)
Srinagar (n=150)	1 (0.7%)	6 (4.0%)	28 (18.7%)	110 (73.3%)	5 (3.3%)	150 (100%)
Total (N=450)	4 (0.9%)	18 (4.0%)	78 (17.3%)	272 (60.4%)	78 (17.3%)	450 (100%)

Source: Teotia (2024)

Connecting threads with the data presented in the above table, which shows that e-governance services have improved the functioning of municipal corporations with reduction in

corruption, increase in transparency and overall functioning of municipal corporations. But there is always scope for improvement in functioning and service delivery mechanism of ULBs which is clearly indicated in Table 6 which shows the satisfaction level of end users of these services.

The study (Teotia 2024) shows that the AMRUT mission has been largely successful. It met its objectives with commendable performance in the selected cities of Shimla, Srinagar and Dehradun, demonstrating substantial progress in physical, financial, and reform-related aspects, particularly in municipal digitization and e-governance. This scheme proves to be relatable in terms of the challenges that it has overcome in the urban service delivery such as water supply, sewerage, drainage, and parks, while simultaneously improving governance efficiency. The data collected through primary sources and Focus Group Discussions (FGDs) show that citizens have been strongly satisfied with the services due to various reasons: like easier billing and tax collection, elimination of intermediaries and many more such applications of e-governance. Moreover, the overall convenience through 24/7 availability of online services, is particularly valuable in difficult hilly terrains.

In terms of effectiveness**,** citizens across all three ULBs widely use online services through mobile phones and computer. This behavior reflects high acceptance of digital governance. Respondents positively reported their interaction with local governments. They asserted increased transparency, and faster service delivery, supported by better MIS systems, cost reduction in operations, streamlined processes and decentralised single-window systems. All these improvements have led to better relationships between local governments and citizens allowing for active citizen participation.

As for the efficiency of the concerned reforms, respondents have reported tangible improvements in water supply, sewage connections, parks, and municipal service delivery mechanisms. Online complaint redressal systems, e-procurement, digital personnel management and improved resource mobilisation have enhanced the functioning of ULBs. With a significant reduction in manual workloads, and paper-based filing systems, municipal staff efficiency has been improved, besides benefitting citizens in saving costs as well as time.

Talking of outcomes and impact, AMRUT scheme has brought about a good number of innovations and better practices in municipal governance. Multiple services have been streamlined leading to the development of robust digital infrastructure, use of apps, and systems like E-MASS. A substantial increase in the revenues out of property taxes has confirmed the scheme's success in broader governance reforms. The study reports improved financial sustainability and positive user feedback and higher trust levels.

As far as sustainability is concerned, AMRUT reforms have undoubtedly contributed to environmental sustainability. This is the result of initiatives like green parks, better sewerage management, non-motorised mobility options and reduced paper use via online services. Economically, it is clear that better resource mobilization, cost-saving and effective human resource utilization is contributing towards more affordability and economical outputs. Social sustainability is reinforced with greater community participation and by inclusive access. A robust monitoring network- operating at multiple levels: city, state and central levels ensure better performance and accountability, in turn driving progress.

FGDs and interviews with citizens, officers, councilors, ex-mayors, legislators and business stakeholders have confirmed the observations related to the reforms in their feedback. Respondents have persistently spoken about the benefits like time and resource savings, enhanced convenience, reduced corruption and transparency in the systems. Although, there are some challenges which still remain in awareness, capacity and infrastructure. Almost a

quarter of the respondents did not possess enough digital literacy necessary to independently navigate online platforms. Infrastructure limitations such as poor internet connectivity and outdated IT systems restricted the real-time functioning of several services. In addition, a significant number of staff members in municipal offices lack proper training in management of digital platforms which lead to delays in procedures and inefficiency in work. It was observed that there was a resistance towards new systems among officials and citizens, with some expressing a continued preference for traditional and manual methods. Language barriers and the absence of user-friendly designs further excluded sections of the population, especially the elderly and those with limited formal education. However the overall triangulation of qualitative and quantitative data analysis indicates positive transformation by AMRUT scheme. Examples of such transformations include transformed service delivery, governance mechanisms and citizen trust in local government, while also laying a strong foundation for sustainable urban governance in the future.

The Case of Punjab: An Evaluative Study of Select Towns

This section is based on another study by the co-author (Teotia 2022) titled as 'Municipal Digitisation and E-Governance Initiatives in Punjab under AMRUT reforms: An Evaluative study of Selected Towns'. In Punjab, among North-Western India's most urbanized states, the Atal Mission for Rejuvenation and Urban Transformation (AMRUT), mandated comprehensive digital upgrades across ULBs. The study assesses how six of Punjab's Municipal Corporations: Abohar, Amritsar, Bathinda, Jalandhar, Ludhiana and Patiala: implemented e-Governance under AMRUT, how have the citizens interacted with these platforms and have they impacted transparency, efficiency and overall trust of the local populations. The study also addresses those persistent barriers must be overcome to realize fully inclusive digital governance.

The methodology followed for the study included extensive secondary data collection form the Punjab Municipal Infrastructure Development Company (PMIDC) and ULB records with primary field research in early 2021. Primary data has been collected using the interview method: 600 in-person interviews- 100 in each selected City Corporation after sampling both households and small businesses that had used any municipal e-services. Users' awareness of AMRUT reforms were explored using structured questionnaires. The questionnaires have also comprehensively explored which digital portals and services they had access, the ease and reliability of those platforms, perceived improvements in municipal functioning and barriers encountered on a daily use. To ensure a mixed-method approach, supplementary interviews with ULB officials and Civic Facilitation Centre (CFC) staff were conducted, while methodology combined extensive secondary data with primary field research.

PMIDC's digital architecture, built on an open-source framework ("DIGIT"), included citizen-facing portals and mobile apps for every ULB, real-time performance dashboards and a host of sectoral modules. Key features included end-to-end online applications for water and sewerage connections, integrated payment gateways (PayTM, BBPS, and POS machines), GIS-linked property records, property tax assessments, trade licensing workflows, grievance redressal via web, WhatsApp chatbot and toll-free lines, double-entry financial accounting and human-resource management for municipal staff. Some municipalities added context-specific modules: Abohar and Amritsar deployed dedicated Fire NOC applications, while others registered street vendors and pets online with a goal of 24×7, paper-less services accessible anywhere.

Despite of such an extensive sophistication of technology, we can still find that user awareness of AMRUT's e-Governance reforms has remained uneven (Table 8).

Table 8

User Awareness, Usage, and Experience of AMRUT e-Governance Reforms in Punjab

Category	Indicator	Percentage	Remarks
Awareness of AMRUT e-Governance	Respondents recognizing AMRUT by name	29.8%	Out of 600 respondents
	Willing to learn more (among unfamiliar)	82%	Shows openness despite low awareness
Usage of Digital Platforms	Logged onto ULB websites	55.1%	Highest usage
	Used municipal apps	37.1%	Moderate adoption
	Accessed mSewa state portal	28.5%	Lower adoption
	Engaged via social media/WhatsApp helplines	27.3%	Alternative channel
Most Sought-after Online Services	New water connection charges	46.3%	Most availed
	Bill payments (water & sewerage)	41.8%	High demand
	Grievance filing	40.5%	Significant
	Vital records (birth/death certificates)	38.5%	Moderate
	Property tax payments	33.8%	Lower compared to others
User Experience & Challenges	Found service information always accessible	65.3%	Positive
	Found portals user-friendly	71.5%	Positive
	Reported technical difficulties	35.1%	Issues: slow load, irregular updates, missing services

Source: Teotia (2022)

Table 8 shows that only 29.8 percent of the 600 respondents recognized the mission by name, though 82 percent of that unfamiliar expressed willingness to learn more. Practically, 55.1 percent of users logged onto ULB websites, 37.1 percent utilized municipal apps, 28.5 percent accessed the unified mSewa state portal and another 27.3 percent engaged via social-media channels or WhatsApp helplines. The most sought-after online services were charges for new water connections (46.3 percent), bill payments for water and sewerage (41.8 percent), issuance

of vital records such as birth and death certificates (38.5 percent), property tax payments (33.8 percent) and grievance filing (40.5 percent). Notably, 65.3 percent reported that information on required services "always" remained accessible, and 71.5 percent found the portals user-friendly, while 35.1 percent reported technical difficulties such as slow load times, inconsistent features across web and app, irregular updates or missing services on some modules.

Trust and data-security concerns proved a more persistent barrier. Only 12.3 percent of users felt "very satisfied" with the protection of their personal information and a mere 12.1 percent understood the provisions of cyber-law frameworks designed to safeguard online transactions. In contrast, 41.0 percent of respondents had used e-Governance channels to lodge grievances, underscoring a clear demand for online dispute resolution even amid privacy anxieties.

Where adoption occurred, perceptions of municipal performance rose sharply. More than 87 percent agreed or strongly agreed that e-Governance had improved ULB functioning and fast-tracked service delivery. Seventy-nine percent believed corruptions had been curbed, 69 percent felt transparency had increased and 64 percent reported renewed faith in municipal authorities. Nearly 48 percent acknowledged that digitalisation eased ULB workload, while 52.6 percent expressed overall satisfaction with the portals they used. At the same time, 15.3 percent saw no improvement in basic civic amenities since digitisation, signaling that benefits had yet to reach all corners of municipal service delivery.

This analysis also uncovers many persistent challenges that constraints the digital landscape of Punjab's urban digital reform. A stark digital divide obstructs the fuller implementation of the digital reforms: Many citizens lack basic ICT literacy, affordable data plans or requisite devices. As a result, the user base gets narrowed down to younger, educated and technically acquainted people. Economic constraints prevent lower-income families from procuring the gadgets required like smartphones and computers. They also lag behind in securing a stable internet connection. Smaller ULBs, particularly municipal councils and nagar panchayats face problems in infrastructure like internet connectivity and on-site technical staffing. People who speak multiple languages often encounter an English-only interface, which significantly complicates the accessibility of digital services for speakers of Punjabi. Fragmented portals where separate websites or apps exist for water, property tax or trade licenses undermine the seamless "single window" experience. Finally, limited public awareness campaigns, budget constraints on software upkeep and insufficient inter-departmental interoperability preserve pockets of manual, paper-bound processes even as digital workflows expand.

In order to overcome these challenges, the study recommends a multipronged strategy for Punjab's ULBs and state agencies: conduct ward-level and school-based awareness drives; deploy digital literacy camps targeting women, seniors and economically vulnerable groups; roll out bilingual interfaces (English and Punjabi) to enhance inclusivity; merge standalone portals into an integrated 'one-stop' municipal services hub, strengthened by Aadhaar authentication for secure single sign-on; staff each ULB with dedicated ICT officers backed by a state helpdesk; incorporate regular SWOT assessments to refine platform performance; establish local Digital Citizen Forums to solicit real-time feedback; publicize data-security protocols and cyber-law rights to build trust; and allocate ring-fenced budgets for continuous platform modernization.

Punjab's experience under AMRUT, documented through CRRID's evaluative lens demonstrates that, when paired with user-cantered design and proactive capacity building, municipal digitisation can yield palpable gains in efficiency, transparency and public trust. However, fuller success in North-Western India will hinge on deepening digital literacy, expanding infrastructure in smaller urban bodies, simplifying user interfaces in regional

languages and forging a robust legal and institutional framework to safeguard data and guarantee universal access. These lessons offer compelling evidence for scaling e-Governance reforms across the region, ensuring that India's smart-city and urban-rejuvenation missions translate into truly inclusive and 24×7 citizen services.

Sociological Interpretation of Some Important Findings

The findings of the studies (Teotia 2022 & 2024) particularly the strong citizen preference for online services and their perception of enhanced transparency can be interpreted through Manuel Castells' concept of the *network society*. Castells (1996) believed that digital technology changes the way in which society and organizations work by making data according greater status to data flows than traditional, in person direct meetings. In this sense, municipal e-governance platforms transform governance into a connected system, which links people and government institutions in real time, thereby enhancing trust and accountability.

The uneven levels of awareness observed in the study: only 22.7% of respondents in hilly towns and 29.8% in Punjab reported familiarity with AMRUT components. These findings highlight persistent inequalities in digital access as simply having the internet isn't enough. Mark Warschauer's (2003) notion of the *digital divide* underscores how access to Information and Communication Technologies is mediated by factors such as education, digital literacy and infrastructural availability. Also, Pierre Bourdieu's (1986) concept of *cultural capital* suggests that individuals with higher education, communication, linguistic competence and digital skills are more equipped to take benefits from digitisation, while groups such as the elderly or low-literacy populations remain at risk of exclusion.

At the same time, the high levels of citizen satisfaction, with nearly 60–70% of respondents reporting improved trust and reduced corruption, may be seen through Amartya Sen's *capability approach*. Sen (1999) argues that true measurement of development can be assessed by examining how much it increases peoples' real freedoms and opportunities. In this context, e-governance initiatives enhance capabilities by enabling citizens to access vital certificates, lodge grievances and receive timely information thereby empowering them to claim rights and be more involved in governance.

Furthermore, the broader implications of municipal digitisation for urban transformation can be understood through Henri Lefebvre's (1968) idea of the *right to the city*. By providing the important services online, local governments are making it possible for more citizens to fully participate in and shape their urban life. However, obstacles such as language differences, lack of awareness and poor internet connectivity in smaller towns of Punjab hamper the universalisation of the same. Finally, this can also be looked at through Ulrich Beck's theory of the *Risk Society* (1992), suggesting that digitisation is a strategic response to governance risks including inefficiency, corruption and environmental strain. Initiatives such as reduced paper use, improved water and sewerage management, green cover, greater resource efficiency and higher level of people's participation indicate that e-governance tries to address both social and environmental vulnerabilities.

Taken together, these sociological frameworks deepen our analysis of AMRUT reforms by conceptualizing digital governance not merely as a technical intervention, but also a larger socio-political transformation, intertwined with the structures of power, inequality and urban rights. While digitization and e-governance try to promote greater transparency, accountability and participation, it may also exacerbate the digital divide, new forms of inequality and exclusion. State-citizen relationship seems to be becoming more direct but data intensive. Issues of data privacy, cyber security and digital illiteracy seems to be emerging,

Recommendations and Way Forward

The recommendations for strengthening municipal digitization and e-governance under AMRUT have been grouped into six broad thematic areas. Beginning with policy, it is suggested that municipal acts be amended to include such provisions through which the dedicated IT cadre/ staff can be recruited trained accordingly. Efforts must be made for ensuring greater convergence and integration of schemes across departments. Elected representatives need to come forward for mobilizing community participation in local areas and spread awareness about e-governance. Some measures would be highly helpful in strengthening municipal digitization like: introducing online 'Tatkal' scheme for speedy delivery of online municipal services such as release of commercial and residential maps of the buildings, birth and death certificates, mutations etc. Providing services in local languages would make e-governance more responsive and citizen-friendly.

From an institutional perspective, ward-level e-governance plans are recommended to decentralize access and bring services closer to citizens. A stronger citizen-centric approach which includes fixed service delivery timelines and robust feedback mechanism is suggested. In addition, the establishment of a dedicated nodal agency or e-governance cell is seen as essential for successful implementation (UNDP, 2023).

From the perspective of infrastructure and technology, it is necessary to strictly adhere to the national e-governance standards. Efficiency and credibility of online portals can be ensured by improving their safety and developing senior-citizen friendly interfaces. Innovative practices and lessons from the best practices of various states can certainly help in strengthening digital infrastructure.

Financially, there is a need for greater allocation of funds for infrastructure, digitization and staff training. Online services should be overseen by dedicated auditors. Also, municipal corporations must ensure transparency by regularly publishing their financial statements online.

Equally important is the enhancement of digital literacy, which not only improves access to services but also strengthens social inclusion. In the Indian context, where social inequalities are multidimensional and play a crucial role in restricting the access to important resources and technology, bridging the digital divide is identified as a critical task.

Finally, awareness and capacity-building measures are emphasized as the foundation of reform. This includes sensitizing stakeholders, raising awareness about cyber laws, building the capacity of officials and elected representatives and deploying adequate technical manpower in municipal IT cells. Regular publication of e-newsletters is also recommended to enhance transparency and build trust with citizens. While measures such as newsletters, local-language portals, safety measures and awareness campaigns are considered short- to mid-term priorities, more complex reforms such as policy amendments, capacity building, bridging the digital divide and adopting innovative technologies are seen as long-term objectives that will require strong political will.

Conclusion

This paper examined the implementation and public perception of municipal digitization and e-governance under AMRUT in selected North-Western Indian towns (Shimla, Srinagar, Dehradun) and an evaluative sample of Punjab municipalities (Abohar, Amritsar, Bathinda, Jalandhar, Ludhiana and Patiala). The study finds strong user preference for online services (approximately 85–95% across the three hill towns) and high levels of satisfaction among

active users, with respondents reporting perceived gains in transparency, time savings and procedural convenience. At the same time, evidence of uneven awareness (only ~22.7% aware of AMRUT components in the hilly towns sample) and structural barriers — poor connectivity, limited digital literacy, language and user-interface issues and low perceived data-security — remain major constraints.

The findings suggest that digitization under AMRUT has delivered important administrative benefits but has not yet produced universal and equitable access. To consolidate gains, municipalities should prioritize (a) ward-level outreach and bilingual interfaces, (b) ring-fenced funds for ongoing platform maintenance and staff training, and (c) institutional reforms to strengthen interoperability and monitoring. Finally, future research should use longitudinal designs to assess causal impacts of digitization on municipal performance and extend study coverage to smaller municipal bodies to better capture heterogeneity across the urban hierarchy.

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