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The Role of GIS in Urban Planning and Infrastructure Development in Pakistan

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ABSTRACT

Rapid urbanization and the development of infrastructure are posing a multifaceted challenge in Pakistan, which Geographic Information Systems (GIS) have emerged as an indispensable tool to tackle. In the era of growing urban population, rapid expansion of major cities like Karachi, Lahore and Islamabad, under- and over- utilization of land resources, congestion of traffic networks, environmental degradation and climate induced disasters, GIS provides advanced spatial analysis tools that can be used to improve land use planning, zoning, traffic optimization, environmental impact assessments, utilities management, and cultural heritage protection. This article looks at the existing uses of GIS by institutions such as development authorities and SUPARCO and emphasizes the critical role of GIS in the China-Pakistan Economic Corridor (CPEC), smart city projects and disaster risk reductions after major floods. However, there remain implementation challenges, such as dated data, lack of institutional coordination, capacity gaps, and policy gaps with some significant progress. The study also covers pathways towards the future that include artificial intelligence, Internet of Things, digital twins and the National Spatial Data Infrastructure. It says that GIS investments are essential for sustainable, resilient, and inclusive urban development in Pakistan, from the infrastructure, human capital, and governance mechanisms point of view. GIS can play a significant role in moving towards creating efficient, climate adaptive and livable cities, through technological capabilities, policy changes and multi-sector cooperation, in support of Pakistan's long-term socio-economic goals.

Keywords: Geographic Information Systems, Urban Planning, Infrastructure Development, Smart Cities, Disaster Management, National Spatial Data Infrastructure

Introduction

Pakistan is at the leading edge of one of the most dynamic urbanisation experiences in South Asia. The total population of the country as per the national census of 2023 was 241.5 million, which included an urban population of about 39 per cent, up from the previous decades (Pakistan Bureau of Statistics, 2023). The urban population increased at a rate of 3.57 percent per annum between 2017 and 2023, which is much higher than the overall population growth rate of 2.55 per cent per year, leading to 22 cities having over 500,000 people by 2023, compared with 14 cities in 2017 (Institute of

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Development Studies, 2025). Urban centers, like Karachi, Lahore and Islamabad, have grown at an explosive rate, with urban areas gaining ground from agriculture and natural environments at an alarming rate. The official statistical reporting on urbanization is complemented by a World Bank study based on satellite imagery and the Degree of Urbanization approach which indicates that the real urbanization rate in Pakistan could be as high as 88 percent, significantly exceeding the administrative definition of urbanization (Barriga Cabanillas et al., 2025). This swift change has posed grave challenges such as massive unplanned urbanization, recurrent traffic jams, acute housing shortage more than millions of units, exploding slums and increased flood vulnerability in Indus river basin and coastal areas.

These urbanization pressures call for advanced decision support tools in a developing country with constrained resources and limited capacity. Geographic Information Systems have emerged as a robust decision support technology, providing the ability to integrate layers of spatial data and analyzing them to develop predictive models of complex urban environments. There are a number of applications of GIS in urban development within Pakistan ranging from land use zoning, optimization of infrastructure networks and real time risk assessment during disasters and environmental monitoring. Using these data, planners can define high-risk areas and optimize allocation of resources. It allows planners to incorporate the complex aspects of urban planning and implement resilient urban development plans that were hitherto difficult and inefficient to achieve. This requires a lot of information and resources. Therefore, organizations like the SUPARCO, Urban Units of Punjab as well as other development organizations have found GIS to be an efficient technology in filling gaps and helping coordination efforts between the federal government and provinces.

The objective of this paper is to evaluate the role of GIS in urban planning and infrastructural development in Pakistan. The research will evaluate existing GIS based solutions for applications in spatial planning, traffic/accessibility management, environmental impact assessment, utility network management, disaster resilience and cultural heritage preservation among others. In addition, issues that impede application of GIS in urban planning and infrastructure will be identified and analyzed, including data quality issues, data interoperability and capacity constraints. The research will further examine the future of GIS in Pakistan including potential applications in the integration of spatial data into other emerging technologies like the internet of things (IoT), artificial intelligence (AI) and national spatial data initiative. Finally, it aims at illustrating GIS as an integral part of sustainable urban development.

GIS in Spatial Planning and Analysis

Geographic Information Systems has wrought groundbreaking changes in land-use planning, zoning and suitability analysis of housing and industrial zones of the fast growing cities of Pakistan. Development organizations like Lahore Development Authority (LDA) are using GIS platforms extensively to digitize land records, keep track of urban expansion, and implement zoning laws more effectively. LDA can be connected directly to property records to enhance the accuracy of land allocation and retrieval using integrated spatial databases, and to support large-scale housing schemes (AOS Tech, 2025). The geospatial analysis conducted at the national level with Landsat data shows that by 2023, 53.6 percent (92,660.9 hectares) of the urban area of Lahore

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was developed, while the projections indicate that by 2048 it would be 75.8 per cent developed, highlighting the need for evidence-based planning tools (Karim et al., 2025). Planners use multi-criteria evaluation models to combine layers of proximity to infrastructure, soil stability, sensitivity to the environment and land-use patterns to determine the best possible locations for residential and industrial development.

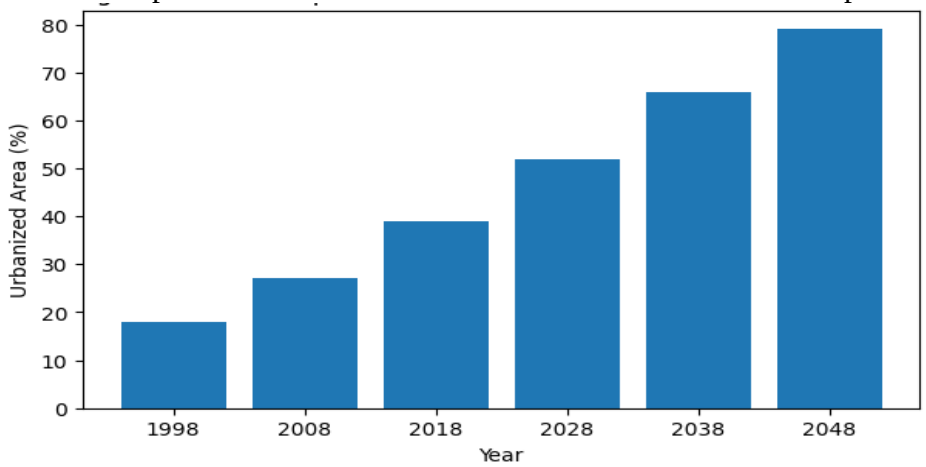


Fig 1. Urban Expansion Trends in Lahore, Pakistan (1998–2048).

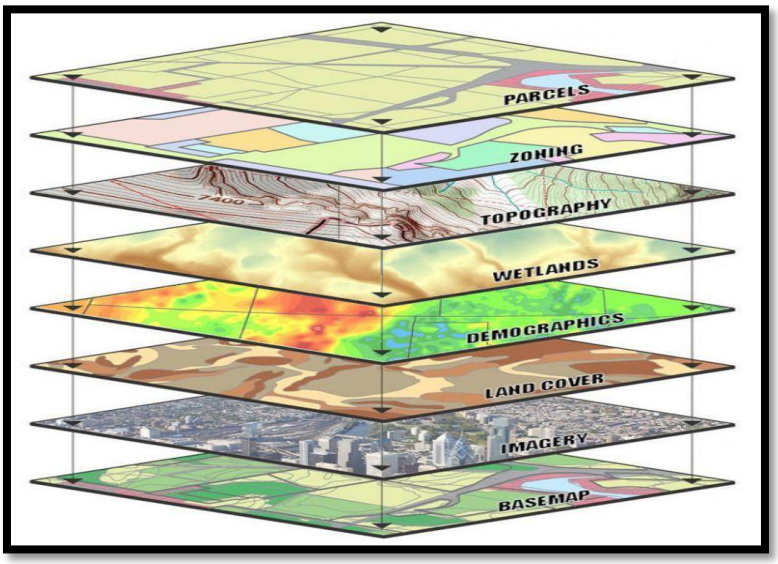
Source: Adapted from Karim et al. (2025)

GPS or Geographic Information Systems have revolutionized land-use planning, zoning and suitability analysis for residential and industrial areas in the fast-growing cities of Pakistan. GIS platforms are widely used in development authorities like Lahore Development Authority (LDA) to digitize land records, track urban expansion and accurately implement zoning laws. LDA will be integrated with spatial databases to provide spatial data directly with property information, thereby enhancing the accuracy of the land allocation and retrieval processes, and facilitating large-scale housing schemes (AOS Tech, 2025). The geospatial analysis of the city of Lahore, performed using satellite data from Landsat, showed that the urban extent in Lahore was 53.6 percent (92,660.9 hectares) in 2023, with estimated growth to 75.8 percent by 2048, highlighting the need for evidence-based planning tools in the city (Karim et al., 2025). Planners use multi-criteria evaluation models that combine aspects of proximity to infrastructure, soil stability, environmental sensitivity and existing patterns of land use to determine optimal residential and industrial development locations.

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This spatial intelligence easily translates into the modeling of traffic flow and planning of accessibility, where GIS has become essential to solve the serious congestion problem in the major cities of Pakistan. Spatial analysis was also crucial in Lahore where it was used to optimize the Bus Rapid Transit (BRT) system by aligning the routes, location of stations and reducing the travel time, through integrating the passenger flow data, road networks, population density and land-use layers (Akbar, 2018). Network modelling using GIS has been used in the rehabilitation of the Karachi Circular Railway to determine critical bottlenecks and to aid in the development of improved multimodal integration in the Karachi Transportation Improvement Plan (Japan International Cooperation Agency, 2012). They allow planners to simulate scenarios for peak hours, assess the effects of new infrastructure projects, and develop specific interventions to alleviate congestion. In addition to major transit corridors, GIS can be used to create pedestrian-friendly environments and bicycle networks by providing detailed overlay analysis that incorporates demographic data, accident hotspots and existing transit infrastructure to identify areas that are underserved and prioritize sidewalk improvements, safe crossings and bicycle lanes (Rasheed, 2024). Real-time traffic data can also be integrated with GIS to further enhance the dynamic signal optimization and emergency route planning capabilities, and SUPARCO's geospatial capabilities allow for more comprehensive route planning for roads and railways throughout the country (SUPARCO, n.d.). Together, these applications illustrate the potential of GIS to contribute to more inclusive, efficient and sustainable urban mobility, to support the mobility needs of the increasing urban population in Pakistan.

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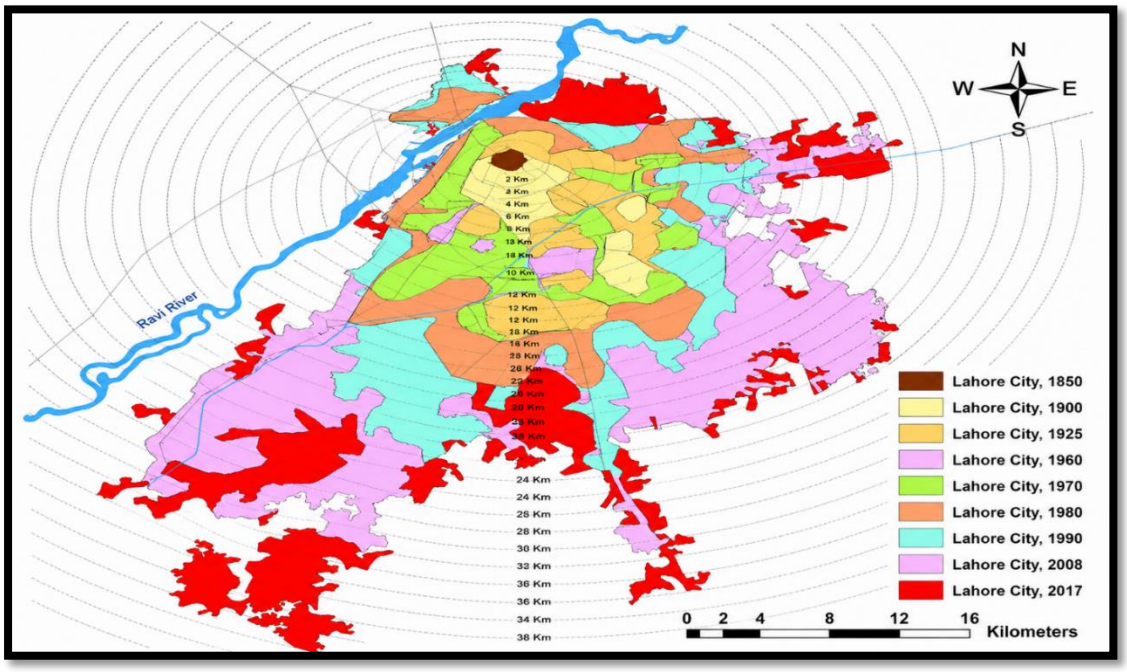


Table 1. Key GIS Applications in Urban Planning and Infrastructure Development in Pakistan

Sector	Key GIS Applications	Major Institutions	Impact
Urban Layout & Design	Land use zoning, Suitability analysis	LDA, CDA, SBCA	Reduced unplanned sprawl
Traffic Management	Route optimization, BRT planning	Transport Authorities	Lower congestion
Environmental Assessment	EIA modeling, Pollution & flood mapping	RUDA, EPA	Better environmental protection
Infrastructure Planning	Utility networks, Smart grids, CPEC routes	NESPAK, WAPDA	Efficient service delivery
Disaster Management	Flood & earthquake vulnerability mapping	SUPARCO, NDMA	Lives saved & faster recovery
Heritage Preservation	Site monitoring & buffer zone planning	Department of Archaeology	Cultural asset protection

GIS is also essential in EIAs for creating a comprehensive framework to merge various environmental datasets and perform advanced analyses. Planners regularly superimpose soil quality, water resources, vegetation cover, biodiversity habitat and flood vulnerability maps to assess ecological risk related to urban projects, such as those on the banks of Ravi, coastal areas of Karachi and forested areas in the north. GIS-based spatial modelling has played a crucial role in conducting all-encompassing EIA processes for the Ravi Riverfront Urban Development Project, facilitating the precise

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mapping of environmental sensitivities and thorough impact assessment (Ravi Urban Development Authority, 2023; Ullah et al., 2024). For water quality protection in riverine and coastal zones, to support biodiversity conservation in northern ecosystems in the context of infrastructure expansion, some advanced applications of SLDs are also particularly beneficial, such as shadow studies, wind flow modeling, noise pollution mapping and pollutant dispersion analysis. GIS provides both visual and quantitative proof of possible impacts and can greatly enhance the scientific basis of environmental reviews, as well as make urban decisions more sustainable (Fischer et al., 2014). As authorities like the Ravi Urban Development Authority and the provincial environmental protection departments embrace GIS, it becomes a vital tool in achieving ecological sustainability and resilience amidst Pakistan's diverse and climate sensitive terrains.

GIS in Infrastructure and Utility Management

GPS technology allows the government to plan and manage roads, sewage and drainage, electricity and water supplies in the cities with unprecedented accuracy and efficiency. Planners use multiple data layers, such as population density, topography, land use and existing utilities, to align the routes of new roads and highways for maximum efficiency and to keep construction costs and the impact on the environment to a minimum. GIS has been a key role in planning the routes for these projects, analyzing the terrain, coordinating infrastructure, and avoiding potential clashes with existing utilities and natural features in the expansive regions of the China Pakistan Economic Corridor (CPEC) (E-Zigurat, 2025). In urban areas, development organizations like NESPAK have heavily utilised GIS in sewerage and drainage scheme planning in cities such as Lahore and Multan and for general mapping of the water supply system to enable sustainable delivery of water supplies to rapidly expanding urban centres (NESPAK, n.d.). GIS helps to map assets, forecast demand and optimize networks for reliable power distribution and efficient wastewater management for new housing societies and smart grid projects, minimizing operational losses. They enable the integration of many different infrastructure development applications into coherent, evidence-based policies that can tackle the serious gaps in urban services in Pakistan and fulfil long-term economic development goals.

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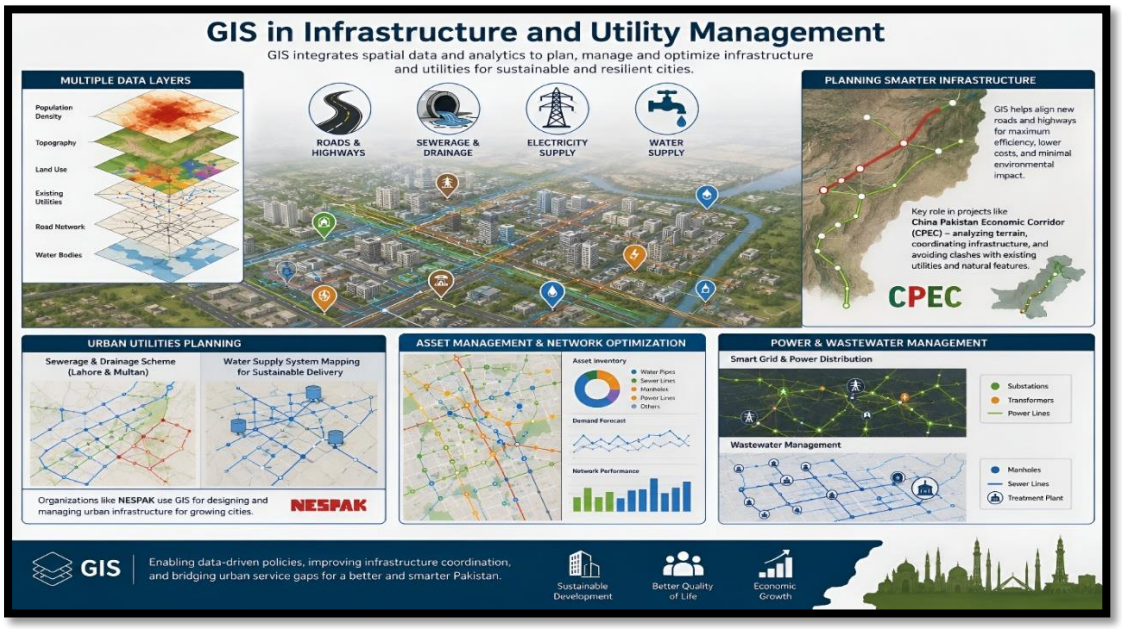
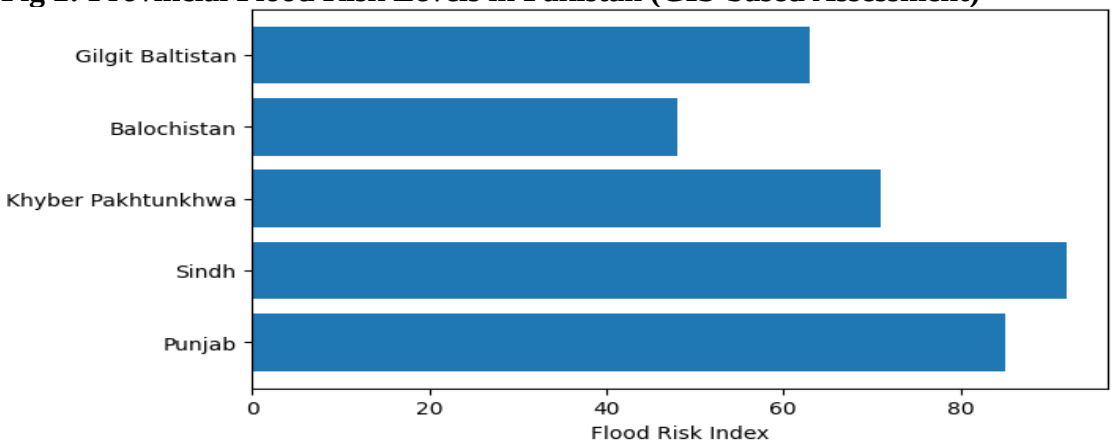


Image Source: https://nespak.com.pk

GIS has proved its analytical capabilities especially in the field of Disaster Management and Response where it has aided in risk reduction prior to disaster and in effective coordination during disasters throughout the hazard prone landscapes of Pakistan. SUPARCO's Space Application Centre for Response in Emergency and Disasters (SACRED) is using remote sensing and GIS to provide a vulnerability assessment, risk modeling, early warning and post-disaster damage evaluation in floods, earthquakes and landslides (SUPARCO, n.d.). For the Indus River basin, detailed flood inundation mapping and risk assessment have been achieved through the integration of hydraulic modelling using HEC-RAS with GIS, which proved to be extremely successful in calibrating the hydraulic model against the catastrophic floods of 2010 and was able to validate flood scenarios for future floods, thereby identifying the highly vulnerable areas within districts like Layyah and Muzaffargarh (Aziz et al., 2026).

Fig 2: Provincial Flood Risk Levels in Pakistan (GIS-based Assessment)



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Note: Higher values indicate greater vulnerability, particularly in the Indus River basin

Similar GIS-based approaches have supported landslide susceptibility mapping in northern mountainous regions like the Shigar and Shyok basins, providing critical inputs for infrastructure protection and community safety (Kanwal et al., 2017). Post 2022 floods, GIS-driven damage assessments using satellite imagery facilitated targeted recovery efforts and informed reconstruction planning. These tools enhance institutional response capacity by delivering real-time spatial intelligence that saves lives and reduces economic losses in one of the world's most disaster-vulnerable countries.

GIS applications are also crucial in the field of historical and cultural preservation, helping to safeguard Pakistan's precious archaeological and architectural heritage from urban encroachment and environmental hazards. Detailed GIS mapping activities have been carried out to document and monitor World Heritage Sites of UNESCO like Mohenjo-Daro, Taxila, Lahore Walled City, etc, and through these mapping efforts authorities are able to review the changes in land-use around these sites, evaluate the structural vulnerabilities and set up protective buffer zones (Pakistan GIS, 2025). Historical records, high-resolution imagery, and ground survey data can be combined to create a predictive model for assessing urban growth pressures on heritage sites and to inform and develop evidence-based conservation strategies that balance heritage conservation with development requirements. Such a spatial approach will enable continuous surveillance of encroachment, tourism effects and climate related risks, enable preservation of iconic sites for future generations and help to create sustainable heritage tourism.

GIS, as a whole, enhances infrastructure resilience, disaster preparedness and cultural continuity, making it a core technology for sustainable urban and regional development in Pakistan. These benefits will continue to grow with additional investments in national spatial data infrastructure and capacity building efforts that will be implemented at the federal, provincial and local planning levels.

Challenges in Implementing GIS in Urban Planning in Pakistan

Despite the potential it offers for transformation, there are numerous and complex challenges that impede the widespread use of GIS and the effectiveness of its use in Pakistan's urban planning sector. Primary and persistent challenges are data accuracy, availability and reliability. A large number of base maps which are being used by planning authorities are still outdated and have a low spatial resolution; hence not suitable for detailed urban analysis in a fast-growing city. Data inconsistencies in formats, scales, frequencies and quality control of data sources across federal and provincial agencies are further complications. These problems require urban planners to rely on either coarse or incomplete data sets, making it difficult to achieve the accuracy needed in the complex urban environment (Ahmed, 2022). In large cities like Lahore and Karachi, the use of old satellite imagery, alongside poorly maintained land records often contribute to inaccuracies in land use mapping, infrastructure planning and zoning. The impacts are poor development results, inefficient resource use, higher project costs and the failure to capitalize on sustainable development opportunities (Kifayatullah et al., 2025). Furthermore, there are no uniform metadata standards and

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frequent data validation procedures which make these issues worse and affect stakeholder trust in GIS-based recommendations.

Other important obstacles preventing the full utilization of the potential of GIS application through a holistic approach include interoperability and coordination among organizations. There can be different computer systems and different definitions of data in government departments, which may cause difficulties with sharing and planning together. However, despite some initiatives by the Survey of Pakistan and others on the development of a National Spatial Data Infrastructure (NSDI), it still is a problem, considering the absence of its full implementation. There are also major discrepancies in the coordination between the departments at the level of the central government (for example, SUPARCO) and the provinces (such as Urban Unit, LDA, and SBCA). This usually ends up with duplicating actions, poor outcomes, and inefficient use of financial resources (Ahmad 2024; Ali 2024). Besides, due to limitations in GIS-BIM connection, there can be problems with using urban 3D models to advance urban designing and infrastructure models, as well as managing assets throughout their life cycle. Institutional silos are not only reducing the analytic possibilities of GIS applications but also slowing down evidence-based urban governance in Pakistan.

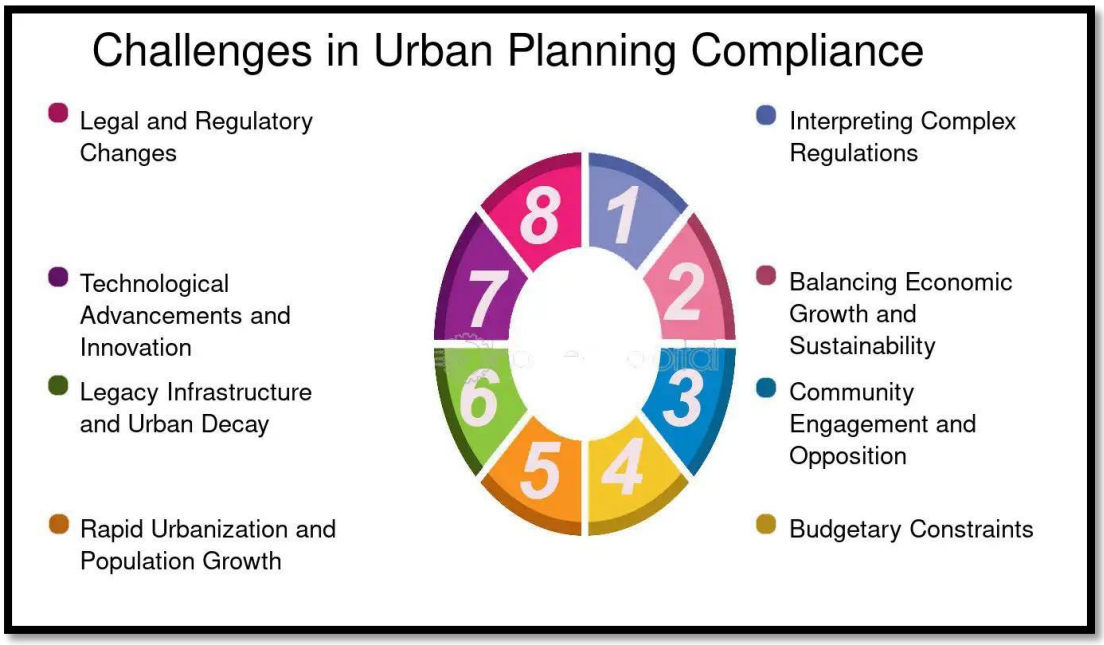
Another great challenge to meaningful scale GIS adoption is capacity and resource limitations. The need for well-trained GIS professionals is chronic and acute at a local government level, where awareness and knowledge of technical skills are still relatively low. Procurement of high-resolution imagery, up to date software licenses, hardware infrastructure and ongoing professional development programmes is severely constrained by funding limitations. Municipal planners still do not have the skill to master high-level spatial analysis tools and instead resort to traditional approaches that are insufficient in the face of the complex nature of urbanization in the modern world (Ahmed, 2022). The absence of an adequate human resource is exacerbated by high staff turnover, lack of institutional incentives and the lack of investment in specialized training and education programmes. The absence of systematic capacity development can make even good GIS initiatives fall short and forgo long-term effectiveness, which can leave local authorities without the capacity to utilize spatial tools to build long-term urban resilience and sustainability.

These technical, institutional and human resource problems are magnified by policy and governance challenges. Lack of enforcement mechanisms also makes it difficult to see many GIS produced master plans and spatial strategies being implemented in practice on the ground, frequently disempowered by short term political agendas, frequent changes of policy and administration and weak statutory support. Trust and collaboration among key stakeholders are undermined by data privacy considerations, ambiguity and nonexistence of clear and enforceable data-sharing procedures and sometimes political interference in spatial decision-making. Lack of comprehensive legal frameworks for geospatial data ownership, access, and dissemination remain as a hindrance to building a comprehensive and integrated national system (Ahmad, 2024; Ali 2024). These governance gaps not only impede technological uptake, but also restrict the ability of public and private sectors to engage in urban planning processes. Addressing this intricate issue requires coordinated policy changes, multi-year

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investments in human capital and infrastructure, improved inter-agency coordination arrangements and the development of a clear governance framework. This systematic approach is the only way for Pakistan to really harness the power of GIS to achieve resilient, efficient and inclusive urban development amidst rapid demographic and environmental pressures.



The Future of GIS in Pakistan's Urban Development

Technological Advancements

Though GIS has tremendous transformative potential, it is faced with numerous formidable and complex challenges in the implementation at urban planning sector in Pakistan and all these challenges are still present and time-tested. One of the primary and persistent challenges is data accuracy, availability, and reliability. A large number of base maps used by planning authorities are outdated, with a low spatial resolution which would be inappropriate for a detailed urban analysis in rapidly growing cities. Inconsistencies in format, scale, update frequency and quality standards, as well as the need for fragmented data sources across federal and provincial agencies, are additional complications. All these challenges necessitate reliance on course or incomplete data sets by urban planners with a significant impact on the accuracy required in complex urban settings (Ahmed, 2022). Many cities around the world, including Lahore and Karachi, are using outdated satellite imagery and land-use records that are often inaccurate, which causes inaccuracies when mapping land use, planning infrastructure and zoning. Results are suboptimal development outcomes, inefficient use of resources, higher project cost, and missed opportunities for sustainable development (Kifayatullah et al., 2025). Furthermore, there is no uniform metadata and frequent data validation processes only adds to these issues, restricting stakeholder trust in GIS recommendations.

Furthermore, interoperability and institutional coordination have also been identified as critical barriers that impede the effectiveness of GIS technology. Different software

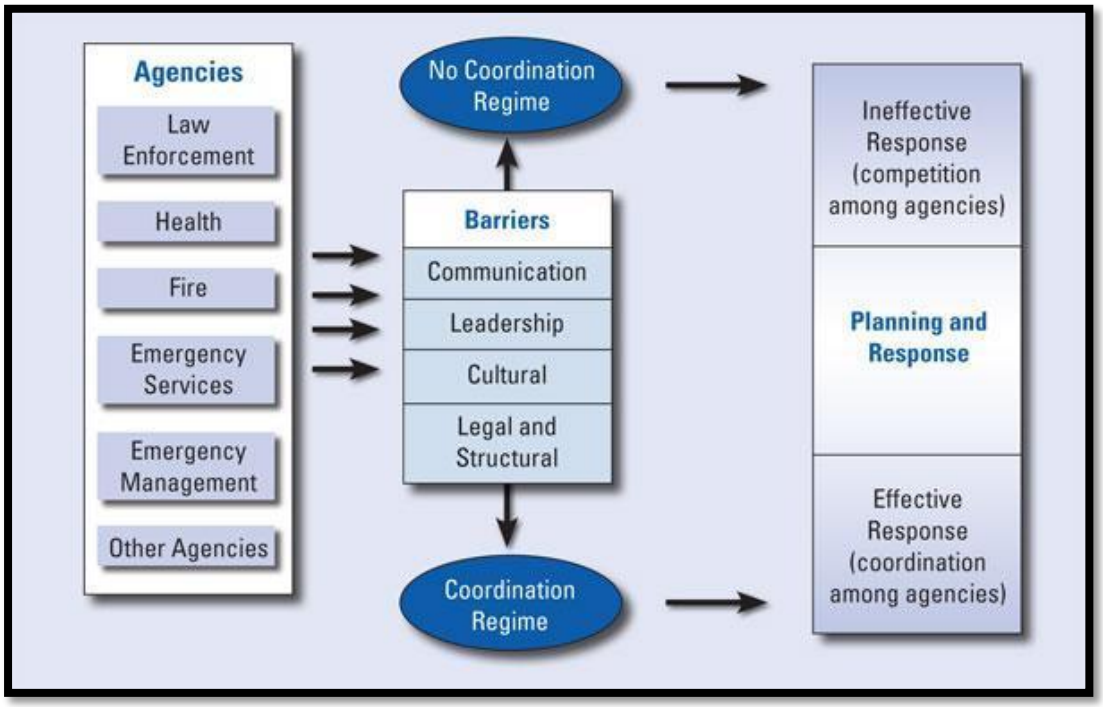
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programs and data formats may be used by government departments, hindering the exchange of data and the joint planning process. While some measures have been taken in this regard by organizations such as Survey of Pakistan, an operational NSDI still needs to be created for achieving successful harmonization. A complete coordination is currently lacking between federal authorities including SUPARCO and provincial authorities such as Sindh Building Control Authority, Urban Unit, and Lahore Development Authority. This can lead to redundancy in activities and poor allocation of public funds (Ahmad, 2024; Ali, 2024). Furthermore, the level of interaction between GIS and BIM systems is rather low, preventing the application of more sophisticated solutions such as urban modeling, infrastructure design and management. Therefore, such institutional barriers do not only hinder the overall analytical capabilities of GIS but also prevent Pakistan from implementing more modern methods.

A second major obstacle to the meaningful scale adoption of GIS is the capacity and resource limitation. There is a chronic and severe lack of trained GIS professionals at local government levels, and awareness and skills are still relatively low. High-resolution imagery, up to date software and hardware and ongoing professional development courses are extremely limited due to funding. Despite the extensive development of spatial analysis tools, many municipal planners remain not proficient in using these tools, and therefore rely on traditional approaches that are not suitable to solve the complex challenges of modern urbanisation (Ahmed, 2022). High staff turnover rates, inadequate institutional incentives, lack of investment in specialized training and education programs are further challenges to the human resource gap. Even the most carefully planned GIS programs fail to have lasting impact without systematic capacity development, and local government officials are not empowered to use spatial technology to support long-term urban resilience and sustainability.



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These technical, institutional and human resource challenges are compounded in significant ways by policy and governance issues. Poor implementation of plans and spatial strategies on the ground, due to weak enforcement mechanisms, often results in many GIS-generated master plans and spatial strategies not being implemented on the ground, with a lack of strong legal support, changing political and administrative leadership, and short-term political priorities. Key stakeholders lose trust and collaboration due to concerns about data privacy, absence of a clear and enforceable process for data sharing, and sometimes politics interfering with spatial decision-making. The lack of comprehensive legal frameworks for the ownership, access and dissemination of geospatial data still has a negative impact on the development of a well-developed and well-integrated national system (Ahmad, 2024; Ali, 2024). Such governance gaps hinder technological incorporation as well as private sector and public participation in urban governance processes. To tackle this intricate set of challenges requires coordinated policy changes, multi-year investments in human capital and infrastructure, more effective inter-agency coordination mechanisms, and the creation of governance frameworks. This systematic intervention is the only way to realize the potential of GIS as a tool to move towards resilient, efficient and inclusive urban development in the context of speedy demographic and environmental changes in Pakistan.

Integration with Smart City Concepts and Digital Initiatives

The application of GIS technology is ideally suited to serve as the backbone of the spatial infrastructure required for the implementation of the development of the concept of the smart cities in Pakistan in Islamabad, Karachi and Lahore. Integration with the Digital Pakistan Vision, use of IoT sensors and the digital twin approach can create a highly integrated ecosystem, which would be able to be controlled and managed in real-time. Smart management of traffic control, energy transmission, waste disposal, and public security could be facilitated using GIS platforms by linking all necessary data within city services. The further development of NSDI would also contribute to standardized data exchange, and development of digital twins for simulation purposes (Ahmad, 2024; nsdi.gov.pk, 2025).

Digital skills, innovation, and infrastructure development is the focus area of Digital Pakistan Vision and associated policies, which are the great basis for further promotion of GIS and other spatial technologies. Policy-making, aimed at bringing together the fragmented information from various geospatial datasets into one single source of truth can minimize data duplication and increase coordination of information. If the policies would succeed, Pakistani cities would become intelligent and responsive, thus becoming more liveable and economically competitive. In other words, they will meet the challenges related to climate vulnerability and gaps in service delivery.

Policy Recommendations

Following are the targeted policy recommendations to advance GIS in Pakistan's urban development:

1. Establish and operationalize a robust National Spatial Data Infrastructure (NSDI) with clear governance frameworks, data standards, and mandatory sharing protocols across all tiers of government.
2. Allocate dedicated multi-year funding for high-resolution geospatial data

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acquisition, technology upgrades, and nationwide GIS infrastructure development.

3. Launch comprehensive capacity-building programs in partnership with universities and international organizations to train thousands of GIS professionals and urban planners.
4. Mandate the integration of GIS and GeoAI tools in all major urban planning, infrastructure, and Environmental Impact Assessment processes through updated regulatory guidelines.
5. Develop and enforce a national One-Map policy to create a unified, authoritative geospatial database accessible to federal, provincial, and local agencies.
6. Foster public-private-academia partnerships to drive innovation, application development, and pilot smart city projects leveraging GIS and emerging technologies.
7. Incorporate GIS education and spatial literacy modules into urban planning, engineering, and environmental science curricula at higher education institutions.
8. Formulate clear legal frameworks addressing data privacy, security, intellectual property, and ethical use of geospatial technologies while promoting open data initiatives where appropriate.

Conclusion

GIS has played an incredibly important role in the area of urban planning, infrastructure and environmental challenges for urbanisation. It is the new way of thinking and acting about how the cities develop and the ways to mitigate problems that have become a result of urbanisation processes and rapid urban growth. Indeed, today Pakistan is facing a number of challenges connected with rapid population growth and urban expansion, lack of infrastructure development, as well as issues related to disaster management. At the same time, the use of GIS has shown impressive results in transforming the way decisions about planning are made. In particular, today GIS technology is used as an effective instrument for supporting spatial decision-making processes and creating an information base for managing urban planning processes in the area of land use, traffic, environment and disasters management. Different authorities are using it successfully for addressing different challenges. For example, Lahore Development Authority uses the technology for improving the infrastructure and disaster management in flood prone regions. SUPARCO is applying GIS technology for preserving cultural heritage in places as Mohenjo-Daro and Taxila, etc. Despite all positive aspects connected with using GIS for solving various problems, some limitations do not allow maximally to exploit the potential of the technology. Such barriers as the absence of interoperability, lack of up-to-date and organised data infrastructure, as well as shortage of professionals are still hindering the efforts. As far as Pakistan experiences fast urbanisation and millions more people are expected to move to cities in the nearest future, GIS can become a powerful tool to create compact, inclusive, climate-smart and economically productive cities.

GIS has a huge potential that can be exploited even further if combined with other technologies, in particular IoT, AI, digital twins, drones. The application of the

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mentioned technologies under the concept of Digital Pakistan will offer great opportunities for overcoming limitations connected with conventional methods of planning. Indeed, it is important for a National Spatial Data Infrastructure to be created and for a One-Map policy to be implemented. Besides, the collaboration between the government, private sector and academia becomes a necessity in order for success to be achieved.

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