

Varanasi Pilots AI-Powered Crowd Management Solutions to Handle Crowding

VARANASI, India (January 29, 2026) The Municipal Corporation of Varanasi unveiled five pilot technologies to manage crowding in the old city of Kashi. Developed under the Sustainable Cities Challenge, by Toyota Mobility Foundation (TMF) in collaboration with the City of Varanasi, World Resources Institute (WRI) and Challenge Works, the innovations use data-driven technology, urban design solutions and intuitive wayfinding to improve safety, accessibility and navigability.

The narrow lanes and *ghats*—where millions visit annually with footfall surging during major festivals—challenge traditional crowd management approaches and are particularly focused on improving the movement of elderly pilgrims, women, children, and people with mobility challenges.

The solutions, developed by VOGIC AI, CITYDATA.ai, Arcadis, The Urbanizer and Prameya Consulting Private Limited, introduce tools for earlier visibility, intuitive navigation and coordinated response across civic agencies to prevent bottlenecks and meaningfully alter crowd behaviour.

The Sustainable Cities Challenge innovator offerings include:

- VOGIC AI (BehtarWay): Audio-visual guidance systems deployed at key choke points to reduce confusion and bottlenecks in narrow lanes.
- CITYDATA.ai (CityFlow): Big data and AI for predictive crowd density analysis and amenity simulations via a city-wide mobility digital twin.
- The Urbanizer (Jan Jatra): Colour-coded wayfinding signage for non-smartphone users, including elderly pilgrims.
- Prameya Consulting (NayiChaal): Phygital (physical + digital) urbanism and predictive crowd management informed by continuous on-ground citizen sensing.
- Arcadis (Sankalp): Real-time decision-support platform linking temple, traffic and emergency systems.

Shri Himanshu Nagpal, IAS, Municipal Commissioner/Chief Executive Officer, Varanasi Municipal Corporation/Varanasi Smart City, said, “Kashi experiences extraordinary footfall due to its heritage and spiritual significance. We are working to ensure that movement across the city becomes safer, more predictable and more dignified for all. The solutions demonstrated through the Sustainable Cities Challenge help us imagine what future crowd management in Varanasi could look like.”

Susumu Matsuda, Deputy Chairman of the Board, Toyota Mobility Foundation, said, “Varanasi is demonstrating how innovation and city leadership can work together to address

complex challenges in dense heritage cities. The check-point meeting allows innovators to test their ideas in real environments and enables the city to imagine what scaled deployment could look like in the coming years. As TMF we are always looking for technologically advanced and human-centric solutions that improve the quality of life of the residents and visitors to Varanasi.”

Pawan Mulukutla, Executive Program Director- Integrated Transport, Clean Air and Hydrogen, noted “Heritage cities like Varanasi need integrated infrastructure and technological solutions that support millions of pilgrims without altering the character of ancient streets. These pilots show how data and design can work in harmony with tradition to improve the pilgrim experience and manage crowding.”

Kathy Nothstine, Director of Cities and Societies at Challenge Works added, “Varanasi is an incredibly unique place to work, and movement patterns in this city are changing every day, week, year. The mid-point review is a chance to give actionable feedback and spot opportunities to sense-check the innovators’ progress and create points of integration. As the innovators sprint to the finish, the judges look forward to working with the Municipal Corporation to evaluate which solutions have the most real-world viability in the complex context of Varanasi.”

About the Sustainable Cities Challenge

The Sustainable City Challenge is a two-stage, three-year \$9 million global opportunity for cities and innovators. The Sustainable Cities Challenge will be delivered over two stages:

- Stage 1: Call to cities**

The Challenge sought cities who wish to host City Challenges in 2024 – 2025. In November 2023, ten shortlisted cities received a range of capacity-building support to help them understand the issue they want to solve and attract innovators to provide solutions. This included participation in a capacity-building academy in Dallas, Texas, from November 13–15, 2023. By May 2024, three cities were selected to host City Challenges to find solutions for local mobility challenges: Detroit (USA), Varanasi (India), and Venice (Italy).

- Stage 2: Call to Innovators via 3 City Challenges**

Working with the host cities, the Sustainable Cities Challenge team supported by designing local City Challenges, which launched between May and June 2024. Each City Challenge offers up to \$3 million in implementation funding to innovators. Host

Cities held open calls for entries from innovators via their City Challenge with the support of the Sustainable Cities Challenge team. Together, they selected their finalists to test their solutions in 2024–2025. In 2026, final implementation funding will be given to winners in each host city to continue to implement and grow their solutions.

Timeline of the TMF Sustainable Cities Challenge

- [Detroit Challenge: Transforming Freight](#)
- [Varanasi Challenge: Innovating Crowd Flow](#)
- [Venice Challenge: Embracing Sustainable Mobility](#)

About Toyota Mobility Foundation

Toyota Mobility Foundation (Chair Akio Toyoda) was established in August 2014 by Toyota Motor Corporation (Toyota) to support the development of a more mobile society in which everyone can move freely. The Foundation underscores Toyota's ongoing commitment to continuous improvement and respect for people. It utilizes Toyota's expertise and technologies to support strong mobility systems while eliminating disparities in mobility. TMF works in partnership with universities, governments, non-profits, research institutions and other organizations, creating programs that are aligned with the UN Sustainable Development Goals (SDGs) to address mobility issues around the world.

"TMF aims to create a truly mobile society that will help people live better lives no matter where they are," said Chair Akio Toyoda.

About Challenge Works

For a decade, Challenge Works has established itself as a global leader in designing and delivering high-impact challenges to incentivize cutting-edge innovation for social good. Challenge Works is a social enterprise founded by the UK's innovation agency Nesta. Over the past decade, Challenge Works has worked on 101 challenge prizes, engaging more than 16,000 innovators and unlocking over £310 million in funding to tackle some of the world's biggest challenges. Challenge Works believe no challenge is unsolvable, partnering with non-profits, governments, and other organizations around the globe to unearth entrepreneurs and their innovations that can solve the greatest challenges of our time. Find out more at <https://challengetheworks.org/>

About World Resources Institute

World Resources Institute (WRI) works to improve people's lives, protect and restore nature and stabilize the climate. As an independent research organization, we leverage our data,

expertise and global reach to influence policy and catalyze change across systems like food, land and water; energy; and cities. Our 2,000+ staff work on the ground in more than a dozen focus countries and with partners in over 50 nations. Learn more: WRI.org and on Twitter @WorldResources.